SUPPLEMENTAL SOIL AND GROUNDWATER INVESTIGATION
2801 MacARTHUR BOULEVARD
OAKLAND, CALIFORNIA
SCI 838.001

Jul 14, 93

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I INTRODUCTION

This report presents the results of a supplemental soil and groundwater investigation conducted by Subsurface Consultants, Inc. (SCI) at 2801 MacArthur Boulevard in Oakland, California. The investigation was required by the Alameda County Department of Environmental Health (ACDEH) to further evaluate impacts to soil and groundwater quality due to hydrocarbon releases from previous underground fuel storage tanks. The site location is shown on the Site Plan, Plate 1.

The site was previously occupied by a gasoline service station. In May 1989, three underground gasoline storage tanks were removed from the site and approximately 435 cubic yards of petroleum contaminated soil was excavated. Subsequent soil and groundwater investigations indicated that impacts from former tank releases remain on-site. The ACDEH has requested further definition of the extent of soil and groundwater contamination. The scope of our services were as outlined in a Work Plan by Streamborn, dated January 31, 1992 and approved by ACDEH on February 3, 1993. In brief, our services included the following tasks:

1. Obtaining a drilling permit, from the Alameda County Flood Control and Water Conservation District, Zone 7,
2. Performing a utility check to clear drilling locations,
3. Drilling 3 test borings approximately 45 feet deep,

4. Constructing a groundwater monitoring well in two of the test borings,

5. Developing, purging and sampling the wells in accordance with Regional Water Quality Control Board guidelines,

6. Performing analytical tests on selected soil and groundwater samples,

7. Performing a level survey of the top of well casings, and

8. Preparing a written report recording the results of the investigation.

II FIELD INVESTIGATION

Subsurface conditions were investigated by SCI on April 27 and 28, 1993 by drilling and sampling three test borings (B-12, M-3, M-4) about 45 feet deep. Two of the borings (M-3 and M-4) were completed as monitoring wells. Boring and well locations are shown on the Site Plan. For completeness, the location of test borings and wells installed previously by other consultants are also shown on Plate 1. A discussion of procedures followed during drilling, soil sampling, monitoring well installation, well development and sampling is provided below.

A. Test Borings

Prior to drilling the test borings, SCI obtained a groundwater protection ordinance permit from the Alameda County Flood Control and Water Conservation District, Zone 7. The project permit number is 93200. A copy of the permit is included in Appendix A. Additionally, underground service alert was notified and performed an underground utility check to clear drilling locations.

The test borings were drilled using a truck-mounted drill rig equipped with 8-inch-diameter hollow stem augers. Our field engineer observed drilling operations, prepared detailed logs of the test borings and obtained undisturbed samples of the materials encountered. Test boring logs are presented in Appendix A on Plates A1 through A3. Soils are classified in accordance with the Unified Soil Classification System described on Plate A4.

A California Drive Sampler (outside diameter: 2.5 inches, inside diameter: 2.0 inches), Modified California Drive Sampler (outside diameter: 3.0 inches, inside diameter: 2.5 inches), and Standard Penetration Test Sampler (outside diameter: 2 inches, inside diameter: 1.4 inches) were used to obtain soil samples. The number of blows required to drive the sampler the final 12 inches of each 18-inch penetration was recorded and are presented on the boring logs. The drilling and sampling equipment was thoroughly steam-cleaned prior to each use to reduce the likelihood of cross-contamination between samples and/or borings.

Soil samples were retained in brass liners. Teflon sheeting was placed over the ends of the soil liners; the liners were subsequently capped and sealed with duct tape. The shoe sample from each drive was retained in a plastic bag and screened in the laboratory at the end of the day for volatile organics using an Organic Vapor Meter (OVM). The bag samples were screened with the OVM at room temperature. OVM measurements are recorded on the test boring logs. The sealed liners were placed in ice-filled coolers

and remained iced until delivery to the analytical laboratory. Chain-of-Custody records accompanied the samples to the laboratory.

Two of the test borings were completed as groundwater monitoring wells (M-3 and M-4), as detailed in the following section. The third boring (B-12) was backfilled with cement-bentonite grout upon completion of drilling.

Soil cuttings generated during drilling were placed in sealed, 55-gallon steel drums and left on-site for later disposal.

B. Groundwater Monitoring Wells and Sampling

At the completion of drilling, monitoring wells were installed in Borings M-3 and M-4. Well schematics are shown on the respective test boring logs. The wells consist of 2 inch diameter, Schedule 40 PVC pipe having flush-threaded joints. The pipe was steam-cleaned prior to being placed in the boreholes. The lower 15 feet of the wells consist of machine-slotted well screen having 0.02-inch slots. The remaining portion of the wells consist of blank pipe. The wells were provided with bottom caps and locking top caps. The well screen is encased in a filter composed of Lonestar No. 3 washed sand. The suitability of this sand filter material was evaluated in the field based upon the soil conditions encountered. It was considered a suitable selection for the given conditions. The filter sand was placed by carefully pouring it through the annulus between the hollow stem of the auger and the well casing. Periodically, the augers were raised to allow the sand to fill the annulus between the casing and borehole. The filter extends from just below the bottom of the well to two feet

above the top of the screened section. A two-foot thick bentonite pellet seal was placed above the sand filter. The annulus above the bentonite seal was backfilled with cement grout. The monitoring wells were completed below grade and are protected by traffic-rated valve boxes.

The wells were developed approximately 1 week after the grout seal was placed in order to allow for proper set up of the seal and stabilization of groundwater levels. Initially, the depth to water was measured below the top of the well casings using an electronic sounder. The wells were then developed by initially surging the well, and then removing water with a hand bailer. The wells were surged by rapidly raising and lowering the bailer. Temperature, conductivity and pH were measured every 1 to 2 gallons during development. The measurements were recorded on Well Development Logs. Development was terminated in Well M-3 after approximately 7 well volumes had been removed and temperature, conductivity and pH measurements had stabilized. Well M-4 was bailed dry after 7 well volumes were removed; the rate of recharge in this well was very slow.

As discussed previously, Well M-4 recharged very slowly. The wells were not sampled until approximately 10 days after development, in order to allow Well M-4 to recharge sufficiently. During this 10 day period, groundwater levels were periodically checked. Prior to sampling, two existing wells (P-2, M-2) and the two new wells (M-3, M-4) were purged of about 3 to 4 well casing volumes of water and allowed to recharge. Wells M-2 and M-3

recharged comparatively fast and were sampled after recovering to approximately 80 percent of the original well level. Wells P-2 and M-4 recharged more slowly. They were bailed dry and allowed to recharge for 4 hours. At this point, the wells had recovered to about 50 percent of their original level. The wells were purged dry again, allowed to recharge, and were sampled. Well development and purge water was placed in 55 gallon drums and stored on-site. Well development and sampling forms are presented in Appendix A.

Groundwater samples were retained in pre-cleaned containers supplied by the laboratory. Water samples were placed in ice-filled coolers and remained iced until delivery to the analytical laboratory. Chain-of-Custody records accompanied the samples to the laboratory.

C. Level Survey

A level survey was performed to determine the elevation of the top of the well casings. The elevations were referenced to the same datum used during previous investigations. The top of the concrete at the west corner of the northernmost dispenser island was used as the benchmark. It was assigned an elevation of 1000.00 feet. The top of casing elevations are presented in Table 1.

III ANALYTICAL TESTING

Selected soil and groundwater samples were analyzed by Curtis & Tompkins, Ltd., a laboratory certified by the California Department of Health Services (DHS) for hazardous waste and water testing. The samples were analyzed for the following:

1. Total petroleum hydrocarbons, as gasoline (TPH-gas)[1], EPA 5030/8015 modified, and
2. Benzene, toluene, xylene, and ethylbenzene (BTXE), EPA 5030/8020.

The results of the soil analyses are presented in Table 2 and on Plate 2. Results of groundwater analyses are presented in Table 3 and on Plate 3. For completeness, analytical results generated during previous investigations are also presented. Analytical test reports and Chain-of-Custody documents are presented in Appendix B.

IV SITE CONDITIONS

A. Surface Conditions

The site was previously occupied by a gasoline service station. The garage, canopy and former pump islands remain on-site. Currently, the garage is being used by an auto repair facility. The eastern portion of the property is occupied by a

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[1] Curtis and Tompkins, Ltd. lab reports refer to this quantity as total volatile hydrocarbons, as gasoline (TVH).

one-story shopping center occupied by several businesses, such as an ice cream parlor and TV repair shop. The remainder of the site is covered by asphalt concrete parking areas.

B. **Soil Conditions**

The test borings encountered alluvial soils consisting predominantly of interlayered dense clayey sands and stiff to very stiff sandy clays. The soils are generally fine grained and clayey; however, they do contain occasional gravel varying up to about 2 inches in diameter. Boring M-3 encountered a thin clayey gravel layer between depths of 27 and 29 feet. The soils encountered were judged to possess low hydraulic conductivities.

The occasional sandy and gravelly layers that were encountered in the borings drilled by SCI and other previous consultants do not appear to exist as continuous units in the area. Rather, they appear to exist as discontinuous zones or lenses within the stiff clayey soils. The sandy lenses likely have limited hydraulic connectivity, as evidenced by the widely varying recharge rates observed in the on-site wells.

C. **Groundwater Conditions**

Stabilized groundwater depths in the wells varied from about 23 (Well M-3) to 32.5 (Well M-4) feet. Stabilized groundwater elevation data from past and current events are presented in Table 1.

Based on the data, it is apparent that groundwater flows toward the south southeast at gradients varying from about 4 to 6 percent. This flow direction and gradient are generally consistent

with those recorded during previous sampling events. Groundwater surface contours on June 1, 1993 are presented on Plate 3. As discussed previously, it is probable that groundwater flow is largely controlled by the clayey, fine grained nature of the soils in the area.

V CONCLUSIONS AND RECOMMENDATIONS

A. Soil Contamination

The lateral and vertical extent of soil contamination has been relatively well defined by the investigations completed to date. Petroleum hydrocarbons, as gasoline, were not present at detectable concentrations in soil samples obtained from Borings B-12 and M-3. Analytical data from Boring M-4 revealed that soils containing up to 130 mg/kg of TPH-gas are present at that location. Chemical concentrations in Boring M-4 suggest that the southerly extent of soil contamination is close to that location. From a practical standpoint, it is our opinion that Well M-4 represents the southerly extent of soil contamination. The approximate extent of soils containing more than 100 mg/kg of TPH-gas is shown on Plate 2. The area measures approximately 90 by 150 feet in plan.

Over much of the site, the soils containing elevated levels of TPH-gas appear to exist within a relatively narrow zone between depths of approximately 30 and 35 feet. This zone is generally coincident with historical groundwater levels. An isolated area of shallower contamination was encountered in Boring B-9, which is

situated near the previous fuel dispenser islands. Elevated concentrations (490 mg/kg) of TPH-gas were detected at a depth of 16 feet in this boring.

B. **Groundwater Contamination**

The groundwater quality data generated by the most recent phase of study provides valuable information regarding the extent of chemicals in groundwater. The analytical data are graphically summarized on Plate 3. It is apparent that TPH-gas and BTXE are present in groundwater. The highest concentrations exist on-site, near the previous fuel tanks Well M-2, and at Well P-2. The elevated concentrations of TPH-gas in Well P-2 may be due to releases from pipelines that previously existed in the area or possibly, may represent contributions from an upgradient source of contamination. The chemicals in groundwater extend generally south of this area in the direction of groundwater flow. TPH-gas concentrations in groundwater decrease substantially in areas downgradient of the previous tanks and Well P-2, as evidenced by the substantially lower TPH-gas concentrations encountered in Well M-4. The data also suggests that there has been very little contaminant migration toward a more south easterly direction, since gasoline was not present in the groundwater sample obtained from Well M-3.

BTXE were present in the wells sampled, except for Well M-3. The BTXE concentrations in Well P-2 exceed the EPA maximum contaminant levels (MCL) for drinking water. However, in the other wells the toluene, xylene and ethylbenzene concentrations are below

the drinking water MCLs. Benzene concentrations exceed its MCL in all of the wells sampled, except Well M-3. Given the apparently low hydraulic conductivity of the formation, we judge that it is unlikely that groundwater in the area will be viewed as a potential source of drinking water.

C. **Recommendations**

We recommend that an evaluation of alternatives to remediate areas of significant soil contamination and to control potential future migration of contaminated groundwater be performed. Upon determination of a viable remediation option, a conceptual workplan should be prepared and submitted to the ACDEH for their review and approval prior to proceeding with a detailed design.

Based upon the data, we do not consider it necessary to conduct further investigations at this point. Quarterly groundwater monitoring will continue in accordance with the approved monitoring program.

Tables:

Table 1 Groundwater Elevation Data

Table 2 Hydrocarbon Concentrations in Soil

Table 3 Hydrocarbon Concentrations in Groundwater

List of Attached Plates:

Plate 1 Site Plan

Plate 2 Summary of Gasoline Concentrations in Soil

Plate 3 Hydrocarbon Concentrations in Groundwater

Appendix A:

Plates A1 through A3 Logs of Test Borings B-12, M-3, and M-4

Plate A4 Unified Soil Classification System
Well Permit
Well Development Forms
Well Sampling Forms

Appendix B: Analytical Test Reports
Chain-Of-Custody Documents

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TABLE 1
Groundwater Elevation Data

Well	TOC[1] Elevation	Date	Groundwater Depth (feet)	Groundwater Elevation (feet)
M1	1000.00	10/24/90	36.1	963.9
		10/25/90	36.1	963.9
		11/02/90[2]	36.4	963.6
		11/06/90	36.8	963.2
		11/16/90	36.8	963.2
		11/23/90	36.9	963.1
		11/28/90	37.0	963.0
		12/05/90	37.2	963.0
		03/18/91	35.8	964.2
		03/29/91	32.4	967.6
		04/03/91	31.9	968.1
		04/09/91	31.6	968.4
		04/16/91	31.2	968.8
		04/18/91	31.1	968.9
		04/30/91	31.1	968.9
		05/07/91	31.2	968.8
		01/23/92	35.5	964.5
		06/01/93	27.5	972.9
M2	999.6	04/30/91	31.1[3]	968.5[3]
		05/07/91	31.3[3]	968.3[3]
		01/16/92	35.1[3]	964.5[3]
		05/17/93	27.2[3]	972.4[3]
		06/01/93	27.6[3]	972.0[3]
M3	992.8	05/17/93	22.2	970.6
		06/01/93	23.3	969.5
M4	999.6	05/17/93	33.8	965.8
		06/01/93	32.5	967.1
P1	999.6	10/24/90	37.9	961.7
		10/25/90	38.0	961.6
		11/02/90[2]	38.4	961.2
		11/06/90	38.7	960.9
		11/16/90	38.3	961.3
		11/23/90	38.1	961.5
		11/28/90	38.3	961.3
		12/05/90	38.2	961.4
		03/18/91	37.8	961.8
		03/29/91	36.9	962.7
		04/03/91	36.8	962.8
		04/09/91	36.9	962.7
		04/16/91	36.7	962.9
		04/18/91	36.8	962.8
		04/30/91	36.3	963.3
		05/07/91	36.2	963.4
		01/16/92	36.6[3]	963.0[3]
		06/01/93	30.0[3]	969.6[3]

TABLE 1 Groundwater Elevation Data (continued)

Well	TOC[1] Elevation	Date	Groundwater Depth (feet)	Groundwater Elevation (feet)
P2	997.8	10/24/90	41.1	956.7
		10/25/90	40.6	957.2
		11/02/90[2]	38.4	959.4
		11/06/90	37.0	960.8
		11/16/90	37.4	960.4
		11/23/90	35.9	961.9
		11/28/90	35.4[3]	962.4[3]
		12/05/90	35.0[3]	962.8[3]
		03/18/91	31.4[3]	966.4[3]
		03/29/91	28.2[3]	969.6[3]
		04/03/91	26.8[3]	971.0[3]
		04/09/91	26.5[3]	971.3[3]
		04/16/91	26.5[3]	971.3[3]
		04/18/91	26.5[3]	971.3[3]
		04/30/91	26.7[3]	971.1[3]
		05/07/91	27.0[3]	970.8[3]
		01/16/92	33.7[3]	964.1[3]
		05/17/93	23.7[3]	974.1[3]
		06/01/93	24.4[3]	973.4[3]
P3	999.1	03/29/91	24.7	974.4
		04/03/91	25.1	974.0
		04/09/91	25.9	973.2
		04/16/91	26.2	972.9
		04/18/91	26.2	972.9
		04/30/91	26.8	972.3
		05/07/91	27.4	971.7
		01/23/92	32.5	966.6
		06/01/93	23.9	975.2

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1 Elevations relative to site-specific datum. Temporary Bench Mark No. 1, top of concrete at west corner of northernmost pump island. Assumed elevation = 1,000.00 feet.

2 An interface probe was used to discern whether free product was present - free product was not detected with the probe.

3 A petroleum odor and/or coating was observed on the water level probe.

Table 2
Hydrocarbon Concentrations in Soil

Sample Location	Sample Depth[2] (feet)	Sample Date	Sampler	TPH-Gasoline (mg/kg)[1]	Benzene (mg/kg)	Toluene (mg/kg)	Ethyl-Benzene (mg/kg)	Xylenes (mg/kg)	Oil & Grease (mg/kg)
B1	20.0	06/12/89	Riedel[3]	<1.0	<0.05	<0.1	<0.1	<0.1	--
B1	25.0	06/12/89	Riedel	<1.0	<0.05	<0.1	<0.1	<0.1	--
B1	30.0	06/12/89	Riedel	<1.0	<0.05	<0.1	<0.1	<0.1	--
B2	5.0	07/13/89	Riedel	<1.0	<0.05	<0.1	<0.1	<0.1	--
B2	10.0	07/13/89	Riedel	<1.0	<0.05	<0.1	<0.1	<0.1	--
B2	15.0	07/13/89	Riedel	<1.0	<0.05	<0.1	<0.1	<0.1	--
B2	20.0	07/14/89	Riedel	<1.0	<0.05	<0.1	<0.1	<0.1	--
B2	25.0	07/14/89	Riedel	<1.0	<0.05	<0.1	<0.1	<0.1	--
B2	30.0	07/14/89	Riedel	<1.0	<0.05	<0.1	<0.1	<0.1	--
B2	35.0	07/14/89	Riedel	<1.0	<0.05	<0.1	<0.1	<0.1	--
B3	5.0	07/13/89	Riedel	<1.0	<0.05	<0.1	<0.1	<0.1	--
B3	10.0	07/13/89	Riedel	<1.0	<0.05	<0.1	<0.1	<0.1	--
B3	15.0	07/13/89	Riedel	<1.0	<0.05	<0.1	<0.1	<0.1	--
B3	20.0	07/14/89	Riedel	<1.0	<0.05	<0.1	<0.1	<0.1	--
B3	25.0	07/14/89	Riedel	<1.0	<0.05	<0.1	<0.1	<0.1	--
B3	30.0	07/14/89	Riedel	<1.0	<0.05	<0.1	<0.1	<0.1	--
B3	35.0	07/14/89	Riedel	72	<0.05	<0.1	<0.1	<0.1	--
B3	38.0	07/14/89	Riedel	<1.0	<0.05	<0.1	<0.1	<0.1	--
B3	39.5	07/13/89	Riedel	<1.0	<0.05	<0.1	<0.1	<0.1	--
B3	41.0	07/13/89	Riedel	<1.0	<0.05	<0.1	<0.1	<0.1	--
B3	42.0	07/13/89	Riedel	<1.0	<0.05	<0.1	<0.1	<0.1	--
B4	5.0	07/14/89	Riedel	<1.0	<0.05	<0.1	<0.1	<0.1	--
B4	10.0	07/14/89	Riedel	<1.0	<0.05	<0.1	<0.1	<0.1	--
B4	15.0	07/14/89	Riedel	<1.0	<0.05	<0.1	<0.1	<0.1	--
B4	20.0	07/14/89	Riedel	<1.0	<0.05	<0.1	<0.1	<0.1	--
B4	25.0	07/14/89	Riedel	<1.0	<0.05	<0.1	<0.1	<0.1	--
B4	30.0	07/14/89	Riedel	150	<0.25	<0.5	<0.5	<0.5	--
B4	35.0	07/14/89	Riedel	5300	<5.0	<10.0	<10.0	<10.0	--
B4	36.5	07/14/89	Riedel	7.9	<0.05	<0.1	<0.1	<0.1	--
B4	38.0	07/14/89	Riedel	<1.0	<0.05	<0.1	<0.1	<0.1	--
B4	39.0	07/14/89	Riedel	71	<0.25	<0.5	<0.5	<0.5	--
B4	40.5	07/14/89	Riedel	15	<0.05	<0.1	<0.1	<0.1	--
B5	20.0	08/24/89	Riedel	<10	<0.025	<0.025	<0.075	<0.075	--
B5	25.0	08/24/89	Riedel	<10	<0.025	<0.025	<0.075	<0.075	--
B5	30.0	08/24/89	Riedel	<10	<0.025	<0.025	<0.075	<0.075	--
B5	35.0	08/24/89	Riedel	<10	<0.025	<0.025	<0.075	<0.075	--
B5	40.0	08/24/89	Riedel	<10	<0.025	<0.025	<0.075	<0.075	--
B5	45.0	08/24/89	Riedel	<10	<0.025	<0.025	<0.075	<0.075	--
B6	20.0	08/24/89	Riedel	<10	<0.025	<0.025	<0.075	<0.075	--
B6	25.0	08/24/89	Riedel	<10	<0.025	<0.025	<0.075	<0.075	--
B6	30.0	08/24/89	Riedel	<10	<0.025	<0.025	<0.075	<0.075	--
B6	35.0	08/24/89	Riedel	<10	<0.025	<0.025	<0.075	<0.075	--
B6	40.0	08/24/89	Riedel	<10	<0.025	<0.025	<0.075	<0.075	--

Table 2
Hydrocarbon Concentrations in Soil
(Continued)

Sample Location	Sample Depth[2] (feet)	Sample Date	Sampler	TPH-Gasoline (mg/kg)[1]	Benzene (mg/kg)	Toluene (mg/kg)	Ethyl-Benzene (mg/kg)	Xylenes (mg/kg)	Oil & Grease (mg/kg)
B7	15.0	08/24/89	Riedel	<10	<0.025	<0.025	<0.075	<0.075	--
B7	20.0	08/25/89	Riedel	<10	<0.025	<0.025	<0.075	<0.075	--
B7	25.0	08/25/89	Riedel	<10	<0.025	<0.025	<0.075	<0.075	--
B7	30.0	08/25/89	Riedel	<10	**0.130**	<0.025	<0.075	<0.075	--
B7	33.0	08/25/89	Riedel	**380**	<0.025	**3.00**	**1.00**	**3.50**	--
B7	36.0	08/25/89	Riedel	**65**	<0.025	**0.120**	**0.190**	**0.440**	--
B7	41.0	08/25/89	Riedel	<10	<0.025	<0.025	<0.075	<0.075	--
B7	45.5	08/25/89	Riedel	<10	<0.025	<0.025	<0.075	<0.075	--
B7	51.0	08/28/89	Riedel	<10	<0.025	<0.025	<0.075	<0.075	--
B8	15.0	08/28/89	Riedel	<10	<0.025	**0.097**	<0.075	<0.075	--
B8	20.0	08/28/89	Riedel	**21**	<0.025	**0.190**	**0.360**	**0.630**	--
B8	25.0	08/28/89	Riedel	<10	<0.025	**0.050**	<0.075	<0.075	--
B8	30.0	08/30/89	Riedel	<10	<0.025	<0.025	<0.075	<0.075	--
B8	35.5	08/30/89	Riedel	<10	<0.025	**0.130**	**0.150**	**0.260**	--
B8	40.5	08/30/89	Riedel	<10	<0.025	**0.056**	<0.075	<0.075	--
B8	45.0	08/30/89	Riedel	<10	<0.025	<0.025	<0.075	<0.075	--
B8	50.0	08/30/89	Riedel	<10	<0.025	**0.2220**	<0.075	<0.075	--
B9	6.5	08/30/89	Riedel	**20**	**0.026**	**0.046**	<0.075	**0.200**	--
B9	9.5	08/30/89	Riedel	<10	<0.025	<0.025	<0.075	<0.075	--
B9	16.5	08/30/89	Riedel	**490**	**0.700**	**0.610**	**2.000**	**15.000**	--
B9	21.0	08/30/89	Riedel	**1500**	**4.1**	**3.4**	**14.0**	**62.0**	--
B9	26.5	08/30/89	Riedel	**1100**	**3.0**	**28.0**	**13.0**	**68.0**	--
B9	31.5	08/30/89	Riedel	**79**	**0.350**	**0.800**	**0.610**	**2.0**	--
B9	35.0	08/30/89	Riedel	<10	**0.390**	**0.130**	<0.075	**0.200**	--
B9	40.5	08/30/89	Riedel	<10	<0.025	**0.043**	<0.075	<0.075	--
B9	45.5	08/30/89	Riedel	<10	<0.025	**0.066**	<0.075	<0.075	--
B9	51.0	08/30/89	Riedel	<10	**0.310**	**0.046**	<0.075	<0.075	--
B10	15.5	10/18/90	Stream[4]	<2.5	<0.005	<0.005	<0.005	<0.075	<10
B10	21	10/18/90	Stream	<2.5	<0.005	<0.005	<0.005	<0.005	<10
B10	30.5	10/18/90	Stream	<2.5	<0.005	<0.005	<0.005	<0.005	<10
B10	45.5	10/18/90	Stream	<2.5	<0.005	<0.005	<0.005	<0.005	<10
B11	21	10/18/90	Stream	<2.5	<0.005	<0.005	<0.005	<0.005	<10
B11	31	10/18/90	Stream	230	**0.15**	**0.47**	**0.88**	**1.60**	<10
B11	36	10/18/90	Stream	<2.5	<0.005	<0.005	<0.005	<0.005	<10
B11	46	10/18/90	Stream	<2.5	<0.005	<0.005	<0.005	<0.005	<10
B12	28	04/28/93	SCI[5]	<1	<0.005	<0.005	<0.005	<0.005	--
B12	30	04/28/93	SCI	<1	<0.005	<0.005	<0.005	<0.005	--
B12	34.5	04/28/93	SCI	<1	<0.005	<0.005	<0.005	<0.005	--
P1	25.5	10/19/90	Stream	<2.5	<0.005	<0.005	<0.005	<0.005	--
P1	35	10/19/90	Stream	**7.4**	**0.011**	<0.005	<0.005	<0.005	--
P1	40.5	10/19/90	Stream	<2.5	<0.005	<0.005	<0.005	<0.005	--
P1	49.7	10/19/90	Stream	<2.5	<0.005	<0.005	<0.005	<0.005	--

Table 2
Hydrocarbon Concentrations in Soil
(Continued)

Sample Location	Sample Depth[2] (feet)	Sample Date	Sampler	TPH-Gasoline (mg/kg)[1]	Benzene (mg/kg)	Toluene (mg/kg)	Ethyl-Benzene (mg/kg)	Xylenes (mg/kg)	Oil & Grease (mg/kg)
P2	20.5	10/19/90	Stream	<2.5	<0.005	<0.005	<0.005	<0.005	<10
P2	30	10/19/90	Stream	20	0.018	<0.005	<0.005	0.013	<10
P2	35.5	10/19/90	Stream	95	0.21	0.20	14	0.33	<10
P2	55.5	10/19/90	Stream	<2.5	<0.005	<0.005	<0.005	<0.005	<10
P3	35.5	03/18/91	Stream	990	5.8	24	11	20	--
P3	40.5	03/18/91	Stream	<1	<0.005	<0.005	<0.005	<0.005	--
M1	20.5	10/20/90	Stream	<2.5	<0.005	<0.005	<0.005	<0.005	<10
M1	25.5	10/20/90	Stream	<2.5	<0.005	<0.005	<0.005	<0.005	<10
M1	35.5	10/20/90	Stream	82	<0.005	0.019	0.028	0.026	<10
M1	45.5	10/20/90	Stream	<2.5	<0.005	<0.005	<0.005	<0.005	<10
M2	26	04/18/91	Stream	1.3	0.32	<0.005	0.04	0.036	--
M2	31	04/18/91	Stream	490	<0.005	0.41	3.4	7.5	--
M2	36	04/18/91	Stream	33	<0.005	0.072	0.099	0.094	--
M2	41	04/18/91	Stream	25	0.17	0.079	0.13	0.12	--
M2	46	04/18/91	Stream	<1	<0.005	<0.005	<0.005	<0.005	--
M3	22	04/28/93	SCI	<1	<0.005	<0.005	<0.005	<0.005	--
M3	27	04/28/93	SCI	<1	<0.005	<0.005	<0.005	<0.005	--
M3	30.5	04/28/93	SCI	<1	<0.005	<0.005	<0.005	<0.005	--
M4	31	04/27/93	SCI	<1	<0.005	<0.005	<0.005	<0.005	--
M4	33	04/27/93	SCI	130	0.43	0.49	2.0	4.5	--
M4	36	04/27/93	SCI	120	0.54	0.90	1.1	4.4	--
M4	39	04/27/93	SCI	<1	<0.005	<0.005	<0.005	<0.005	--

---

[1] mg/kg = milligrams per kilogram
[2] Top of sample depth
[3] Riedel = Riedel Environmental Services, Inc.
[4] Stream = Streamborn
[5] SCI = Subsurface Consultants, Inc.

Table 3
Hydrocarbon Concentrations in Groundwater

Sample Location	Sample Date	TPH[1]	Benzene	Toluene	Ethyl-benzene	Xylenes
P2	11/06/90	33000[2]	4700	2100	380	630
	01/16/92	99000	6500	12000	2000	16000
	03/09/93	70000	5900	11000	2100	12000
	05/17/93	87000	6600	13000	2200	13000
M2	05/07/91	16000	1300	950	170	890
	01/16/92	22000	960	570	370	1800
	03/09/93	27000	1100	970	490	1400
	05/17/93	17000	1200	770	480	1300
M3	05/17/93	<50	<0.5	<0.5	<0.5	<0.5
M4	05/17/93	7500	1200	230	11	350
P1	01/16/92	6700	500	4.4	80	40
	03/09/93	5600	1100	29	63	120

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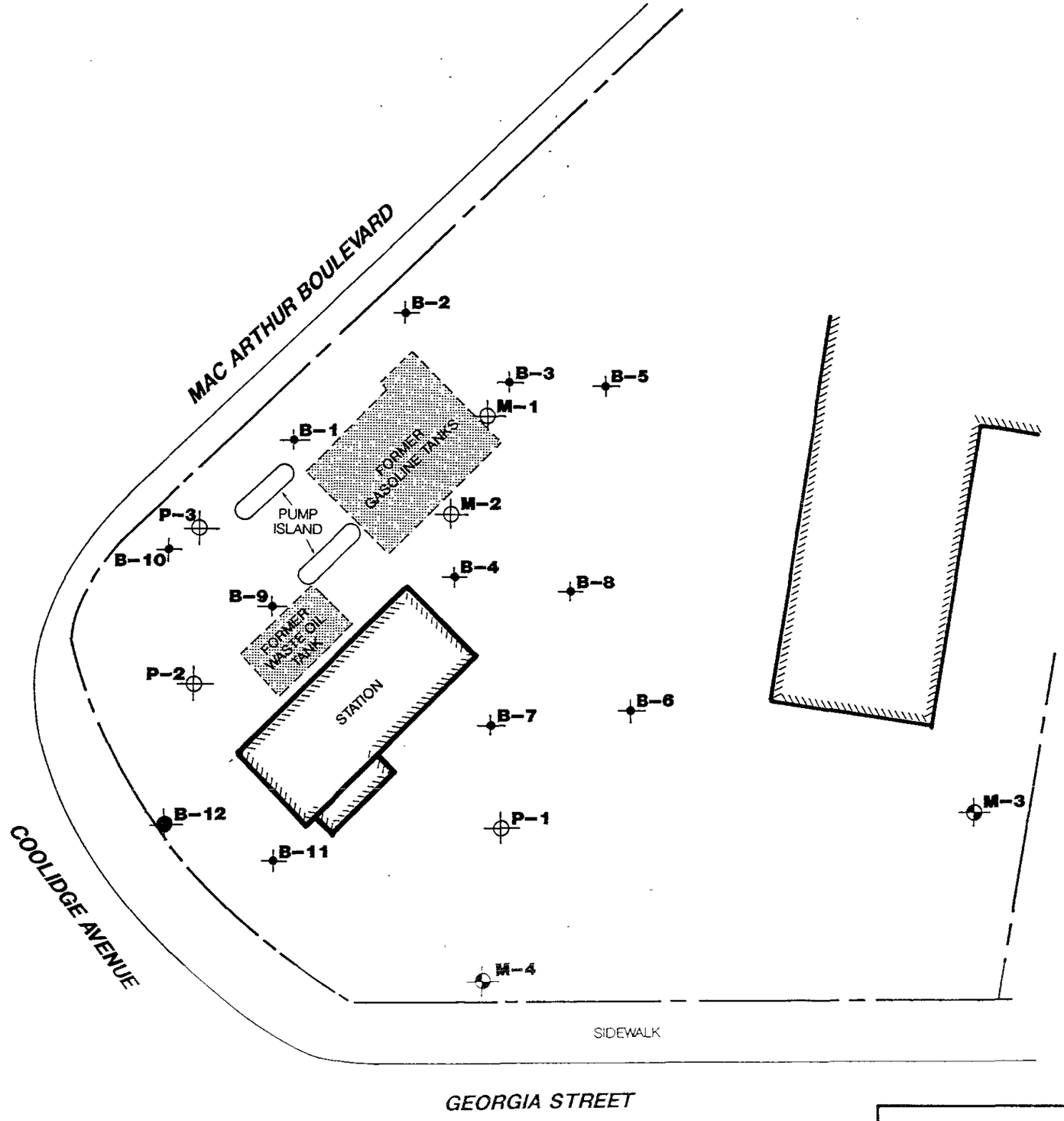
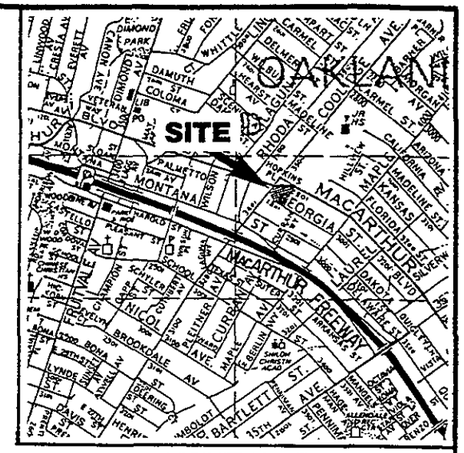
[1] TPH = Total petroleum hydrocarbons, as gasoline
[2] All concentrations are reported in micrograms per liter (ug/l)





VICINITY MAP

- TEST BORING BY SCI
- MONITORING WELL BY SCI
- TEST BORING BY OTHERS
- MONITORING WELL BY OTHERS
- FORMER EXCAVATION
- PROPERTY BOUNDARY
- EXISTING BUILDING

APPROXIMATE SCALE (feet)

0 30 60

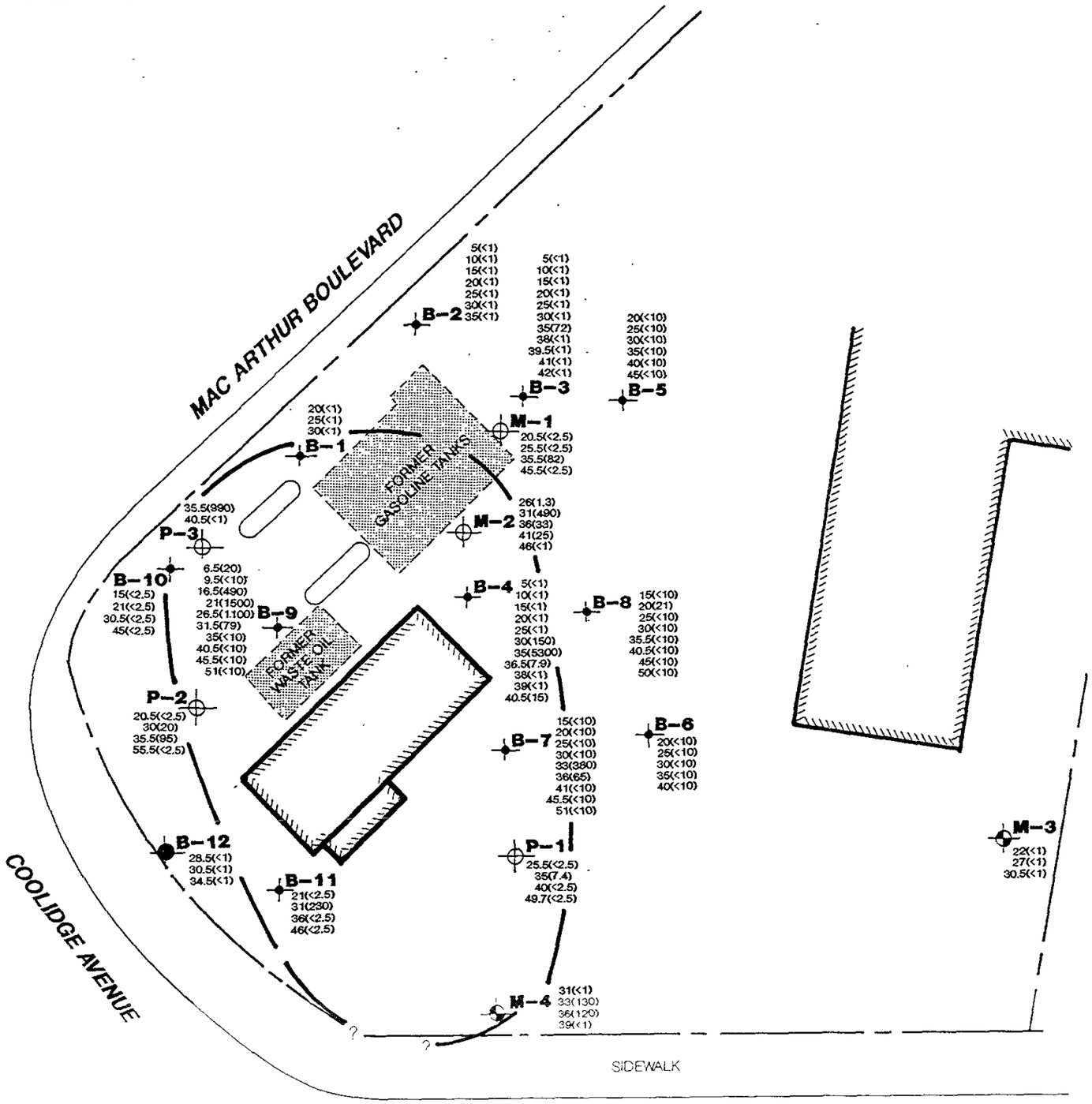
SITE PLAN

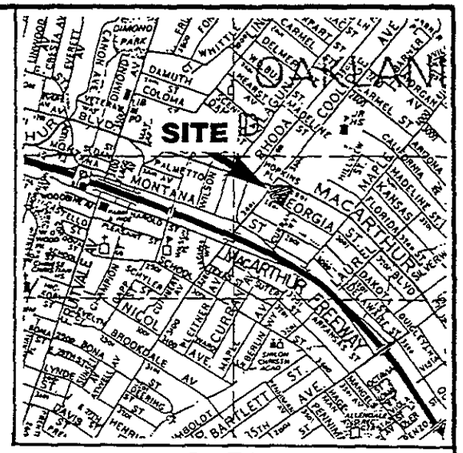
Subsurface Consultants

2801 MAC ARTHUR BLVD - OAKLAND, CA

JOB NUMBER	DATE	APPROVED
838.001	5/3/93	

PLATE 1





VICINITY MAP

- APPROXIMATE LIMITS OF SOIL CONTAINING MORE THAN 100 mg/kg OF GASOLINE
- TEST BORING BY SCI
- MONITORING WELL BY SCI
- TEST BORING BY OTHERS
- MONITORING WELL BY OTHERS
- FORMER EXCAVATION
- PROPERTY BOUNDARY
- EXISTING BUILDING
- 30(150) — GASOLINE CONCENTRATION (mg/kg); SAMPLE DEPTH (feet)

APPROXIMATE SCALE (feet)

0 30 60

SUMMARY OF GASOLINE CONCENTRATIONS IN SOIL

Subsurface Consultants

2801 MacARTHUR BLVD – OAKLAND, CA

JOB NUMBER	DATE	APPROVED
838:001	6/7/93	

PLATE 2

MAC ARTHUR BOULEVARD

Date	TPH	B	T	E	X
5/17/93	87,000	6,600	13,000	2,200	13,000
3/9/93	70,000	5,900	11,000	2,100	12,000
1/16/92	99,000	6,500	12,000	2,000	16,000
11/6/90	33,000	4,700	2,100	380	630

M-1
972.6

FORMER GASOLINE TANKS

M-2
972.0

Date	TPH	B	T	E	X
5/17/93	17,000	1,200	770	480	1,300
3/9/93	27,000	1,100	970	490	1,400
1/16/92	22,000	960	570	370	1,800
5/7/91	16,000	1,300	950	170	890

P-3
975.2

976'

FORMER WASTE OIL TANK

P-2
973.4

975'

974'

973'

972'

971'

970

969

968

P-1
969.6

Date	TPH	B	T	E	X
3/9/93	5,600	1,100	29	63	120
1/16/92	6,700	500	4.4	80	40

M-3
969.5

Date	TPH	B	T	E	X
5/17/93	<50	<0.5	<0.5	<0.5	<0.5

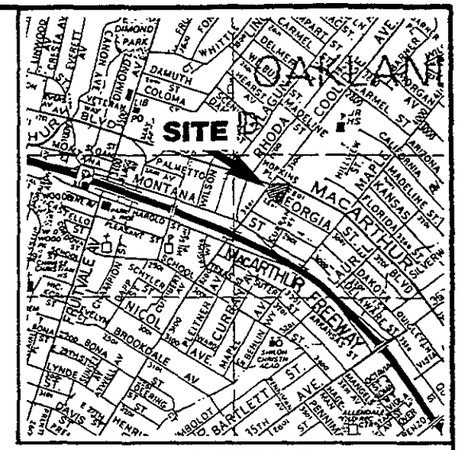
M-4
967.1

Date	TPH	B	T	E	X
5-17/93	7,500	1,200	230	11	350

SIDEWALK

COOLIDGE AVENUE

GEORGIA STREET



VICINITY MAP

972.6	GROUNDWATER ELEVATION 6/1/93
	MONITORING WELL BY SCI
	MONITORING WELL BY OTHERS
	FORMER EXCAVATION
	PROPERTY BOUNDARY
	EXISTING BUILDING
971'	GROUNDWATER LEVEL CONTOURS (feet) 6/1/93
TPH	TOTAL PETROLEUM HYDROCARBONS
B	BENZENE
T	TOLUENE
E	ETHYLBENZENE
X	XYLENES

ALL CONCENTRATIONS IN ug/l

N

APPROXIMATE SCALE (feet)

0 30 60

HYDROCARBON CONCENTRATIONS IN GROUNDWATER

Subsurface Consultants

2801 MacARTHUR BLVD – OAKLAND, CA

JOB NUMBER	DATE	APPROVED
838.001	6/7/93	

PLATE 3

LOG OF TEST BORING B-12

EQUIPMENT 8" Hollow Stem Auger
DATE DRILLED 4/28/93
ELEVATION 977 feet +

MOISTURE CONTENT %	DRY DENSITY (PCF)	OVM (ppm)	DEPTH (feet)	SAMPLE	BLOWS PER FOOT	
			0			ASPHALTIC CONCRETE - 3" thick ORANGE BROWN SANDY CLAY (CL) stiff, moist
		3	5		*35	
			10		*40	ORANGE BROWN CLAYEY SAND (SC) dense, moist
		0				ORANGE BROWN SILTY SANDY CLAY (CL) stiff, moist
		3	15		*27	
		77				
			20		*28	ORANGE BROWN CLAYEY SAND (SC) dense, moist, with occasional gravel to 1" in dia.
		3				
		0			*41	ORANGE BROWN SANDY CLAY (CL) very stiff, moist, occasional gravel to 1/2" in dia.
		0	25		*26	
		0				increase in silt content color change to light brown
		0			*47	
		0	30		*30	color change at 30 feet to orange brown
		0	▼			GROUNDWATER LEVEL 4/29/93 (not stabilized)
		0	35		*29	
			40		*39	MOTTLED BROWN AND ORANGE BROWN SANDY SILTY CLAY (CL) very stiff, moist
		0	45		*45	ORANGE BROWN CLAYEY SAND (SC) very dense, moist, with coarse sand
			50			
			55			
			60			
			65			
			70			
			75			
			80			

Boring backfilled with cement grout

SAMPLER TYPES:
- MODIFIED CALIFORNIA DRIVE
  - O.D.: 3.0 inches
  - I.D.: 2.5 inches
- *CALIFORNIA DRIVE
  - O.D.: 2.5 inches
  - I.D.: 2.0 inches
- **STANDARD PENETRATION TEST
  - O.D.: 2.0 inches
  - I.D.: 1.4 inches

HAMMER WEIGHT: 140 pounds
HAMMER DROP: 30 inches

+Reference Elevation: Top of concrete on western end of northern most pump island. Assumed elevation 1000.0 feet.

Subsurface Consultants

2801 MacARTHUR BLVD. - OAKLAND, CA

JOB NUMBER	DATE	APPROVED
838.001	5/3/93	

PLATE A-1

GENERAL SOIL CATEGORIES			SYMBOLS	TYPICAL SOIL TYPES
COARSE GRAINED SOILS More than half is larger than No. 200 seive	GRAVEL More than half coarse fraction is larger than No. 4 seive size	Clean Gravel with little or no fines	GW	Well Graded Gravel, Gravel-Sand Mixtures
			GP	Poorly Graded Gravel, Gravel-Sand Mixtures
		Gravel with more than 12% fines	GM	Silty Gravel, Poorly Graded Gravel-Sand-Silt Mixtures
			GC	Clayey Gravel, Poorly Graded Gravel-Sand-Clay Mixtures
	SAND More than half coarse fraction is smaller than No. 4 seive size	Clean Sand with little or no fines	SW	Well Graded Sand, Gravelly Sand
			SP	Poorly Graded Sand, Gravelly Sand
		Sand with more than 12% fines	SM	Silty Sand, Poorly Graded Sand-Silt Mixtures
			SC	Clayey Sand, Poorly Graded Sand-Clay Mixtures
FINE GRAINED SOILS More than half is smaller than No. 200 seive	SILT AND CLAY Liquid Limit Less than 50%		ML	Inorganic Silt and Very Fine Sand, Rock Flour, Silty or Clayey Fine Sand, or Clayey Silt with Slight Plasticity
			CL	Inorganic Clay of Low to Medium Plasticity, Gravelly Clay, Sandy Clay, Silty Clay, Lean Clay
			OL	Organic Clay and Organic Silty Clay of Low Plasticity
	SILT AND CLAY Liquid Limit Greater than 50%		MH	Inorganic Silt, Micaceous or Diatomaceous Fine Sandy or Silty Soils, Elastic Silt
			CH	Inorganic Clay of High Plasticity, Fat Clay
			OH	Organic Clay of Medium to High Plasticity, Organic Silt
HIGHLY ORGANIC SOILS			PT	Peat and Other Highly Organic Soils

UNIFIED SOIL CLASSIFICATION SYSTEM

Subsurface Consultants

2801 MacARTHUR BLVD. - OAKLAND, CA

JOB NUMBER	DATE	APPROVED
838.001	5/3/93	MW

PLATE **A-4**

ZONE 7 WATER AGENCY

5997 PARKSIDE DRIVE PLEASANTON, CALIFORNIA 94588 VOICE (510) 484-2600
FAX (510) 462-3914

DRILLING PERMIT APPLICATION

FOR APPLICANT TO COMPLETE

LOCATION OF PROJECT 2801 MacArthur Blvd
Oakland, CA

CLIENT
Name APA Fund, Ltd c/o Anika Molnar
Address 3419 Via Lido #621 Voice 714-675-1267
City Newport Beach, CA Zip 92663

APPLICANT
Name Subsurface Consultants, Inc Fax 510-268-0137
Address 171 12th St 5B 171 Voice 510-268-0461
City Oakland Zip 94607

TYPE OF PROJECT

Well Construction		Geotechnical Investigation	
Cathodic Protection	___	General	___
Water Supply	___	Contamination	✓
Monitoring	✓	Well Destruction	___

PROPOSED WATER SUPPLY WELL USE
Domestic ___ Industrial ___ Other ___
Municipal ___ Irrigation ___

DRILLING METHOD:
Mud Rotary ___ Air Rotary ___ Auger ✓
Cable ___ Other ___

DRILLER'S LICENSE NO. 384167

WELL PROJECTS
Drill Hole Diameter 8 in. Maximum
Casing Diameter 2 in. Depth 45 ft.
Surface Seal Depth 30 ft. Number 2

GEOTECHNICAL PROJECTS
Number of Borings 1 Maximum
Hole Diameter 8 in. Depth 45 ft.

ESTIMATED STARTING DATE 4/27/93
ESTIMATED COMPLETION DATE 4/28/93

I hereby agree to comply with all requirements of this permit and Alameda County Ordinance No. 73-68.

APPLICANT'S SIGNATURE Marianne Watada Date 4/21/93

FOR OFFICE USE

PERMIT NUMBER 93200
LOCATION NUMBER

PERMIT CONDITIONS

Circled Permit Requirements Apply

(A.) GENERAL
1. A permit application should be submitted so as to arrive at the Zone 7 office five days prior to proposed starting date.
2. Submit to Zone 7 within 60 days after completion of permitted work the original Department of Water Resources Water Well Drillers Report or equivalent for well Projects, or drilling logs and location sketch for geotechnical projects.
3. Permit is void if project not begun within 90 days of approval date.

(B.) WATER WELLS, INCLUDING PIEZOMETERS
1. Minimum surface seal thickness is two inches of cement grout placed by tremie.
2. Minimum seal depth is 50 feet for municipal and industrial wells or 20 feet for domestic and irrigation wells unless a lesser depth is specially approved. Minimum seal depth for monitoring wells is the maximum depth practicable or 20 feet.

(C.) GEOTECHNICAL. Backfill bore hole with compacted cuttings or heavy bentonite and upper two feet with compacted material. In areas of known or suspected contamination, tremied cement grout shall be used in place of compacted cuttings.

D. CATHODIC. Fill hole above anode zone with concrete placed by tremie.

E. WELL DESTRUCTION. See attached.

Approved Wyman Hong Date 22 Apr 93
Wyman Hong

91992

WELL DEVELOPMENT FORM

Project Name: 2801 MacArthur blvd Well Number: M3

Job No.: 838.001 Well Casing Diameter: 2 inches

Developed By: FV Date: 5/6/93

TOC Elevation: _____ Weather: clear

Depth to Casing Bottom (below TOC) 39.86' feet

Depth to Groundwater (below TOC) 21.84 (21.84 on 5/7/93) feet

Feet of Water in Well 18.02 feet

Casing Volume (feet of water x Casing DIA ^{2} x 0.0408) 2.94 gallons

Depth Measurement Method Tape & Paste / Electronic Sounder / Other

Development Method DISPOSIBLE BAILER

FIELD MEASUREMENTS

Gallons Removed	pH	Temp °F (~~°C~~)	Conductivity (micromhos/cm)	Salinity S%	Comments
1	7.44	67.1	2.22 X100		Clear
3	7.64	63.3	1.87 X 100		"
5	7.30	61.3	2.36 x 100		"
7	7.10	59.7	2.38 x100		Semi-clear
9	7.09	61.2	2.50 x100		"
11	6.98	59.3	2.34 x 100		"
13	6.93	60.8	2.06 x 100		murky
15	6.87	60.5	2.15 x 100		"
18	6.90	61.2	2.09 x 100		"
20	6.89	62.2	2.15 x 100		"

Total Gallons Removed 20 gallons

Depth to Groundwater After Development (below TOC) _____ feet

Subsurface Consultants	JOB NUMBER	DATE	APPROVED	PLATE

WELL DEVELOPMENT FORM

Project Name: 2801 Mac Arthur blvd
Well Number: MW

Job No.: 838.001
Well Casing Diameter: 2 inches

Developed By: FV
Date: 5/6/93

TOC Elevation: _____
Weather: clear

Depth to Casing Bottom (below TOC) 45.20 feet

Depth to Groundwater (below TOC) 36 (36.42 on 5/7/93) feet

Feet of Water in Well 8.78 feet

Casing Volume (feet of water x Casing DIA ^{2} x 0.0408) 1.43 gallons

Depth Measurement Method Tape & Paste / (Electronic Sounder) / Other

Development Method DISPOSIBLE BAILER

FIELD MEASUREMENTS

Gallons Removed	pH	Temp (°F)	Conductivity (micromhos/cm)	Salinity S%	Comments
1	6.47	65.3	4.24 x100		Clear-slight odor
2	6.43	66.6	4.06x100		"
3	6.46	65.8	4.19 x100		"
4	5.90	67.7	4.09 x100		"
5	5.75	64.6	4.79x100		"
7	6.66	63.6	5.65 x100		semi-murky
9	6.67	64.4	12.44x100		"
10	6.68	65.9	14.73x100		"
DRY					

Total Gallons Removed 10 gallons

Depth to Groundwater After Development (below TOC) _____ feet

Subsurface Consultants	JOB NUMBER	DATE	APPROVED	PLATE

WELL SAMPLING FORM

Project Name: 2801 MacArthur blvd Well Number: M2

Job No.: 838.001 Well Casing Diameter: 2 inch

Sampled By: FV Date: 5/17/93

TOC Elevation: _____ Weather: CLEAR

Depth to Casing Bottom (below TOC) 44.90 feet

Depth to Groundwater (below TOC) 27.15 feet

Feet of Water in Well 17.75 feet

Depth to Groundwater When 80% Recovered 30.70 feet

Casing Volume (feet of water x Casing DIA ^{2} x 0.0408) 2.90 gallons

Depth Measurement Method Tape & Paste / (Electronic Sounder) Other

Free Product _____

Purge Method DISPOSIBLE BAILER

FIELD MEASUREMENTS

Gallons Removed	pH	Temp °F (~~C~~)	Conductivity (micromhos/cm)	Salinity S%	Comments
1	6.30	69.0	12.59 x 100		clear; gas odor
3	6.10	66.6	12.94 x 100		"
5	6.38	69.9	14.84 x 100		"
7	6.37	68.5	14.21 x 100		"
9	6.44	68.3	14.41 x 100		"
11	6.38	68.9	14.58 x 100		"

Total Gallons Purged 11 gallons

Depth to Groundwater Before Sampling (below TOC) 27.85 feet

Sampling Method DISPOSIBLE BAILER

Containers Used 3 (40 ml) _____ (liter) _____ (pint)

Subsurface Consultants

JOB NUMBER DATE APPROVED PLATE

WELL SAMPLING FORM

Project Name: 2801 MacArthur blvd Well Number: M3

Job No.: 838.001 Well Casing Diameter: 2 inch

Sampled By: FV Date: 5/17/93

TOC Elevation: _____ Weather: CLEAR

Depth to Casing Bottom (below TOC) 39.86 feet

Depth to Groundwater (below TOC) 22.15 feet

Feet of Water in Well 17.71 feet

Depth to Groundwater When 80% Recovered 25.69 feet

Casing Volume (feet of water x Casing DIA ^{2} x 0.0408) 2.89 gallons

Depth Measurement Method Tape & Paste / (Electronic Sounder) / Other

Free Product _____

Purge Method DISPOSIBLE BAILER

FIELD MEASUREMENTS

Gallons Removed	pH	Temp °F (~~°C~~)	Conductivity (micromhos/cm)	Salinity S%	Comments
2	9.25	68.7	290 X 100		Semi clear; no odor
4	7.83	67.2	3.15 X 100		"
6	7.74	67.6	3.07 X 100		"
8	7.61	67.0	3.13 X 100		"
10	7.69	66.3	3.11 X 100		"

Total Gallons Purged 10 gallons

Depth to Groundwater Before Sampling (below TOC) 25.45 feet

Sampling Method DISPOSIBLE BAILER

Containers Used 3 (40 ml) _____ (liter) _____ (pint)

Subsurface Consultants

JOB NUMBER DATE APPROVED PLATE

WELL SAMPLING FORM

Project Name: 2801 MacArthur blvd
Well Number: M4
Job No.: 838.001
Well Casing Diameter: 2 inch
Sampled By: FV
Date: 5/17/93
TOC Elevation:
Weather: CLEAR

Depth to Casing Bottom (below TOC) 45.20 feet
Depth to Groundwater (below TOC) 33.81 feet
Feet of Water in Well 11.39 feet
Depth to Groundwater When 80% Recovered 36.09 feet
Casing Volume (feet of water x Casing DIA ^{2} x 0.0408) 1.86 gallons
Depth Measurement Method Tape & Paste / (Electronic Sounder) / Other
Free Product
Purge Method DISPOSIBLE BAILER

FIELD MEASUREMENTS

Gallons Removed	pH	Temp (°F)	Conductivity (micromhos/cm)	Salinity S%	Comments
1	6.82	72.8	19.57 X 100		clear, good odor
3	6.59	70.2	2.11 X 1000		"
5	6.70	69.0	2.07 X 1000		"
6	6.69	70.1	1.92 X 1000		"
DRY					slow recharge

Total Gallons Purged 6 + 6 more gallons and sample gallons
Depth to Groundwater Before Sampling (below TOC) 38.75 feet
Sampling Method DISPOSIBLE BAILER
Containers Used 3 (40 ml) ____ (liter) ____ (pint)

Subsurface Consultants

JOB NUMBER DATE APPROVED

PLATE

WELL SAMPLING FORM

Project Name: 2801 MacArthur blvd Well Number: P2

Job No.: 838.001 Well Casing Diameter: 2 inch

Sampled By: FV Date: 5/17/93

TOC Elevation: _____ Weather: CLEAR

Depth to Casing Bottom (below TOC) 42.20 feet

Depth to Groundwater (below TOC) 23.66 feet

Feet of Water in Well 18.54 feet

Depth to Groundwater When 80% Recovered 27.37 feet

Casing Volume (feet of water x Casing DIA ² x 0.0408) 3.03 gallons

Depth Measurement Method Tape & Paste / (Electronic Sounder) / Other

Free Product _____

Purge Method DISPOSIBLE BAILER

FIELD MEASUREMENTS

Gallons Removed	pH	Temp °F (°C)	Conductivity (micromhos/cm)	Salinity S%	Comments
2	9.64	72.2	7.15 X 100		Sheen - gas odor
4	9.93	68.0	5.54 X 100		Clear gas odor
6	10.24	67.7	5.33 X 100		"
8	9.99	67.6	5.48 X 100		"
10	11.23	68.9	8.64 X 100		"
12 DRY	11.23	68.3	8.48 X 100		"

Total Gallons Purged 12 +3 more gallon gallons

Depth to Groundwater Before Sampling (below TOC) 36.42 slow recharge feet

Sampling Method DISPOSIBLE BAILER

Containers Used _____ 40 ml _____ liter _____ pint

Subsurface Consultants

JOB NUMBER | DATE | APPROVED | PLATE

Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878
2323 Fifth Street, Berkeley, CA 94710, Phone (510) 486-0900

DATE RECEIVED: 05/03/93
DATE REPORTED: 05/10/93

LABORATORY NUMBER: 110775

CLIENT: SUBSURFACE CONSULTANTS

PROJECT ID: 838.001

LOCATION: A.P.A. FUND

RESULTS: SEE ATTACHED

Reviewed by

Reviewed by

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 110775
CLIENT: SUBSURFACE CONSULTANTS
PROJECT ID: 838.001
LOCATION: A.P.A. FUND

DATE SAMPLED: 04/27,28/93
DATE RECEIVED: 05/03/93
DATE ANALYZED: 05/02-03/93
DATE REPORTED: 05/10/93

Total Volatile Hydrocarbons with BTXE in Soils & Wastes
TVH by California DOHS Method/LUFT Manual October 1989
BTXE by EPA 5030/8020

LAB ID	SAMPLE ID	TVH AS GASOLINE (mg/Kg)	BENZENE (ug/Kg)	TOLUENE (ug/Kg)	ETHYL BENZENE (ug/Kg)	TOTAL XYLENES (ug/Kg)
110775-1	B-12@28.5	ND(1)	ND(5)	ND(5)	ND(5)	ND(5)
110775-3	B-12@34.5	ND(1)	ND(5)	ND(5)	ND(5)	ND(5)
110775-4	M-3@22	ND(1)	ND(5)	ND(5)	ND(5)	ND(5)
110775-5	M-3@27	ND(1)	ND(5)	ND(5)	ND(5)	ND(5)
110775-6	M3@30.5	ND(1)	ND(5)	ND(5)	ND(5)	ND(5)
110775-7	M-4@31	ND(1)	ND(5)	ND(5)	ND(5)	ND(5)

ND = Not detected at or above reporting limit; Reporting limit indicated in parentheses.

QA/QC SUMMARY

LCS RECOVERY, %	104

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 110775
CLIENT: SUBSURFACE CONSULTANTS
PROJECT ID: 838.001
LOCATION: A.P.A. FUND

DATE SAMPLED: 04/27,28/93
DATE RECEIVED: 05/03/93
DATE ANALYZED: 05/04/93
DATE REPORTED: 05/10/93

Total Volatile Hydrocarbons with BTXE in Soils & Wastes
TVH by California DOHS Method/LUFT Manual October 1989
BTXE by EPA 5030/8020

LAB ID	SAMPLE ID	TVH AS GASOLINE (mg/Kg)	BENZENE (ug/Kg)	TOLUENE (ug/Kg)	ETHYL BENZENE (ug/Kg)	TOTAL XYLENES (ug/Kg)
110775-2	B-12@30.5	ND(1)	ND(5)	ND(5)	ND(5)	ND(5)
110775-10	M-4@39	ND(1)	ND(5)	ND(5)	ND(5)	ND(5)

ND = Not detected at or above reporting limit; Reporting limit indicated in parentheses.

QA/QC SUMMARY

RPD, %	3
RECOVERY, %	90

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 110775
CLIENT: SUBSURFACE CONSULTANTS
PROJECT ID: 838.001
LOCATION: A.P.A. FUND

DATE SAMPLED: 04/27,28/93
DATE RECEIVED: 05/03/93
DATE ANALYZED: 05/05/93
DATE REPORTED: 05/10/93

Total Volatile Hydrocarbons with BTXE in Soils & Wastes
TVH by California DOHS Method/LUFT Manual October 1989
BTXE by EPA 5030/8020

LAB ID	SAMPLE ID	TVH AS GASOLINE (mg/Kg)	BENZENE (ug/Kg)	TOLUENE (ug/Kg)	ETHYL BENZENE (ug/Kg)	TOTAL XYLENES (ug/Kg)
110775-8	M-4@33	130	430	490*	2,000	4,500*
110775-9	M-4@36	120	540	900	1,100	4,400

* Presence of this compound confirmed by second column; however, the confirmation concentration differed from the reported result by more than a factor of two.

ND = Not detected at or above reporting limit; Reporting limit indicated in parentheses.

QA/QC SUMMARY

RPD, %	3
RECOVERY, %	93

CHAIN OF CUSTODY FORM

PAGE \ OF

PROJECT NAME: A.P.A. Fund
JOB NUMBER: 338.001 LAB: C+T
PROJECT CONTACT: Marianne Watada TURNAROUND: normal
SAMPLED BY: John Wolfe REQUESTED BY: M. Watada

LABORATORY I.D. NUMBER	SCI SAMPLE NUMBER	MATRIX: WATER	MATRIX: SOIL	MATRIX: WASTE	MATRIX: AIR	CONTAINERS: VOA	CONTAINERS: LITER	CONTAINERS: PINT	CONTAINERS: TUBE	METHOD PRESERVED: HCL	METHOD PRESERVED: H_2SO_4	METHOD PRESERVED: HNO_3	METHOD PRESERVED: ICE	METHOD PRESERVED: NONE	SAMPLING DATE: MONTH	SAMPLING DATE: DAY	SAMPLING DATE: YEAR	SAMPLING DATE: TIME	NOTES	ANALYSIS REQUESTED: TVH/BTXE
110775-1	B-12@28.5		X						X				X		04	28	93			X
-2	B-12@30.5		X						X				X							X
-3	B-12@34.5		X						X				X							X
-4	M-3@22		X						X				X							X
-5	M-3@27		X						X				X							X
-6	M-3@30.5		X						X				X							
-7	M-4@31		X						X				X		04	27	93			X
-8	M-4@33		X						X				X							X
-9	M-4@36		X						X				X							X
-10	M-4@39		X						X				X							X

CHAIN OF CUSTODY RECORD

RELEASED BY: (Signature)	DATE / TIME	RECEIVED BY: (Signature)	DATE / TIME
Dennis Alexander	5/3/93 11:05 a.m.		
RELEASED BY: (Signature)	DATE / TIME	RECEIVED BY: (Signature)	DATE / TIME
RELEASED BY: (Signature)	DATE / TIME	RECEIVED BY: (Signature)	DATE / TIME
RELEASED BY: (Signature)	DATE / TIME	RECEIVED BY: (Signature)	DATE / TIME
			5/3/93 1105

COMMENTS & NOTES:

Subsurface Consultants, Inc.
171 12TH STREET, SUITE 201, OAKLAND, CALIFORNIA 94607
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2323 Fifth Street, Berkeley, CA 94710, Phone (510) 486-0900

DATE RECEIVED: 05/18/93
DATE REPORTED: 05/26/93

LABORATORY NUMBER: 110941

CLIENT: SUBSURFACE CONSULTANTS

PROJECT ID: 838.001

LOCATION: 2801 MAC ARTHUR BLVD

RESULTS: SEE ATTACHED

Reviewed by

Reviewed by

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 110941
CLIENT: SUBSURFACE CONSULTANTS
PROJECT ID: 838.001
LOCATION: 2801 MAC ARTHUR BLVD

DATE SAMPLED: 05/17/93
DATE RECEIVED: 05/18/93
DATE ANALYZED: 05/24/93
DATE REPORTED: 05/26/93

Total Volatile Hydrocarbons with BTXE in Aqueous Solutions
TVH by California DOHS Method/LUFT Manual October 1989
BTXE by EPA 5030/8020

LAB ID	SAMPLE ID	TVH AS GASOLINE (ug/L)	BENZENE (ug/L)	TOLUENE (ug/L)	ETHYL BENZENE (ug/L)	TOTAL XYLENES (ug/L)
110941-1	M2	17,000	1,200	770	480	1,300
110941-3	M4	7,500	1,200	230	11	350
110941-4	P2	87,000	6,600	13,000	2,200	13,000

QA/QC SUMMARY

RPD, %	7
RECOVERY, %	96

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 110941
CLIENT: SUBSURFACE CONSULTANTS
PROJECT ID: 838.001
LOCATION: 2801 MAC ARTHUR BLVD

DATE SAMPLED: 05/17/93
DATE RECEIVED: 05/18/93
DATE ANALYZED: 05/23/93
DATE REPORTED: 05/26/93

Total Volatile Hydrocarbons with BTXE in Aqueous Solutions
TVH by California DOHS Method/LUFT Manual October 1989
BTXE by EPA 5030/8020

LAB ID	SAMPLE ID	TVH AS GASOLINE (ug/L)	BENZENE (ug/L)	TOLUENE (ug/L)	ETHYL BENZENE (ug/L)	TOTAL XYLENES (ug/L)
110941-2	M3	ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)

ND = Not detected at or above reporting limit; Reporting limit indicated in parentheses.

QA/QC SUMMARY

RPD, %	2
RECOVERY, %	98

CHAIN OF CUSTODY FORM

PAGE 1 OF 1

PROJECT NAME: 2801 Mac Arthur blvd

JOB NUMBER: 838.001 LAB: CURTIS & TOMPKINS

PROJECT CONTACT: MARIANNE WATADA TURNAROUND: NORMAL

SAMPLED BY: FERNANDO VELEZ REQUESTED BY: MARIANNE WATADA

LABORATORY I.D. NUMBER	SCI SAMPLE NUMBER	MATRIX: WATER	SOIL	WASTE	AIR			CONTAINERS: VOA	LITER	PINT	TUBE			METHOD PRESERVED: HCL	H_2SO_4	HNO_3	ICE	NONE	SAMPLING DATE: MONTH	DAY	YEAR	TIME	NOTES	ANALYSIS REQUESTED: TVH / BTXE
110941 -1	M2	X						3						X			X		05	17	93	1200		X
-2	M3	X						3						X			X		05	17	93	1330		X
-3	M4	X						3						X			X		05	17	93	1100		X
-4	P2	X						3						X			X		05	17	93	1500		X

CHAIN OF CUSTODY RECORD

RELEASED BY: (Signature)	DATE / TIME	RECEIVED BY: (Signature)	DATE / TIME
Shawn Alexander	5/18/93 5:38	[signature]	5/18/93 1730
RELEASED BY: (Signature)	DATE / TIME	RECEIVED BY: (Signature)	DATE / TIME
RELEASED BY: (Signature)	DATE / TIME	RECEIVED BY: (Signature)	DATE / TIME
RELEASED BY: (Signature)	DATE / TIME	RECEIVED BY: (Signature)	DATE / TIME

COMMENTS & NOTES:

Subsurface Consultants, Inc.

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