Subsurface Consultants, Inc.

November 17, 1998
SCI 1039.007

Strough Family Trust of 1983
c/o Mr. Don Strough
Concord Honda/Pontiac
1300 Concord Avenue
Concord, California 94520

Report of Groundwater Monitoring Activities and Additional Subsurface Investigation
327 34th Street
Oakland, California

Dear Mr. Strough:

This letter records the results of groundwater monitoring activities and additional subsurface investigation performed by Subsurface Consultants, Inc. (SCI) at 327 34th Street in Oakland, California. The subsurface field investigation was conducted on June 26, 1998. The annual groundwater monitoring event was conducted on June 30, 1998. The location of the property is shown on the Vicinity Map, Plate 1. The site configuration is shown on the Site Plan, Plate 2.

BACKGROUND

On March 4 and 5, 1993, one 1,000-gallon underground storage tank (UST) containing unleaded gasoline and one 1,000-gallon UST containing waste oil were removed by KTW & Associates/ Subsurface Environmental Corporation under the direction of Alameda County Health Care Services Agency (ACHCSA). Results of chemical analyses on soil samples collected beneath the ends of the gasoline UST indicated impacts by total petroleum hydrocarbons (TPH) as gasoline, and toluene, ethylbenzene, and xylenes. Soil samples from the waste oil UST excavation showed only relatively low concentrations of TPH as diesel, ethylbenzene, and xylenes.

A soil and groundwater investigation was conducted by GeoPlexus, Inc. in 1993 to assess petroleum hydrocarbon impacts to groundwater. GeoPlexus, Inc. installed three groundwater monitoring wells (MW-1 through MW-3; see Plate 2). Analytical testing of soil and groundwater samples from the wells identified impacts from gasoline-range hydrocarbons at two of the wells (MW-2 and MW-3) located downgradient of the former gasoline UST. Approximately 1/4 inch of free floating product was observed in well MW-3. The product was reportedly gasoline.

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SCI was originally retained in September 1997 to evaluate the presence of free floating and dissolved phase petroleum hydrocarbons in existing wells MW-1 through MW-3. Based on results of this study, SCI prepared a Work Plan to perform additional subsurface investigation to evaluate the extent of soil and groundwater impacts. The Work Plan also included monthly free product removal and quarterly groundwater monitoring. The investigation included drilling three borings and completing two of the borings as monitoring wells. The ACHCSA approved SCI's Work Plan (January 16, 1998) for this study in their letter dated February 17, 1998. A copy of the ACHCSA letter is attached.

MONITORING ACTIVITIES

Monthly Free Product Removal

In accordance with the approved Work Plan, SCI began measuring separate-phase product thickness and depth-to-water in all the site wells on a monthly basis. Field forms for the June, July, and August 1998 monthly events are attached. Future reporting of the monthly measurements will continue on a quarterly basis.

Groundwater Monitoring Event

On June 30, 1998, depth-to-water and free product thickness were measured in the site wells (MW-1 through MW-5). Groundwater and free product elevation data are summarized in Table 1. The groundwater flow direction is not definitive for this site. Based on studies conducted at nearby sites and the areal geology, the expected groundwater flow direction beneath the site is toward the east-southeast.

On June 30, 1998, all site wells were purged by removing water with new disposable bailers. The wells were purged until measurements of pH, temperature, and conductivity had stabilized. After the wells recharged to within 80 percent of their initial level, they were sampled with new disposable bailers. Purge water was placed in labeled 55-gallon steel drums and left onsite for later disposal.

Groundwater samples collected were retained in pre-cleaned containers supplied by the analytical laboratory and 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. Copies of the records are presented with the analytical test report.

ADDITIONAL SUBSURFACE INVESTIGATION

Drilling and Sampling

Prior to drilling, SCI obtained a drilling permit from the Alameda County Public Works Agency. This approved permit is attached. SCI retained the services of California Utility Surveys, an underground utility locator to clear proposed soil boring locations. SCI also retained the services of the Penhall Company to core the concrete flooring of the service facility to facilitate drilling.

SCI retained West Hazmat to drill three soil borings (MW-4, MW-5, and B-6) to depths ranging from 26 to 31.5 feet below the ground surface (bgs) using a limited access drill rig equipped with hollow-stem auger equipment. The test boring locations are shown on Plate 2. All three borings were located within the existing service facility. Logs of Test Borings MW-4, MW-5, and B-6 are shown on Plates 3 through 5. Soils were classified in accordance with the Unified Soil Classification System shown on Plate 6. Logs of Test Borings MW-1, MW-2, and MW-3 are also attached.

Soil samples were collected from each boring at 5-foot intervals. SCI's field geologist observed drilling operations, prepared detailed logs, and screened soil samples using an organic vapor meter (OVM). Soil samples were retained in brass sample liners. Teflon sheeting was placed on the ends of the liners prior to capping and sealing with tape. Upon sealing and labeling, the samples were placed in an ice filled cooler and delivered to Curtis & Tompkins, Ltd., a state-certified chemical testing laboratory, using appropriate chain-of-custody documentation. SCI selected soil samples for chemical analyses on the basis of visual observations, OVM readings, or their proximity to the groundwater surface.

All augers, drill rods, and sampling equipment that were placed in the test borings were cleaned prior to their initial use, and prior to each subsequent use to reduce the likelihood of cross-contamination between borings and/or samples. Using a disposable bailer, SCI checked for the presence of free product in boring B-6, and then collected a grab groundwater sample. Test boring B-6 was tremie-filled with neat cement grout following sample collection. Test borings MW-4 and MW-5 were completed as monitoring wells, as described in the next section.

Well Construction, Development, Sampling, and Surveying

Borings MW-4 and MW-5 were completed as groundwater monitoring wells to depths of 31.5 feet bgs. The wells are constructed of 2-inch-diameter, Schedule 40 PVC pipe having flush threaded joints. The upper 15 feet of both wells consist of solid PVC well casing. The remaining length consists of machine-slotted well screen having 0.020-inch slots. The annular space around

the screened section is backfilled with #3 Lonestar sand. A bentonite seal, approximately 12 inches thick, is in place above the sand pack in each well. The annular space above the bentonite seal is backfilled with cement/bentonite grout. Each well was finished below grade in a traffic-rated utility box and secured by a locking cap.

Groundwater levels were measured in the wells prior to development/purging. The new wells were developed on June 30, 1998, by bailing, until the water became relatively free of turbidity, and the temperature, conductivity, and pH stabilized. A minimum of 10 well volumes were purged during development. After the wells had recharged to at least 80 percent of their original volume, groundwater samples were obtained using new disposable, pre-cleaned bailers. The water samples were placed in pre-cleaned containers supplied by the analytical laboratories, and refrigerated until delivery to the laboratories. The water samples were accompanied by chain-of-custody records. A copy of the records are presented with the analytical test report.

An elevation survey of the wells was performed on July 3, 1998. The results of the elevation survey and water level measurements are presented on Table 2.

CHEMICAL ANALYSES

Chemical analyses of samples were performed by Curtis & Tompkins, Ltd., a state-certified chemical testing laboratory. CytoCulture International, an environmental microbiology testing laboratory, performed biological and bacterial enumeration tests. A summary of sample preparation and test methods is presented below.

Analysis	Sample Preparation Method	Analysis Method
Total Volatile Hydrocarbons (TVH)	EPA 5030	EPA 8015 Mod.
Benzene, Toluene, Ethylbenzene, Xylenes (BTEX) and Methyl Tertiary Butyl Ether (MTBE) in Soil	EPA 5030	EPA 8020A
BTEX and MTBE in Groundwater	EPA 5030	EPA 8260

Groundwater samples from three of the site wells (MW-1, MW-3, and MW-4) were analyzed for biological parameters and bacterial enumeration. Specifically, these groundwater samples were additionally analyzed for:

- Dissolved oxygen (DO) and pH,
- Dissolved iron (Fe^{3+}) and manganese (Mn), EPA Method 6010A,
- Sulfate (SO_4^{2-}), EPA Method 375.2/300.0,

- Bacterial enumeration by plate count (colony forming units),
- Nitrogen as ammonia (NH_3), Standard Methods for Water and Wastes (SMWW) 4500-NH_3 C,
- Nitrogen as nitrate (NO^{3-}), SMWW Method 4500-NO_3 B, and
- Ortho-phosphate (PO_4), SMWW Method 4500-P E.

Groundwater analytical test results are summarized in Table 2. Soil and grab groundwater analytical test results are summarized in Tables 3 and 4. Biological parameters and bacterial enumeration results are summarized in Table 5. Field sampling forms, analytical test reports, and chain-of-custody documents are attached.

DISCUSSION OF RESULTS

Subsurface Geology

According to a geologic map by Radbruch[1], the site is underlain by the Temescal Formation, The Temescal Formation is an alluvial fan deposit comprised of interfingering lenses of clayey gravel, sandy silty clay, and sand-clay-silt mixtures. Additionally, the map indicates a former stream channel beneath the eastern portion of the site which was a tributary to Glen Echo Creek. Current City of Oakland sewer maps indicate the former channel has been diverted to an underground culvert beneath the eastern portion of the site property (see Plate 2).

The Log of Test Boring MW-1 indicates an extensive clay layer extending from approximately 2 feet to 13 feet bgs, underlain by sands and silts to a depth of 32 feet. Logs of Test Borings MW-2, MW-3, and MW-4 have near surface clay deposits extending to depths of 6 to 10 feet bgs, underlain by at least 20 feet of permeable interbedded silts, sands, and/or gravels. Logs of Test Borings MW-5 and B-6 indicate predominately impermeable materials to depths of approximately 18 feet bgs, underlain by interbedded clays, silts, sands, and gravels to the depths explored (31.5 and 26 feet bgs, respectively).

Groundwater Gradient

The gradient near wells MW-1, MW-2, MW-3, and MW-4 is relatively flat with a 0.24-foot difference in elevation between the four points. Well MW-5 located approximately 100 feet southwest of these wells has a groundwater surface elevation approximately 1.5 feet lower than

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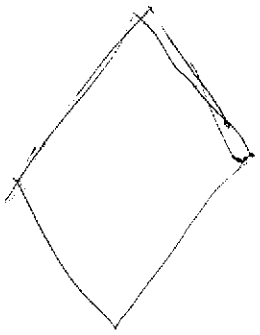
[1] Radbruch, Dorothy H., Areal and Engineering Geology of the Oakland West Quadrangle, California, USGS, 1957.



those of wells MW-1 through MW-4. Topographic relief at the site and the presence of the Broadway Branch of Glen Echo Creek as a culvert beneath the site suggest the groundwater flow direction should be toward the east-southeast. This is not currently reflected by the groundwater elevation data, which shows higher elevations in the northern portion of the property and a lower elevation in the southern portion of the property.

Free Product

Historically, free product has been detected in two of the site wells (MW-2 and MW-3). Free product was measured only in well MW-2 during this quarter and the thickness of free product detected in this well decreased from 0.45 to 0.08 foot. Free product was removed by bailing. Free product was not detected in the four other site wells.

Soil Test Results

Seven soil samples were obtained from the three test borings drilled and sampled by SCI. These samples were submitted for analysis of TVH, BTEX, and MTBE. Analytical data for soil samples is summarized in Table 3.

Soil samples collected from locations MW-4, MW-5, and B-6 above the groundwater table did not detect the presence of any of the compounds analyzed. One soil sample collected from below the water table at sample location MW-4 detected relatively low concentrations of TVH, BTEX, and MTBE.

Impacts to soil appear to be limited to the area adjacent to the former gasoline UST location, as shown by concentrations detected in soil from boring MW-2.

Grab Groundwater Test Results

A grab groundwater sample was collected from test boring B-6 during field activities. Relatively low concentrations of gasoline-range petroleum hydrocarbons (or TVH) and BTEX were detected in this sample. MTBE was not detected above the laboratory reporting limit. Analytical data is presented in Table 4.

Monitoring Well Test Results

Elevated levels of gasoline-range petroleum hydrocarbons (or TVH), BTEX, and MTBE were detected in groundwater samples from wells MW-2, MW-3, and MW-4 during this event. The groundwater sample collected from well MW-1 contained relatively low concentrations of TVH,

ethylbenzene, and MTBE. The groundwater sample collected from well MW-5 contained MTBE at a relatively low concentration, although neither TVH nor BTEX were detected.

Biological Parameter and Bacterial Plate Enumeration Test Results

Biological parameter and bacterial plate enumeration tests were performed on samples from wells MW-1, MW-3, and MW-4. Results of biological testing indicate that nutrient levels are sufficient at MW-3 and MW-4 to support bacterial growth. DO is higher in upgradient well MW-1 than wells MW-3 and MW-4 indicating biological activity is occurring in wells MW-3 and MW-4 because DO is being utilized. CytoCulture prepared a consulting report for the site (attached) that discusses the evidence for biological degradation occurring at MW-3 and MW-4. Measured nutrient levels as well as the ratios of detected chemicals of concern are cited as evidence for microbiological degradation. BTEX components are preferentially biodegradable at different rates, and a comparison of concentration ratios from MW-3 and MW-4 provides further evidence for biodegradation activity at the site.

Wells MW-3 and MW-4, which contained elevated groundwater concentrations of petroleum hydrocarbons, showed higher levels of hydrocarbon and heterotroph degraders. This would be expected since the petroleum hydrocarbon is a food source for the bacteria.

CONCLUSIONS

The highest concentrations of petroleum hydrocarbon compounds are detected in wells with extensive sand and gravel layers (wells MW-2, MW-3, and MW-4). Free product appears to be currently localized in the area of the former tanks. For this quarter, free product has been detected in well MW-2 only. The dissolved hydrocarbon plume appears to be well delineated to the north, west, and south. The plume has not migrated offsite to the south, as evidenced by data from monitoring well MW-5. The extent of the plume to the east of monitoring well MW-4, however, is unknown.

Based on results of biological parameter and bacterial enumeration assays, the subsurface environment of the site appears to promote biodegradation.

RECOMMENDATIONS

SCI recommends scheduling a meeting with the client and ACHCSA to determine what future activities, if any, may be required to move the site toward closure.

It should be realized that environmental investigation is an iterative process. Additional study and ongoing monitoring may be required. SCI would be pleased to continue to provide environmental consultation and investigation services to the Strough Family Trust of 1983 on this project.

ONGOING ACTIVITIES

SCI will continue to remove observed free product in the wells by hand bailing and will continue to record water level measurements on a monthly basis in accordance with the approved monitoring plan. The next sampling event will be a quarterly event which will occur in September 1998.

If you have any questions, please call.

Yours very truly,

Subsurface Consultants, Inc.

Meg Mendoza
Project Engineer

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Certified Professional Soil Scientist 1134 (expires 12/31/98)
Registered Environmental Assessor 00526 (expires 6/30/99)

Jeriann N. Alexander, PE, REA
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Attachments: Table 1 - Groundwater and Free Product Elevation Data
Table 2 - Summary of Petroleum Hydrocarbon Concentrations in Groundwater
Table 3 - Summary of Petroleum Hydrocarbon Concentrations in Soil
Table 4 - Summary of Petroleum Hydrocarbon Concentrations in Grab Groundwater
Table 5 - Summary of Biological Nutrients and Bacterial Plate Enumerations
Plate 1 - Vicinity Map
Plate 2 - Site Plan
Plates 3 through 5 - Logs of Test Borings MW-4, MW-5, and B-6
Plate 6 - Unified Soil Classification System
Logs of Test Borings MW-1, MW-2 and MW-3
Alameda County Health Care Services Agency letter dated February 17, 1998
Field Forms- June 1998 through August 1998
Analytical Test Reports
Chain-of-Custody Documents
Alameda County Public Works Agency Drilling Permit
CytoCulture Technical Consulting Report, July 27, 1998

cc: Ms. Madhulla Logan
Hazardous Materials Specialist
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TABLE 1
GROUNDWATER AND FREE PRODUCT ELEVATION DATA
327 34TH STREET
OAKLAND, CALIFORNIA

Monitoring Well	Date	Elevation[1]	Depth to Groundwater (feet)	Product Thickness (feet)	Groundwater Elevation (feet)	Product Elevation (feet)
MW-1	7/27/93	100.00	20.79[2]	NA	79.21	NA
	10/2/97		21.22	--	78.78	--
	6/30/98		18.21	--	81.79	--
	7/29/98		18.74	--	81.26	--
	8/26/98		19.28	--	80.72	--
MW-2	7/27/93	101.27	22.10[2]	NA	79.17	NA
	10/2/97		22.91	0.43	78.36	78.79
	6/30/98		19.69	0.45	81.58	82.03
	7/29/98		20.11	0.29	81.16	81.45
	8/26/98		20.54	0.08	80.73	80.81
MW-3	7/27/93	101.29	22.28[2]	0.02	79.01	79.03
	10/2/97		22.71	0.03	78.58	78.61
	6/30/98		19.47	--	81.82	--
	7/29/98		20.01	--	81.28	--
	8/26/98		20.62	--	80.67	--
MW-4	6/30/98	98.65	16.93	--	81.72	--
	7/29/98		17.48	--	81.17	--
	8/26/98		18.65	--	80.00	--
MW-5	6/30/98	100.9	20.60	--	80.30	--
	7/29/98		21.52	--	79.38	--
	8/26/98		22.21	--	78.69	--

[1] Elevations are referenced to monitoring well MW-1, with an assumed datum of 100.00 feet.

[2] Measurements by others

-- Product not observed

NA = Data not available

TABLE 2
SUMMARY OF PETROLEUM HYDROCARBON CONCENTRATIONS IN GROUNDWATER
327 34TH STREET
OAKLAND, CALIFORNIA

Location	Date	Groundwater Elevation† (feet)	TVH (µg/l)	TEH (µg/l)	Benzene (µg/l)	Toluene (µg/l)	Ethyl-benzene (µg/l)	Total Xylenes (µg/l)	MTBE (µg/l)	Oil & Grease (mg/l)
MW-1	7/27/93	79.21	<50	<50	<0.5	<0.5	<0.5	<0.5	--	<5
	10/2/97	78.78	<50	--	<0.5	<0.5	<0.5	<0.5	<2	--
	6/30/98	**81.79**	**84**	--	**<0.5**	**<0.5**	**2.1**	**0.55**	**2.1**	--
MW-2	7/27/93	79.17	120,000	--	10,000	27,000	2,900	20,000	--	--
	10/2/97	78.36	*	--	*	*	*	*	*	*
	6/30/98	**81.58**	**72,000**	--	**7,300**	**18,000**	**2,500**	**15,600**	**5,500**	--
MW-3	7/27/93	79.01	330,000	--	9,100	24,000	5,300	33,000	--	--
	10/2/97	78.58	36,000	--	4,200	11,000	1,800	10,600	3,500	--
	6/30/98	**81.82**	**51,000**	--	**4,800**	**11,000**	**1,200**	**7,100**	**3,900**	--
MW-4	**6/30/98**	**81.72**	**10,000**	--	**2,200**	**930**	**850**	**2,100**	**1,800**	--
MW-5	**6/30/98**	**78.69**	**<50**	--	**<0.5**	**<0.5**	**<0.5**	**<0.5**	**23**	--

NOTES:
TVH = Total volatile hydrocarbons as gasoline
TEH = Total extractable hydrocarbons as diesel
MTBE= Methyl tertiary butyl ether
-- = Not analyzed
mg/l = milligrams per liter
µg/l = micrograms per liter
ND = Not detected at concentrations above reporting limits
* = This sample contained free-product and was found to resemble weathered gasoline as determined by fuel fingerprint analysis.
†= Arbitrary datum

TABLE 3
SUMMARY OF PETROLEUM HYDROCARBON CONCENTRATIONS IN SOIL
327 34TH STREET
OAKLAND, CALIFORNIA

Sample ID	Consultant	Depth (feet)	Sample Date	TPH as Gasoline (mg/kg)	TPH as Diesel (mg/kg)	Benzene (µg/kg)	Toluene (µg/kg)	Ethyl-benzene (µg/kg)	total Xylenes (µg/kg)	MTBE (µg/kg)	Oil & Grease (mg/kg)
June 1998 Investigation Data											
MW-4 @ 5'	SCI	5-5.5	6/26/98	<1	--	<5	<5	<5	<5	<20	--
MW-4 @ 20'	SCI	20-20.5	6/26/98	<1	--	<5	<5	<5	<5	<20	--
MW-4 @ 25' *	SCI	25-25.5	6/26/98	<1	--	45	15	12	30	62	--
MW-5 @ 14.5'	SCI	14.5-15	6/26/98	<1	--	<5	<5	<5	<5	<20	--
MW-5 @ 20'	SCI	20-20.5	6/26/98	<1	--	<5	<5	<5	<5	<20	--
B-6 @ 15.5'	SCI	15.5-16	6/26/98	<1	--	<5	<5	<5	<5	<20	--
B-6 @ 21'	SCI	21-21.5	6/26/98	<1	--	<5	<5	<5	<5	<20	--
July 1993 Investigation Data											
MW1-S1	Geo Plexus	4.5 - 6	7/19/93	<1	<10	<5	<5	<5	<5	--	<50
MW1-S2	Geo Plexus	9.5 - 11	7/19/93	<1	<10	<5	<5	<5	<5	--	<50
MW1-S3	Geo Plexus	14.5 - 16	7/19/93	<1	<10	<5	<5	<5	<5	--	<50
MW1-S4	Geo Plexus	19.5 - 21	7/19/93	<1	<10	<5	<5	<5	<5	--	<50
MW1-S5	Geo Plexus	24.5 - 26	7/19/93	<1	<10	<5	<5	<5	<5	--	<50
MW2-S1	Geo Plexus	4.5 - 6	7/19/93	2,000	--	7,200	71,000	31,000	260,000	--	--
MW2-S2	Geo Plexus	9.5 - 11	7/19/93	1,700	--	5,700	54,000	24,000	210,000	--	--
MW2-S3	Geo Plexus	14.5 - 16	7/19/93	410	--	1,800	14,000	5,100	51,000	--	--
MW2-S4	Geo Plexus	19.5 - 21	7/19/93	10,000	--	100,000	780,000	260,000	1,700,000	--	--
MW2-S5	Geo Plexus	24.5 - 26	7/20/93	19	--	1,900	5,200	560	3,400	--	--
MW3-S1	Geo Plexus	4.5 - 6	7/20/93	<1	--	ND	9	<5	14	--	--
MW3-S2	Geo Plexus	9.5 - 11	7/20/93	<1	--	<5	<5	<5	9	--	--
MW3-S3	Geo Plexus	14.5 - 16	7/20/93	<1	--	79	9	10	23	--	--
MW3-S4	Geo Plexus	19.5 - 21	7/20/93	1,400	--	6,400	46,000	14,000	150,000	--	--
MW3-S5	Geo Plexus	24.5 - 26	7/20/93	19	--	1,400	2,600	380	2,000	--	--

TABLE 3
SUMMARY OF PETROLEUM HYDROCARBON CONCENTRATIONS IN SOIL
327 34TH STREET
OAKLAND, CALIFORNIA

Sample ID	Consultant	Depth (feet)	Sample Date	TPH as Gasoline (mg/kg)	TPH as Diesel (mg/kg)	Benzene (µg/kg)	Toluene (µg/kg)	Ethyl-benzene (µg/kg)	total Xylenes (µg/kg)	MTBE (µg/kg)	Oil & Grease (mg/kg)
Tank Removal Sampling Data											
TA001	SEC	~11	3/4/93	5	--	<10	110	480	280	--	--
TA002	SEC	~11	3/4/93	130	--	<80	200	4,900	7,800	--	--
TB003	SEC	~9	3/5/93	<1	96	<5	<5	14	18	--	<50
TB004	SEC	~9	3/5/93	<1	7	<5000	<5000	<5000	<5000	--	<50

Notes:
mg/kg = milligrams per kilogram
µg/kg = micrograms per kilogram
<1 = Analyte not detected above laboratory reporting limit stated.
-- = not analyzed
* = sample collected below the groundwater surface
SCI = Subsurface Consultants, Inc.
SEC = Subsurface Environmental Corporation

TABLE 4
SUMMARY OF PETROLEUM HYDROCARBON CONCENTRATIONS IN GRAB GROUNDWATER SAMPLE
327 34TH STREET
OAKLAND, CALIFORNIA

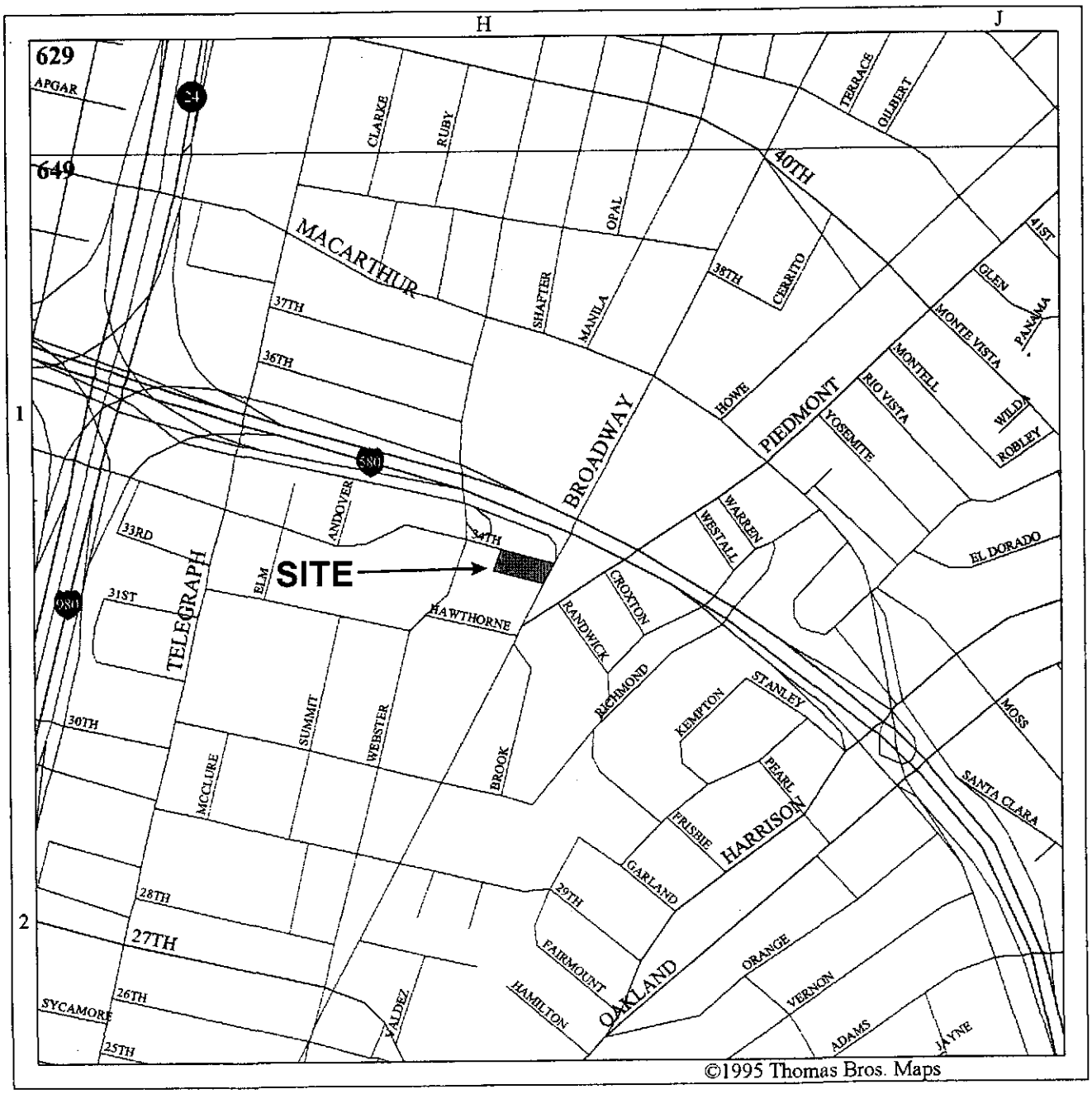
Location	Date	TVH (µg/l)	Benzene (µg/l)	Toluene (µg/l)	Ethyl-benzene (µg/l)	Total Xylenes (µg/l)	MTBE (µg/l)
B-6	6/26/98	92	30	1.7	1.4	1.3	<2

NOTES:
TVH = Total volatile hydrocarbons as gasoline
MTBE= Methyl tertiary butyl ether
µg/l = micrograms per liter
<2 = Analyte not detected at concentration above the laboratory reporting limit stated.

TABLE 5
SUMMARY OF BIOLOGICAL NUTRIENT PARAMETERS IN GROUNDWATER
327 34TH STREET
OAKLAND, CALIFORNIA

Location	Date	Iron (µg/l)	Manganese (µg/l)	Ammonia-N (mg/l)	Carbon Dioxide* (mg/l)	o-Phosphate (mg/l)	Nitrate-N (mg/l)	Sulfate (mg/l)	pH	Dissolved Oxygen Field (mg/l)	Dissolved Oxygen Laboratory (mg/l)	Bacterial Plate Enumerations Hydrocarbon Degraders (cfu/ml)	Bacterial Plate Enumerations Total Heterotrophs (cfu/ml)
MW-1	6/30/98	150	46	<0.1	204	2.0	<0.1	55	6.4	5	5.1	57	180
MW-3	6/30/98	1,400	9,800	1.4	300	2.4	<0.1	13	6.6	2.2	3.2	94	240
MW-4	6/30/98	140	4,300	0.8	222	1.5	0.3	14	6.6	2.6	3.5	660	1200

NOTES:
µg/l = micrograms per liter
mg/l = milligrams per liter
cfu/ml = colony forming units per milliliter
<0.1 = Compound not detected above laboratory reporting limit
* = Measured in the field



N

APPROXIMATE SCALE (feet)

0 800 1600

VICINITY MAP

Subsurface Consultants, Inc.
Geotechnical & Environmental Engineers

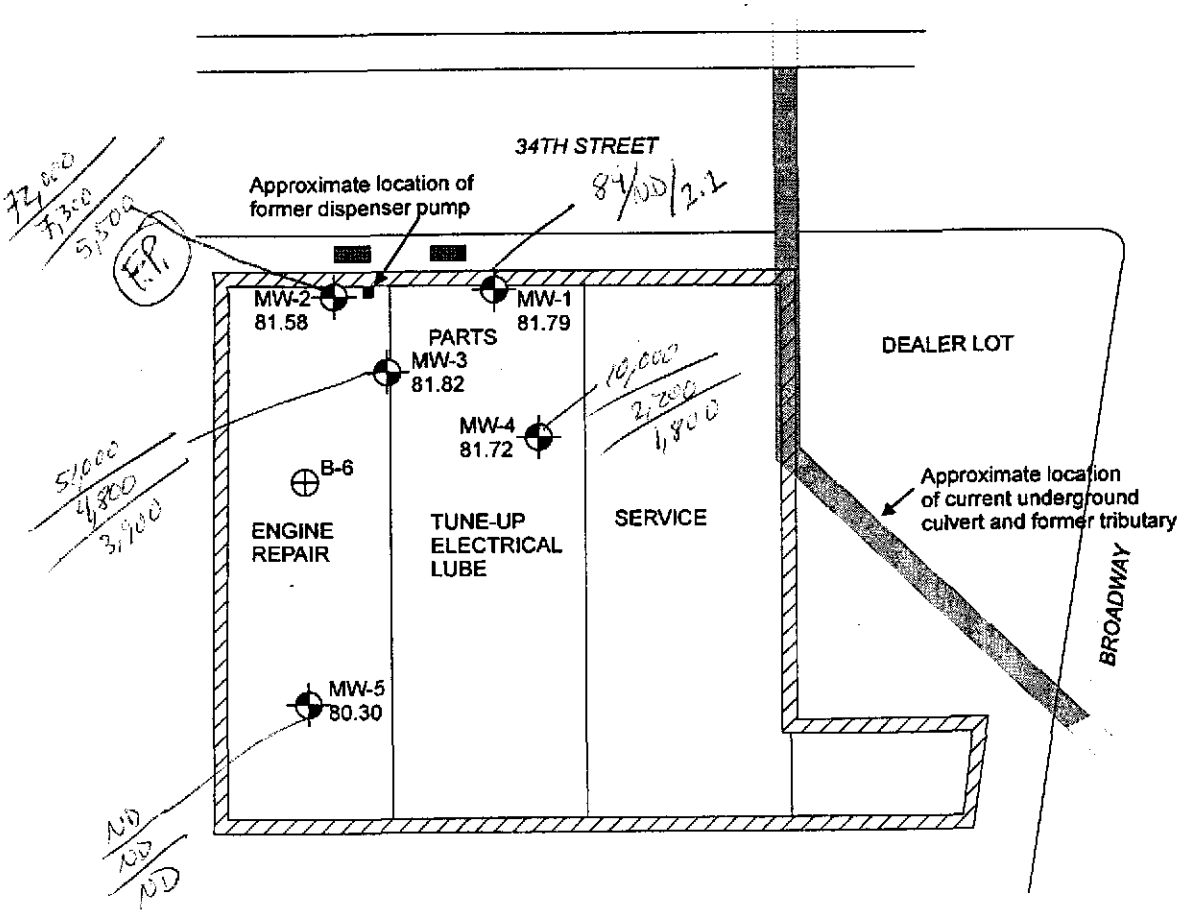
327 34TH STREET
OAKLAND, CALIFORNIA

JOB NUMBER	DATE	APPROVED
1039.007	8/17/98	

PLATE 1

LEGEND

- Limits of site structures
- Monitoring well location
- 81.58 — Groundwater elevation (6/30/98)
- Boring location
- Approximate location of former underground storage tank



TPHg
Benzene (ppb)
MTBE

N

APPROXIMATE SCALE (feet)

0 60 120

SITE PLAN

Subsurface Consultants, Inc.
Geotechnical & Environmental Engineers

327 34TH STREET
OAKLAND, CALIFORNIA

JOB NUMBER	DATE	APPROVED
1039.007	9/4/98	

PLATE 2

LOG OF WELL NO. MW-4

Project Name & Location: 327 34th Street, Oakland, California	Ground Surface Elevation/TOC Elevation: 99.04 / 98.65
	Elevation Datum: MW-1 TOC = 100' (arbitrary)
Drilling Coordinates:	Start: Date 6/26/98 Time 0850 — Finish: Date 6/26/98 Time 1100
Drilling Company & Driller: West HazMat / Scott Havens	Drilling Fluid: N/A — Hole Diameter: 8"
Rig Type & Drilling Method: CME LAR - 75 - Propane	
Sampler Type(s): A) 2.0 California Sampler B) C)	Logged By: John Wolfe
Sampling Method(s): A) 140 lb downhole hammer; wire line; 30" drop B) C)	Backfill Method: Well Construction — Date: 6/26/98

Elevation (feet) / Depth (feet)	Sampler Type	Blows/12 inches	OVM (ppm)	Sample Interval	Graphic Log	Well Construction	SOIL DESCRIPTIONS GROUP NAME (GROUP SYMBOL) color, consistency/density, moisture condition, other descriptions (Local Name or Material Type)	Moisture Content (%)	Dry Density (pcf)	Well Construction Details
0							Concrete Slab - 6 inches thick			Traffic-rated well box locking cap
			0				**POORLY GRADED GRAVEL WITH SAND AND CLAY (GP-GC)** yellowish brown 10YR 5/8, dense, moist (Fill)			8"-diameter borehole
							LEAN CLAY (CL) yellowish brown 10YR 5/8, stiff, moist			
5	A	52	0				**GRAVELLY SILT WITH SAND (ML-GM)** brownish yellow 10YR 6/6, very stiff, moist, gravel-subangular to subrounded, sand-fine grained			Neat cement grout to 11' below grade (bg)
							LEAN CLAY (CL) dark yellowish brown 10YR 5/6, very stiff, moist			
10	A	52/6"	0				**CLAYEY GRAVEL WITH SAND (GC)** dark yellowish brown 10YR 3/6, very dense, moist, gravel-angular, well graded			Bentonite seal from 11' to 13' bg
							LEAN CLAY (CL) dark yellowish brown 10YR 3/6, stiff, moist			2"-diameter Schedule 40 PVC blank well casing to 15' bg
15	A	65					**CLAYEY SAND WITH GRAVEL (SC)** dark yellowish brown 10YR 3/6, very dense, moist, sand and gravel-well graded			#3 RMC Lonestar sand from 13' to 31.5' bg
			0				**POORLY GRADED SAND WITH CLAY (SP-SC)** yellowish brown 10YR 5/8, dense, moist to wet, sand-medium grained			
			▽				**LEAN CLAY WITH SAND (CL)** yellowish brown 10YR 5/8, stiff, moist Groundwater level during drilling			2"-diameter Schedule 40 PVC well screen 0.020" slot size from 15' to 31.0' bg
							CLAYEY GRAVEL (GC) yellowish brown 10YR 5/8, dense, wet, gravel-well graded			
20	A	75	0				**INTERBEDDED CLAYEY GRAVEL AND CLAYEY SAND (SC-GC)** brownish yellow 10YR 6/6, very dense, wet, beds to 6 inches thick			
	A	52								
25	A	55/6"	21				**WELL GRADED SAND WITH SILT AND GRAVEL (SW-SM)** very dense, wet, with thin lenses of clay (2 inches thick)			
30	A	58	0							Threaded end cap

SCI **Subsurface Consultants, Inc.**
Geotechnical & Environmental Engineers

327 34TH STREET
OAKLAND, CALIFORNIA

JOB NUMBER	DATE	APPROVED
1039.007	7/6/98	

PLATE 3

LOG OF WELL NO. MW-5

Project Name & Location: 327 34th Street, Oakland, California	Ground Surface Elevation/TOC Elevation: 101.51 / 100.90
	Elevation Datum: MW-1 TOC = 100' (arbitrary)
Drilling Coordinates:	Start: Date 6/26/98 Time 1230 — Finish: Date 6/26/98 Time 1500
Drilling Company & Driller: West HazMat / Scott Havens	Drilling Fluid: N/A — Hole Diameter: 8"
Rig Type & Drilling Method: CME LAR - 75 - Propane	
Sampler Type(s): A) 2.0 California Sampler B) C)	Logged By: John Wolfe
Sampling Method(s): A) 140 lb downhole hammer; wire line; 30" drop B) C)	Backfill Method: Well Construction — Date: 6/26/98

Elevation (feet) / Depth (feet)	Sampler Type	Blows/12 inches	OVM (ppm)	Sample Interval	Graphic Log	Well Construction	SOIL DESCRIPTIONS GROUP NAME (GROUP SYMBOL) color, consistency/density, moisture condition, other descriptions (Local Name or Material Type)	Moisture Content (%)	Dry Density (pcf)	Well Construction Details
0							Concrete Slab - 6 inches thick **POORLY GRADED GRAVEL (GP)** brown 10YR 5/3, dense, dry (Aggregate Base) **LEAN CLAY (CL)** dark yellowish brown 10YR 3/6, stiff, moist			Traffic-rated well box locking cap 8"-diameter borehole
5	A	37	0				Color changes to yellowish brown 10YR 5/8			Neat cement grout to 11' below grade (bg)
10	A	62	0				**GRAVELLY CLAY WITH SAND (CL-GC)** dark yellowish brown 10YR 4/6, very stiff, moist, gravel well graded, subangular, variable			Bentonite seal from 11' to 13' bg 2"-diameter Schedule 40 PVC blank well casing to 15' bg
15	A	50					**LEAN CLAY (CL)** yellowish brown 10YR 5/4, very stiff, moist			#3 RMC Lonestar sand from 13' to 31.5' bg
20	A	75	0 ▽				**CLAYEY GRAVEL WITH SAND (GC)** dark yellowish brown 10YR 3/6, very dense, moist to wet **LENS OF LEAN CLAY (CL)** brownish yellow Groundwater level during drilling **CLAYEY SAND (SC)** brownish yellow 10YR 6/6, dense, wet			2"-diameter Schedule 40 PVC well screen 0.020" slot size from 15' to 31.0' bg
25	A	52	0				**LEAN CLAY (CL)** brownish yellow 10YR 6/6, very stiff, wet **CLAYEY GRAVEL (GC)** brownish yellow 10YR 6/6, dense, wet **SANDY SILT WITH CLAY (ML)** brownish yellow 10YR 6/6, very stiff, wet			
30	A	67	0				**CLAYEY SAND** brownish yellow 10YR 6/6, dense, wet			Threaded end cap

SCI **Subsurface Consultants, Inc.**
Geotechnical & Environmental Engineers

327 34TH STREET
OAKLAND, CALIFORNIA

JOB NUMBER	DATE	APPROVED
1039.007	7/6/98	

PLATE 4

LOG OF BORING NO. B-6

Project Name & Location: 327 34th Street, Oakland, California	Ground Surface Elevation:
	Elevation Datum:
Drilling Coordinates:	Start: Date 6/26/98 Time 1500 / Finish: Date 6/26/98 Time 1800
Drilling Company & Driller: West HazMat / Scott Havens	Drilling Fluid: N/A / Hole Diameter: 8"
Rig Type & Drilling Method: CME LAR - 75 - Propane	
Sampler Type(s): A) 2.0 California Sampler B) C)	Logged By: John Wolfe
Sampling Method(s): A) 140 lb downhole hammer, wire line; 30" drop B) C)	Backfill Method: Grout / Date: 6/26/98

Elevation (feet) / Depth (feet)	Sampler Type	Blows/12 inches	OVM (ppm)	Sample Interval	Graphic Log	SOIL DESCRIPTIONS **GROUP NAME (GROUP SYMBOL)** color, consistency/density, moisture condition, other descriptions (Local Name or Material Type)	LABORATORY DATA Moisture Content (%)	Dry Density (pcf)	Other
0						Concrete Slab - 6 inches thick			
						LEAN CLAY (CL) dark yellowish brown 10YR 3/6, stiff, moist			
5	A	47	0						
						GRADES TO SANDY LEAN CLAY WITH GRAVEL (CL) mottled dark yellowish brown 10YR 4/6 and pale brown 10YR 6/3, very stiff/hard, moist, sand-fine grained			
10	A	68	0						
15	A	46	0			Increasing silt content			
						GRADES TO SILT WITH SAND (ML-MH) brownish yellow 10YR 6/6, stiff, moist/wet			
20	A	52							
	A	24	0			**SILTY SAND (SM-SC)** pale brown 10YR 6/3, medium dense, wet, sand-fine grained			
						WELL GRADED SAND WITH SILT AND GRAVEL (SW-SM) light olive brown 2.5Y 5/6, very dense, wet			
25	A	68							
30									

SCI **Subsurface Consultants, Inc.**
Geotechnical & Environmental Engineers

327 34TH STREET
OAKLAND, CALIFORNIA

JOB NUMBER	DATE	APPROVED
1039.007	7/6/98	

PLATE 5

UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D2487-93)

MAJOR DIVISIONS			GROUP NAMES		
COARSE-GRAINED SOILS More than 50% retained on the No. 200 sieve	GRAVELS More than 50% of coarse fraction retained on No. 4 sieve	Clean gravels less than 5% fines	GW		Well-graded gravel, Well-graded gravel with sand
			GP		Poorly graded gravel, Poorly graded gravel with sand
		Gravels with more than 12% fines	GM		Silty gravel, Silty gravel with sand
			GC		Clayey gravel, Clayey gravel with sand
	SANDS 50% or more of coarse fraction passes No. 4 sieve	Clean sand less than 5% fines	SW		Well-graded sand, Well-graded sand with gravel
			SP		Poorly graded sand, Poorly graded sand with gravel
		Sands with more than 12% fines	SM		Silty sand, Silty sand with gravel
			SC		Clayey sand, Clayey sand with gravel
FINE-GRAINED SOILS 50% or more passes the No. 200 sieve	SILTS AND CLAYS Liquid Limit Less than 50%		ML		Silt, Silt with sand or gravel, Sandy or gravelly silt, Sandy or gravelly silt with gravel or sand
			CL		Lean clay, Lean clay with sand or gravel, Sandy or gravelly lean clay, Sandy or gravelly lean clay with gravel or sand
			OL		Organic silt or clay, Organic silt or clay with sand or gravel, Sandy or gravelly organic silt or clay, Sandy or gravelly organic silt or clay with gravel or sand
	SILTS AND CLAYS Liquid Limit Greater than 50%		MH		Elastic silt, Elastic silt with sand or gravel, Sandy or gravelly elastic silt, Sandy or gravelly elastic silt with gravel or sand
			CH		Fat clay, Fat clay with sand or gravel, Sandy or gravelly fat clay, Sandy or gravelly fat clay with gravel or sand
			OH		Organic silt or clay, Organic silt or clay with sand or gravel, Sandy or gravelly organic silt or clay, Sandy or gravelly organic silt or clay with gravel or sand
HIGHLY ORGANIC SOILS			Pt		Peat

For definition of dual and borderline symbols, see ASTM D2487-93.

KEY TO TEST DATA AND SYMBOLS

Perm	-	Permeability
Consol	-	Consolidation
LL	-	Liquid Limit
PI	-	Plasticity Index
Gs	-	Specific Gravity
MA	-	Particle Size Analysis
-200	-	Percent Passing No. 200 Sieve
ND	-	Not Detected
■	-	Tube Sample
⊠	-	Bag or Bulk Sample
⊟	-	Lost Sample
▽	-	First Groundwater
▼	-	Stabilized Groundwater

	Shear Strength (psf)	Confining Pressure (psf)	
TxUU	3200	(2600)	Unconsolidated-Undrained Triaxial Shear
TxCU	3200	(2600)	Consolidated-Undrained Triaxial Shear
TxCD	3200	(2600)	Consolidated-Drained Triaxial Shear
SSCU	3200	(2600)	Consolidated-Undrained Simple Shear
SSCD	3200	(2600)	Consolidated-Drained Simple Shear
DSCD	2700	(2000)	Consolidated-Drained Direct Shear
UC	470		Unconfined Compression
LVS	700		Laboratory Vane Shear
FV	300		Field Vane Shear
RFV			
TV	800		Torvane Shear
PP	400		Pocket Penetrometer *(actual reading divided by 2)*

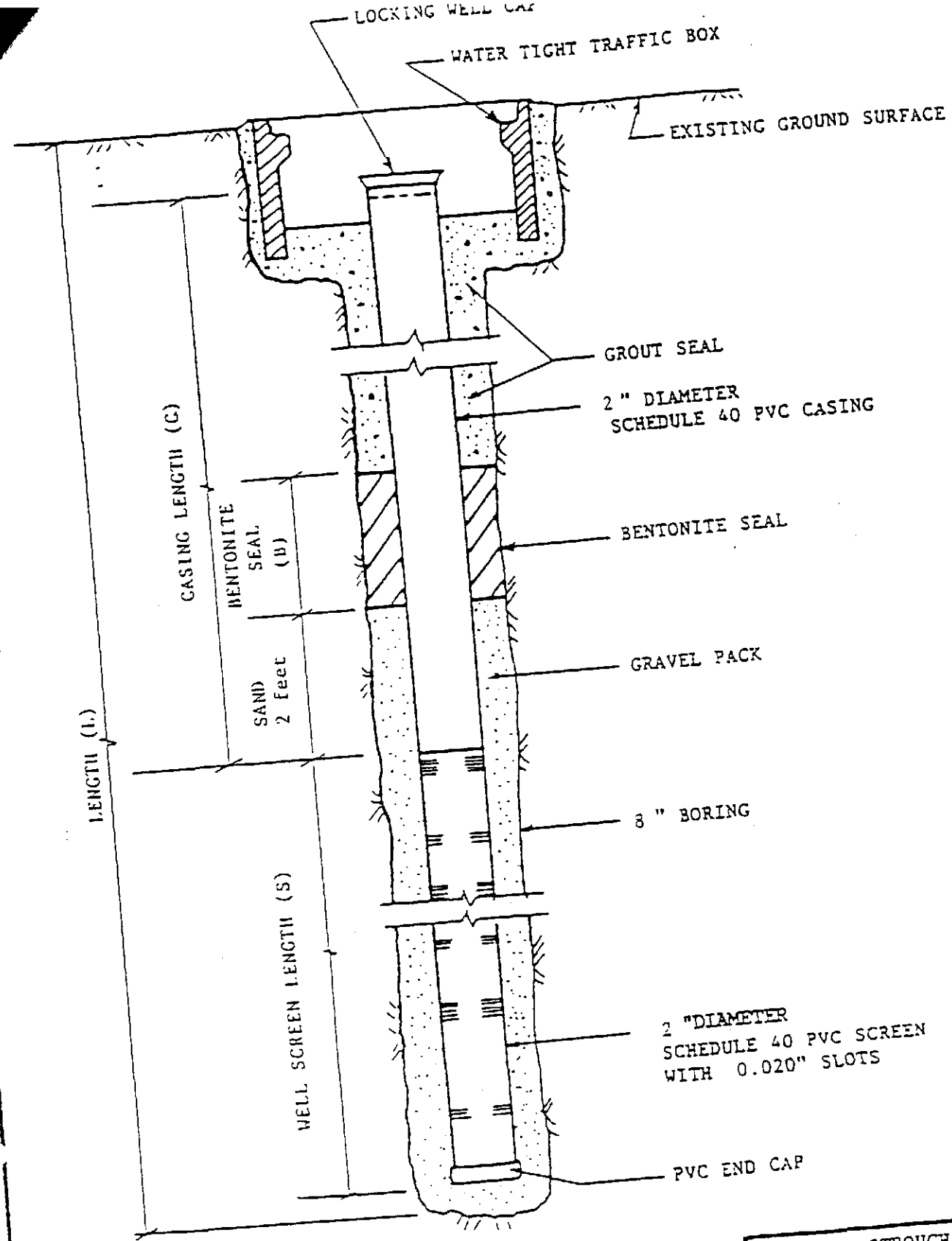
SUBSURFACE DATA LOG

LOG No. MW-1 DATE: 7-19-93
LOCATION: Val Strough Chevrolet
EQUIPMENT: Exploration Geoservices
PROJECT No.

DRY DENSITY (lbs cu. ft.)	MOISTURE (% of dry wt.)	"N" VALUE (blows/ft.)	OVM READING (ppm)	SAMPLE TYPE	DEPTH (ft.)	LOG	U.S.C.	
							GP	3" PCC Floor Slab GRAVELLY SAND (Fill), redish brown, moist, dense
							ML	SILT, brown, moist, dense
		core	--	S1	5		CL/ML	CLAYEY SILT, orange-brown-gray (mottled), moist, stiff, contains minor gravel fraction
		core	—	S2	10			
							CL	GRAVELLY CLAY, gray-orange (mottled), moist, stiff
		core	--	S3	15		SC	CLAYEY SAND, red-brown, moist, dense contains chert fragments in medium to coarse grained sand matrix
		core	---	S4	20		ML	CLAYEY SILT, olive-gray, moist, stiff contains medium to coarse sand stringers
		core	—	S5	▼ 25		SM	SILTY SAND, yellow-brown, moist, dense wet at 25 feet
					30			BOTTOM OF BORING 32 feet

FIGURE 6

GeoPlexus, Inc.



L= 32 feet
S= 15 feet
C= 17 feet
B= 1 foot

VAL STROUGH CHEVROLET		
DATE 7-19-93	SCALE n/a	DRAWN BY dcg
MONITORING WELL MW-1		
	Figure 9	

GeoPlexus, Inc.

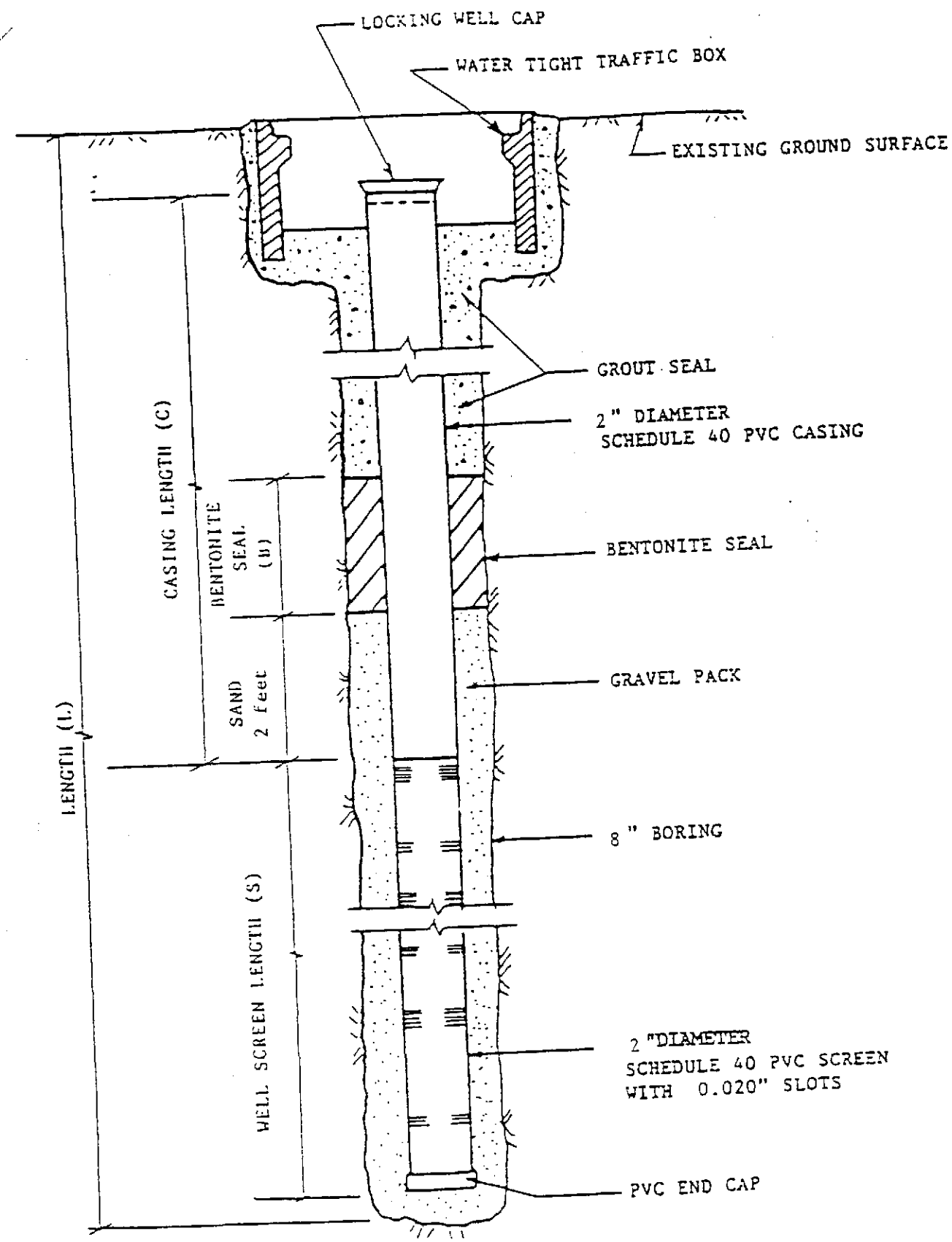
SUBSURFACE DATA LOG

LOG No. MW-2 DATE: 7-19-92
LOCATION: Val Strough Chevrolet
EQUIPMENT: Exploration Geoservices
PROJECT No.

DRY DENSITY (lbs cu. ft.)	MOISTURE (% of dry wt.)	"N" VALUE (blows/ft.)	OVM READING (ppm)	SAMPLE TYPE	DEPTH (ft.)	LOG	U.S.C.	
							GM	3" PCC Floor Slab GRAVELLY SAND, green, wet, loose
							CL	SILTY CLAY, redish-brown, moist, stiff very strong gasoline vapors
		core	--	S1	5			
							SC	CLAYEY SAND, yellow-brown, moist, dense strong gasoline vapors
		core	--	S2	10		SC	CLAYEY SAND, redish-brown-gray (mottled), moist, dense, green staining and strong gasoline vapors
		core	--	S3	15		SC	CLAYEY SAND, medium gray-brown, moist, dense very low vapor emissions
		core	--	S4	20		SM	SILTY SAND, gray-brown, moist, medium dense strong gasoline vapors ▼ wet at 22 feet
		core	--	S5	25		SC	CLAYEY SAND, redish-brown, wet, dense, fine to medium grained sand, strong gasoline vapors
					30			BOTTOM OF BORING 33 feet

SeaPlexus, Inc.

FIGURE 7



L= 33 feet
S= 15 feet
C= 18 feet
B= 1 foot

VAL STROUGH CHEVROLET		
DATE 7-20-93	SCALE n/a	DRAWN BY dcg
MONITORING WELL MW-2		
	Figure 10	

GeoPlexus, Inc.

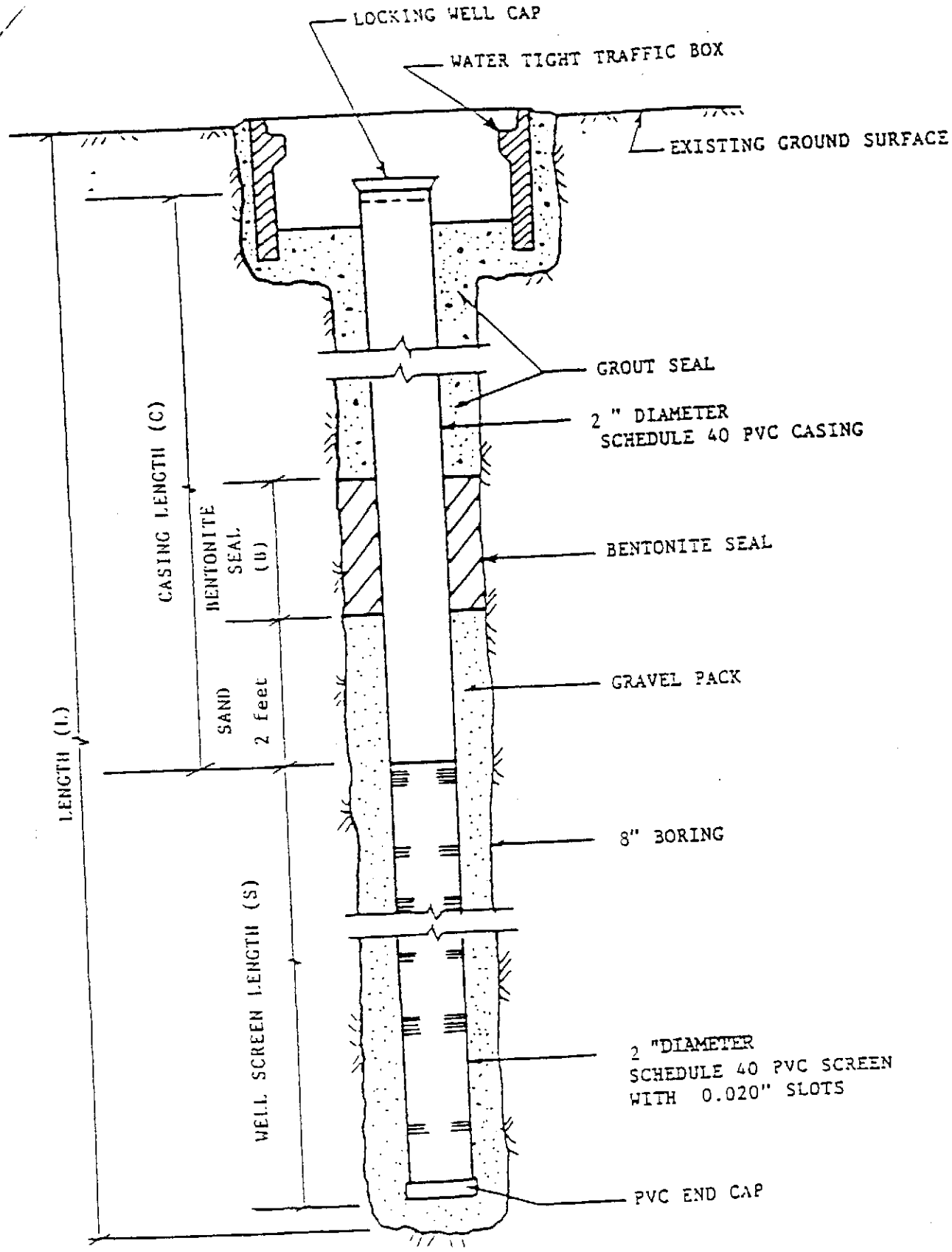
SUBSURFACE DATA

LOG No. MW-3 DATE: 7-20-93
LOCATION: Val Strough Chevrolet
EQUIPMENT: Exploration Geoservices
PROJECT No.

DRY DENSITY (lbs cu ft)	MOISTURE (% of dry wt)	"N" VALUE (blows/ft)	OVM READING (ppm)	SAMPLE TYPE	DEPTH (ft)	LOG	U.S.C.	
							SP	3" PCC Floor Slab GRAVELLY SAND, red, moist, dense (Fill)
							ML	SILTY SAND, red-brown, moist, dense
		core	—	S1	5			
							CL	GRAVELLY, SANDY CLAY, mottled orange-yellow-brown, moist, firm, contains chert fragments
		core	--	S2	10		SC	SANDY CLAY, yellow-brown, moist, firm, medium to coarse grained sand fraction, no odors
							SC	SANDY CLAY, orange-brown, moist, stiff
		core	—	S3	15		ML	SILTY CLAY, mottled olive-brown-gray, moist, stiff, strong gasoline vapors
		core	—	S4	20		SP	SAND, orange-brown, moist, dense, coarse-grained strong gasoline vapors wet at 23 feet
		core	—	S5	25			color change to greenish-brown (staining) grain size change to medium to coarse grained visable sheen on sample S5
					30			BOTTOM OF BORING 34 feet

FIGURE 8

GeoPlexus, Inc.



L= 34 feet
S= 16 feet
C= 18 feet
B= 1 foot

VAL STROUGH CHEVROLET		
DATE 7-20-93	SCALE n/a	DRAWN BY dcg
MONITORING WELL MW-3		
	Figure 11	

GeoPlexus, Inc.

ALAMEDA COUNTY
HEALTH CARE SERVICES
AGENCY
DAVID J. KEARS, Agency Director

ENVIRONMENTAL HEALTH SERVICES
ENVIRONMENTAL PROTECTION (LOP)
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577
(510) 567-6700
FAX (510) 337-9335

February 17, 1998

Don Strough
Concord Honda/Pontiac
1300 Concord Avenue
Concord, CA - 94520

Ref: 327 34th Street, Oakland, CA - 94520

Dear Mr. Strough:

I am in receipt of the workplan, dated January 16, 1998, prepared by Subsurface Consultants, Inc., for the above referenced project. This Department has reviewed the document and finds it acceptable with the following changes:

> The proposed monitoring well near the tune-up/lube area should be moved to the north and hence closer to the former underground storage tank area. This would enable us to identify the extent of the plume if the groundwater gradient tends towards the east rather than the predicted west.

If you have any questions, you may reach me at (510) 567-6764.

Sincerely,

Madhulla Logan

Madhulla Logan
Hazardous Material Specialist

C: **Jonathan Redding**
Fitzgerald Abbott and Beardsley, LLP
1221 Broadway, 21st Floor
Oakland, CA - 94612

Madhulla Logan
Alameda County Health Care Services Agency
1131 Harbor Bay Parkway, 2nd Floor
Alameda, CA - 94502

GROUNDWATER DEPTHS

Project Name: 327 34th St.

Job No.: 1039.007

Measured by: DWA

Well	Date	Time	Groundwater Depth (feet)	Comments
MW-1	6/30/98	0745	18.21	no product
MW-2		0800	19' 8¼"	Top of Product = 19' 2⅜" Product thickness = 5⅜" Bailed = 60 ml
MW-3		0740	19.41	no product
MW-4		0720	16.93	no product
MW-5	↓	0730	20.60	no product

WELL SAMPLING FORM

Project Name: 329 34th St. Well Number: MW-1

Job No.: 1039.007 Well Casing Diameter: 2 inches

Sampled By: DWA Date: 6/30/98

TOC Elevation: _____ Weather: foggy

Depth to Casing Bottom (below TOC) 32.00 feet

Depth to Groundwater Before Purging (below TOC) 18.21 feet

Feet of Water in Well 13.79 feet

Depth to Groundwater When 80% Recovered 20.97 feet

Casing Volume (feet of water x Casing DIA ^{2} x 0.0408) 2.3 gallons

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

Free Product none

Purge Method disposable bailer fast recharge

FIELD MEASUREMENTS

D.O. = 5 ppm
CO_2 = 204 ppm

Gallons Removed	Time	pH	Temp (°C / °F)	Conductivity (micromhos/cm)	~~Salinity S%~~	Comments
2		6.75	17.0	675		semi-clear/no odor
4		6.40	17.0	725		
6		6.23	17.0	700		
8		6.16	17.0	700		

Total Gallons Purged 8 gallons

Depth to Groundwater Before Sampling (below TOC) 19.44 feet

Sampling Method disposable bailer

Containers Used 7 (40 ml) 2 (liter) _____ (pint) _____

Subsurface Consultants

JOB NUMBER DATE APPROVED PLATE

WELL SAMPLING FORM

Project Name: 327 34th St. Well Number: MW-2

Job No.: 1039.007 Well Casing Diameter: 2 inches

Sampled By: DWA Date: 6/30/98

TOC Elevation: _____ Weather: foggy

Depth to Casing Bottom (below TOC) 33.00 feet

Depth to Groundwater Before Purging (below TOC) 19.70 feet

Feet of Water in Well 13.30 feet

Depth to Groundwater When 80% Recovered 22.36 feet

Casing Volume (feet of water x Casing DIA ^{2} x 0.0408) 2.2 gallons

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

Free Product ~~5~~ 5 3/8" thick - 2½" visible in bailer

Purge Method disposable bailer immediate recharge

FIELD MEASUREMENTS

D.O. = 2.2 ppm
CO_2 = 185 ppm

Gallons Removed	Time	pH	Temp (°C / °F)	Conductivity (micromhos/cm)	Salinity S%	Comments
1		6.04	22.0	355		muddy / strong odor + sheen
3		6.02	21.5	420		decreasing odor/sheen
5		5.98	22.0	460		
7		5.99	22.0	525		
9		5.98	21.5	525		

Total Gallons Purged 9 gallons

Depth to Groundwater Before Sampling (below TOC) 19.70 feet

Sampling Method disposable bailer

Containers Used 7 (40 ml) 2 (liter) _____ (pint) _____

Subsurface Consultants

JOB NUMBER DATE APPROVED PLATE

WELL SAMPLING FORM

Project Name: 327 34th st.
Well Number: MW-3
Job No.: 1039.007
Well Casing Diameter: 2 inches
Sampled By: DWA
Date: 6/30/98
TOC Elevation:
Weather: foggy

Depth to Casing Bottom (below TOC) 34.00 feet
Depth to Groundwater Before Purging (below TOC) 19.47 feet
Feet of Water in Well 14.53 feet
Depth to Groundwater When 80% Recovered 22.38 feet
Casing Volume (feet of water x Casing DIA ² x 0.0408) 2.4 gallons
Depth Measurement Method ~~Tape & Paste~~ / (Electronic Sounder) / Other
Free Product none
Purge Method disposable bailer

fast recharge

FIELD MEASUREMENTS

D.O. = 2.2 ppm
CO_2 = 300 ppm

Gallons Removed	Time	pH	Temp (°C / °F)	Conductivity (micromhos/cm)	Salinity S%	Comments
2		5.90	19.5	750		murky/strong odor/sheen
4		5.93	19.0	775		decreasing sheen/odor
6		6.00	19.0	800		decreasing turbidity
8		6.03	20.0	800		↓

Total Gallons Purged 8 gallons
Depth to Groundwater Before Sampling (below TOC) 19.53 feet
Sampling Method disposable bailer
Containers Used 7 (40 ml) 2 (liter) (pint)

Subsurface Consultants

JOB NUMBER | DATE | APPROVED | PLATE

WELL DEVELOPMENT FORM

Project Name: 327 34th St. Well Number: MW-4

Job No.: 1039.007 Well Casing Diameter: 2 inches

Developed By: DWA Date: 6/30/98

TOC Elevation: _____ Weather: foggy

Depth to Casing Bottom (below TOC) 31.00 feet

Depth to Groundwater (below TOC) 16.93 feet

Feet of Water in Well 14.07 feet

Casing Volume (feet of water x Casing DIA ^{2} x 0.0408) 2.3 gallons

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

Development Method disposable bailer

Cast Recharge no product

FIELD MEASUREMENTS

D.O. = 2.6 ppm
CO_2 = 222 ppm

Gallons Removed	pH	Temp (°c)	Conductivity (micromhos/cm)	Salinity S%	Comments
1	6.14	18.0	1325		murky/no odor
3	6.36	18.0	1525		
5	6.28	18.0	1500		
7	6.39	18.0	1375		
9	6.27	18.5	1275		
12	6.21	18.5	1250		decreasing turbidity
15	6.17	18.5	1200		
~~R~~20	6.14	18.0	1075		
25	6.18	18.5	1050		

Total Gallons Removed 25 gallons

Depth to Groundwater After Development (below TOC) 17.71 feet

Subsurface Consultants

JOB NUMBER DATE APPROVED PLATE

WELL DEVELOPMENT FORM

Project Name: 327 34th St. Well Number: MW-5

Job No.: 1039.007 Well Casing Diameter: 2 inches

Developed By: DWA Date: 6/30/98

TOC Elevation: _____ Weather: foggy

Depth to Casing Bottom (below TOC) 31.00 feet

Depth to Groundwater (below TOC) 20.60 feet

Feet of Water in Well 10.40 feet

Casing Volume (feet of water x Casing DIA ^{2} x 0.0408) 1.7 gallons

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

Development Method disposable bailer

fast recharge
no product

FIELD MEASUREMENTS

D.O. = 4.3 ppm
CO_2 = 220 ppm

Gallons Removed	pH	Temp (°c)	Conductivity (micromhos/cm)	Salinity S%	Comments
1	5.90	21.0	370		murky/no odor
3	6.00	20.5	430		
5	6.03	21.0	435		
7	6.13	21.0	420		
9	6.22	21.0	445		
12	6.13	21.0	465		decreasing turbidity
15	6.10	21.0	550		
18	6.10	21.0	525		

Total Gallons Removed 18 gallons

Depth to Groundwater After Development (below TOC) 21.82 feet

Subsurface Consultants

JOB NUMBER | DATE | APPROVED | PLATE

GROUNDWATER DEPTHS

Project Name: 327 34th St.

Job No.: 1039.007

Measured by: DWA

Well	Date	Time	Groundwater Depth (feet)	Comments
MW-1	7/29/98	0810	18.74	no product
MW-2		0825	20' 1 3/8"	Top of Product = 19' 9 7/8" Product Thickness = 3 1/2" Bailed = 1 VOA (40ml)
MW-3		0815	20.01	no product
MW-4		0755	17.48	no product
MW-5	↓	0805	21.52	no product

GROUNDWATER DEPTHS

Project Name: 327 34th St.

Job No.: 1039.007

Measured by: DWA

Well	Date	Time	Groundwater Depth (feet)	Comments
MW-1	8/26/98	1145	19.28	no product
MW-2		1200	20'6½"	Top of Product = 20'5½" Product thickness=1" none seen in Bailer Bailed = none
MW-3		1150	20.62	no product
MW-4		1135	18.05	no product
MW-5	↓	1140	22.21	no product

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

ANALYTICAL REPORT

Prepared for:

Subsurface Consultants
3736 Mt. Diablo Blvd.
Suite 200
Lafayette, CA 94549

Date: 14-JUL-98
Lab Job Number: 134341
Project ID: 1039.007
Location: 327 34th St.

Reviewed by: _____

Reviewed by: _____

CLIENT: Subsurface Consultants
PROJECT ID: 1039.007
LOCATION: 327 34th St.
MATRIX: Filtrate

DATE REPORTED: 07/14/98

Metals Analytical Report

				Iron					
Sample ID	Lab ID	Sample Date	Receive Date	Result (ug/L)	Reporting Limit (ug/L)	IDF	QC Batch	Method	Analysis Date
MW-1	134341-001	06/30/98	07/01/98	150	100	1	41797	EPA 6010A	07/07/98
MW-3	134341-003	06/30/98	07/01/98	1400	100	1	41797	EPA 6010A	07/07/98
MW-4	134341-004	06/30/98	07/01/98	140	100	1	41797	EPA 6010A	07/07/98

Curtis & Tompkins, Ltd.

CLIENT: Subsurface Consultants
PROJECT ID: 1039.007
LOCATION: 327 34th St.
MATRIX: Filtrate

DATE REPORTED: 07/14/98

Metals Analytical Report

				Manganese					
Sample ID	Lab ID	Sample Date	Receive Date	Result (ug/L)	Reporting Limit (ug/L)	IDF	QC Batch	Method	Analysis Date
MW-1	134341-001	06/30/98	07/01/98	46	10	1	41797	EPA 6010A	07/07/98
MW-3	134341-003	06/30/98	07/01/98	9800	10	1	41797	EPA 6010A	07/07/98
MW-4	134341-004	06/30/98	07/01/98	4300	10	1	41797	EPA 6010A	07/07/98

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CLIENT: Subsurface Consultants
JOB NUMBER: 134341

DATE REPORTED: 07/14/98

BATCH QC REPORT
PREP BLANK

Compound	Result	Reporting Limit	Units	IDF	QC Batch	Method	Analysis Date
Iron	ND	100	ug/L	1	41797	EPA 6010A	07/07/98
Manganese	ND	10	ug/L	1	41797	EPA 6010A	07/07/98

ND = Not Detected at or above reporting limit

Curtis & Tompkins, Ltd.

CLIENT: Subsurface Consultants
JOB NUMBER: 134341

DATE REPORTED: 07/14/98

BATCH QC REPORT
BLANK SPIKE / BLANK SPIKE DUPLICATE

Compound	Spike Amount	BS Result	BSD Result	Units	BS% Rec.	BSD% Rec.	Rec. Limits	RPD %	RPD Limit	QC Batch	Method	Analysis Date
Iron	1000	1087	1085	ug/L	109	109	80-120	0	35	41797	EPA 6010A	07/07/98
Manganese	500	551	549	ug/L	110	110	80-120	0	35	41797	EPA 6010A	07/07/98

Aromatic Volatile Organics
EPA 8020 Analyte List

Client:	Subsurface Consultants	Analysis Method:	EPA 8260
Project#:	1039.007	Prep Method:	EPA 5030
Location:	327 34th St.		

Field ID:	MW-1	Sampled:	06/30/98
Lab ID:	134341-001	Received:	07/01/98
Matrix:	Water	Extracted:	07/07/98
Batch#:	41819	Analyzed:	07/07/98
Units:	ug/L		
Diln Fac:	1		

Analyte	Result	Reporting Limit
MTBE	2.1	2.0
Benzene	ND	0.5
Toluene	ND	0.5
Chlorobenzene	ND	0.5
Ethylbenzene	2.1	0.5
m,p-Xylenes	0.55	0.5
o-Xylene	ND	0.5
1,3-Dichlorobenzene	ND	0.5
1,4-Dichlorobenzene	ND	0.5
1,2-Dichlorobenzene	ND	0.5

Surrogate	%Recovery	Recovery Limits
1,2-Dichloroethane-d4	99	85-121
Toluene-d8	97	92-110
Bromofluorobenzene	96	84-115

Aromatic Volatile Organics
EPA 8020 Analyte List

Client:	Subsurface Consultants	Analysis Method:	EPA 8260
Project#:	1039.007	Prep Method:	EPA 5030
Location:	327 34th St.		

Field ID:	MW-2	Sampled:	06/30/98
Lab ID:	134341-002	Received:	07/01/98
Matrix:	Water	Extracted:	07/08/98
Batch#:	41873	Analyzed:	07/08/98
Units:	ug/L		
Diln Fac:	125		

Analyte	Result	Reporting Limit
MTBE	5500	250
Benzene	7300	63
Toluene	18000	63
Chlorobenzene	ND	63
Ethylbenzene	2500	63
m,p-Xylenes	11000	63
o-Xylene	4600	63
1,3-Dichlorobenzene	ND	63
1,4-Dichlorobenzene	ND	63
1,2-Dichlorobenzene	ND	63

Surrogate	%Recovery	Recovery Limits
1,2-Dichloroethane-d4	99	85-121
Toluene-d8	99	92-110
Bromofluorobenzene	100	84-115

Aromatic Volatile Organics
EPA 8020 Analyte List

Client:	Subsurface Consultants	Analysis Method:	EPA 8260
Project#:	1039.007	Prep Method:	EPA 5030
Location:	327 34th St.		

Field ID:	MW-3	Sampled:	06/30/98
Lab ID:	134341-003	Received:	07/01/98
Matrix:	Water	Extracted:	07/11/98
Batch#:	41930	Analyzed:	07/11/98
Units:	ug/L		
Diln Fac:	83.33		

Analyte	Result	Reporting Limit
MTBE	3900	170
Benzene	4800	42
Toluene	11000	42
Chlorobenzene	ND	42
Ethylbenzene	1200	42
m,p-Xylenes	4700	42
o-Xylene	2400	42
1,3-Dichlorobenzene	ND	42
1,4-Dichlorobenzene	ND	42
1,2-Dichlorobenzene	ND	42

Surrogate	%Recovery	Recovery Limits
1,2-Dichloroethane-d4	100	85-121
Toluene-d8	98	92-110
Bromofluorobenzene	98	84-115

Aromatic Volatile Organics
EPA 8020 Analyte List

Client: Subsurface Consultants
Project#: 1039.007
Location: 327 34th St.

Analysis Method: EPA 8260
Prep Method: EPA 5030

Field ID: MW-4
Lab ID: 134341-004
Matrix: Water
Batch#: 41873
Units: ug/L
Diln Fac: 25

Sampled: 06/30/98
Received: 07/01/98
Extracted: 07/08/98
Analyzed: 07/08/98

Analyte	Result	Reporting Limit
MTBE	1800	50
Benzene	2200	13
Toluene	930	13
Chlorobenzene	ND	13
Ethylbenzene	850	13
m,p-Xylenes	1900	13
o-Xylene	200	13
1,3-Dichlorobenzene	ND	13
1,4-Dichlorobenzene	ND	13
1,2-Dichlorobenzene	ND	13

Surrogate	%Recovery	Recovery Limits
1,2-Dichloroethane-d4	98	85-121
Toluene-d8	99	92-110
Bromofluorobenzene	99	84-115

Aromatic Volatile Organics
EPA 8020 Analyte List

Client:	Subsurface Consultants	Analysis Method:	EPA 8260
Project#:	1039.007	Prep Method:	EPA 5030
Location:	327 34th St.		

Field ID:	MW-5	Sampled:	06/30/98
Lab ID:	134341-005	Received:	07/01/98
Matrix:	Water	Extracted:	07/07/98
Batch#:	41819	Analyzed:	07/07/98
Units:	ug/L		
Diln Fac:	1		

Analyte	Result	Reporting Limit
MTBE	23	2.0
Benzene	ND	0.5
Toluene	ND	0.5
Chlorobenzene	ND	0.5
Ethylbenzene	ND	0.5
m,p-Xylenes	ND	0.5
o-Xylene	ND	0.5
1,3-Dichlorobenzene	ND	0.5
1,4-Dichlorobenzene	ND	0.5
1,2-Dichlorobenzene	ND	0.5

Surrogate	%Recovery	Recovery Limits
1,2-Dichloroethane-d4	102	85-121
Toluene-d8	98	92-110
Bromofluorobenzene	95	84-115

Lab #: 134341

BATCH QC REPORT

Curtis & Tompkins, Ltd.

Purgeable Aromatics by GC/MS
EPA 8020 Analyte List

Client: Subsurface Consultants
Project#: 1039.007
Location: 327 34th St.

Analysis Method: EPA 8260
Prep Method: EPA 5030

METHOD BLANK

Matrix: Water
Batch#: 41819
Units: ug/L
Diln Fac: 1

Prep Date: 07/06/98
Analysis Date: 07/06/98

MB Lab ID: QC74148

Analyte	Result	Reporting Limit
MTBE	ND	2.0
Benzene	ND	0.5
Toluene	ND	0.5
Chlorobenzene	ND	0.5
Ethylbenzene	ND	0.5
m,p-Xylenes	ND	0.5
o-Xylene	ND	0.5
1,3-Dichlorobenzene	ND	0.5
1,4-Dichlorobenzene	ND	0.5
1,2-Dichlorobenzene	ND	0.5

Surrogate	%Rec	Recovery Limits
1,2-Dichloroethane-d4	100	85-121
Toluene-d8	99	92-110
Bromofluorobenzene	98	84-115

Lab #: 134341

BATCH QC REPORT

Curtis & Tompkins, Ltd.

Purgeable Aromatics by GC/MS
EPA 8020 Analyte List

Client: Subsurface Consultants
Project#: 1039.007
Location: 327 34th St.

Analysis Method: EPA 8260
Prep Method: EPA 5030

METHOD BLANK

Matrix: Water
Batch#: 41930
Units: ug/L
Diln Fac: 1

Prep Date: 07/11/98
Analysis Date: 07/11/98

MB Lab ID: QC74584

Analyte	Result	Reporting Limit
MTBE	ND	2.0
Benzene	ND	0.5
Toluene	ND	0.5
Chlorobenzene	ND	0.5
Ethylbenzene	ND	0.5
m,p-Xylenes	ND	0.5
o-Xylene	ND	0.5
1,3-Dichlorobenzene	ND	0.5
1,4-Dichlorobenzene	ND	0.5
1,2-Dichlorobenzene	ND	0.5

Surrogate	%Rec	Recovery Limits
1,2-Dichloroethane-d4	101	85-121
Toluene-d8	101	92-110
Bromofluorobenzene	101	84-115

Purgeable Aromatics by GC/MS
EPA 8020 Analyte List

Client: Subsurface Consultants
Project#: 1039.007
Location: 327 34th St.

Analysis Method: EPA 8260
Prep Method: EPA 5030

METHOD BLANK

Matrix: Water
Batch#: 41930
Units: ug/L
Diln Fac: 1

Prep Date: 07/11/98
Analysis Date: 07/11/98

MB Lab ID: QC74587

Analyte	Result	Reporting Limit
MTBE	ND	2.0
Benzene	ND	0.5
Toluene	ND	0.5
Chlorobenzene	ND	0.5
Ethylbenzene	ND	0.5
m,p-Xylenes	ND	0.5
o-Xylene	ND	0.5
1,3-Dichlorobenzene	ND	0.5
1,4-Dichlorobenzene	ND	0.5
1,2-Dichlorobenzene	ND	0.5

Surrogate	%Rec	Recovery Limits
1,2-Dichloroethane-d4	100	85-121
Toluene-d8	98	92-110
Bromofluorobenzene	99	84-115

Purgeable Aromatics by GC/MS
EPA 8020 Analyte List

Client: Subsurface Consultants
Project#: 1039.007
Location: 327 34th St.

Analysis Method: EPA 8260
Prep Method: EPA 5030

LABORATORY CONTROL SAMPLE

Matrix: Water
Batch#: 41930
Units: ug/L
Diln Fac: 1

Prep Date: 07/11/98
Analysis Date: 07/11/98

LCS Lab ID: QC74583

Analyte	Result	Spike Added	%Rec #	Limits
Benzene	45.1	50	90	87-117
Toluene	46.12	50	92	88-116
Chlorobenzene	46.33	50	93	87-117

Surrogate	%Rec	Limits
1,2-Dichloroethane-d4	98	85-121
Toluene-d8	99	92-110
Bromofluorobenzene	101	84-115

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits
Spike Recovery: 0 out of 3 outside limits

Purgeable Aromatics by GC/MS
EPA 8020 Analyte List

Client: Subsurface Consultants
Project#: 1039.007
Location: 327 34th St.

Analysis Method: EPA 8260
Prep Method: EPA 5030

BLANK SPIKE/BLANK SPIKE DUPLICATE

Matrix: Water
Batch#: 41819
Units: ug/L
Diln Fac: 1

Prep Date: 07/06/98
Analysis Date: 07/06/98

BS Lab ID: QC74145

Analyte	Spike Added	BS	%Rec #	Limits
Benzene	50	50.62	101	87-117
Toluene	50	52.11	104	88-116
Chlorobenzene	50	52.15	104	87-117

Surrogate	%Rec	Limits
1,2-Dichloroethane-d4	98	85-121
Toluene-d8	98	92-110
Bromofluorobenzene	97	84-115

BSD Lab ID: QC74146

Analyte	Spike Added	BSD	%Rec #	Limits	RPD #	Limit
Benzene	50	49.21	98	87-117	3	10
Toluene	50	50.46	101	88-116	3	10
Chlorobenzene	50	50.6	101	87-117	3	10

Surrogate	%Rec	Limits
1,2-Dichloroethane-d4	98	85-121
Toluene-d8	99	92-110
Bromofluorobenzene	98	84-115

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits
RPD: 0 out of 3 outside limits
Spike Recovery: 0 out of 6 outside limits

Lab #: 134341

BATCH QC REPORT

Curtis & Tompkins, Ltd.

Purgeable Aromatics by GC/MS
EPA 8020 Analyte List

Client: Subsurface Consultants
Project#: 1039.007
Location: 327 34th St.

Analysis Method: EPA 8260
Prep Method: EPA 5030

BLANK SPIKE/BLANK SPIKE DUPLICATE

Matrix: Water
Batch#: 41873
Units: ug/L
Diln Fac: 1

Prep Date: 07/08/98
Analysis Date: 07/08/98

BS Lab ID: QC74351

Analyte	Spike Added	BS	%Rec #	Limits
Benzene	50	46.24	92	87-117
Toluene	50	47.53	95	88-116
Chlorobenzene	50	47.91	96	87-117

Surrogate	%Rec	Limits
1,2-Dichloroethane-d4	98	85-121
Toluene-d8	98	92-110
Bromofluorobenzene	96	84-115

BSD Lab ID: QC74352

Analyte	Spike Added	BSD	%Rec #	Limits	RPD #	Limit
Benzene	50	44.92	90	87-117	3	10
Toluene	50	46.23	92	88-116	3	10
Chlorobenzene	50	46.78	94	87-117	2	10

Surrogate	%Rec	Limits
1,2-Dichloroethane-d4	97	85-121
Toluene-d8	99	92-110
Bromofluorobenzene	97	84-115

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits
RPD: 0 out of 3 outside limits
Spike Recovery: 0 out of 6 outside limits

Lab #: 134341

BATCH QC REPORT

Curtis & Tompkins, Ltd.

Purgeable Aromatics by GC/MS
EPA 8020 Analyte List

Client: Subsurface Consultants
Project#: 1039.007
Location: 327 34th St.

Analysis Method: EPA 8260
Prep Method: EPA 5030

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

Field ID: ZZZZZZ
Lab ID: 134425-018
Matrix: Water
Batch#: 41930
Units: ug/L
Diln Fac: 1

Sample Date: 07/01/98
Received Date: 07/02/98
Prep Date: 07/11/98
Analysis Date: 07/11/98

MS Lab ID: QC74585

Analyte	Spike Added	Sample	MS	%Rec #	Limits
Benzene	50	<0.5	42.64	85	80-116
Toluene	50	<0.5	44.2	88	82-114
Chlorobenzene	50	<0.5	42.89	86	79-115

Surrogate	%Rec	Limits
1,2-Dichloroethane-d4	100	85-121
Toluene-d8	99	92-110
Bromofluorobenzene	100	84-115

MSD Lab ID: QC74586

Analyte	Spike Added	MSD	%Rec #	Limits	RPD #	Limit
Benzene	50	42.44	85	80-116	0	10
Toluene	50	43.35	87	82-114	2	10
Chlorobenzene	50	42.74	85	79-115	0	10

Surrogate	%Rec	Limits
1,2-Dichloroethane-d4	102	85-121
Toluene-d8	99	92-110
Bromofluorobenzene	101	84-115

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits
RPD: 0 out of 3 outside limits
Spike Recovery: 0 out of 6 outside limits

TVH-Total Volatile Hydrocarbons

Client: Subsurface Consultants
Project#: 1039.007
Location: 327 34th St.

Analysis Method: EPA 8015M
Prep Method: EPA 5030

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
134341-001	MW-1	41871	06/30/98	07/09/98	07/09/98	
134341-002	MW-2	41900	06/30/98	07/10/98	07/10/98	
134341-003	MW-3	41900	06/30/98	07/10/98	07/10/98	
134341-004	MW-4	41900	06/30/98	07/10/98	07/10/98	

Matrix: Water

Analyte Diln Fac:	Units	134341-001 1	134341-002 10	134341-003 10	134341-004 1
Gasoline C7-C12	ug/L	84	72000	51000	10000
Surrogate					
Trifluorotoluene	%REC	113	116	117	126
Bromofluorobenzene	%REC	107	127	126	140

TVH-Total Volatile Hydrocarbons

Client: Subsurface Consultants
Project#: 1039.007
Location: 327 34th St.

Analysis Method: EPA 8015M
Prep Method: EPA 5030

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
134341-005	MW-5	41900	06/30/98	07/10/98	07/10/98	

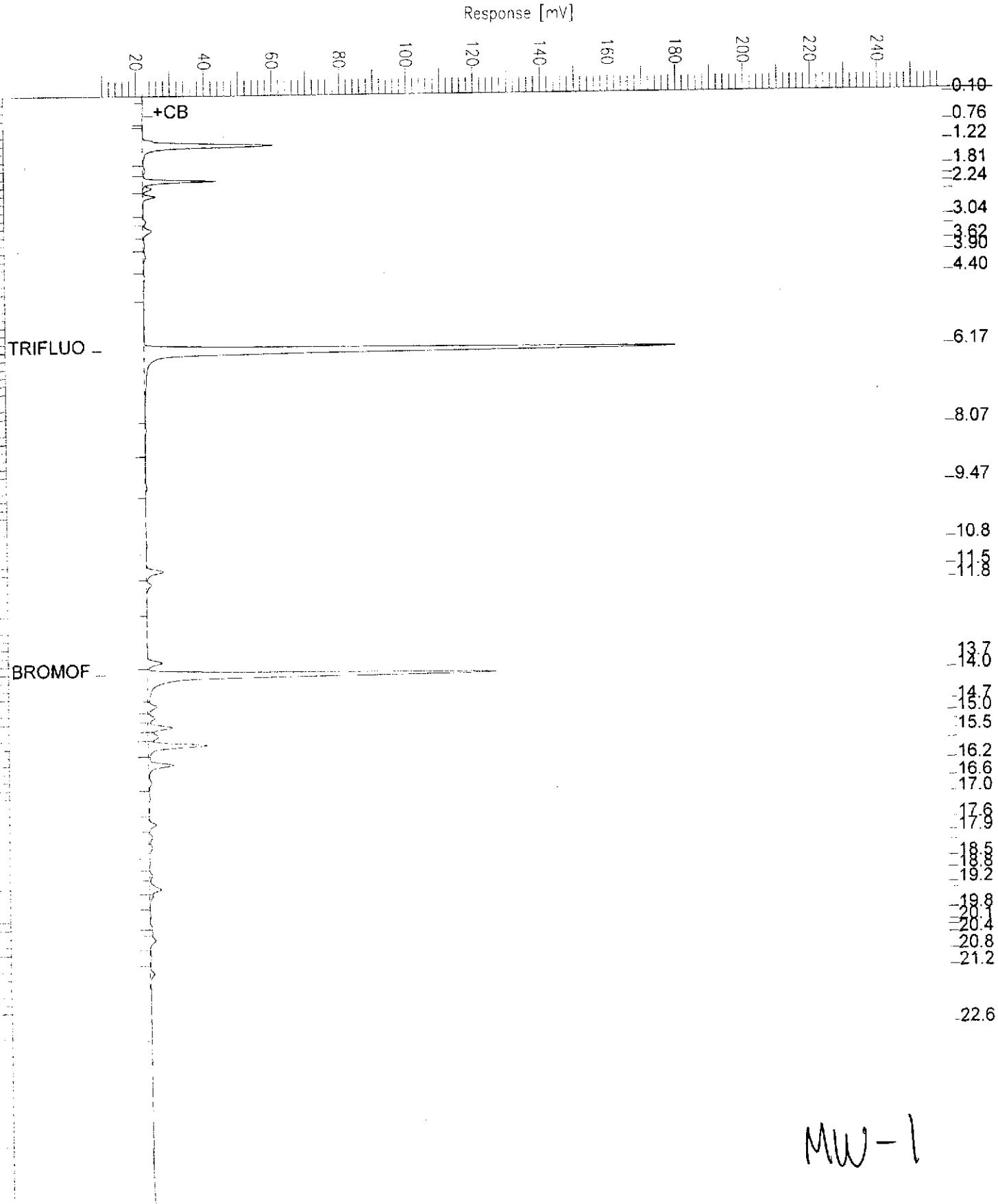
Matrix: Water

Analyte	Units	134341-005
Diln Fac:		1
Gasoline C7-C12	ug/L	<50
Surrogate		
Trifluorotoluene	%REC	113
Bromofluorobenzene	%REC	106

GC05 'H' File TVH

Sample Name : S,134341-001,41871,TVH ONLY,
FileName : G:\GC05\DATA\189G037.raw
Method : TVHBTXE
Start Time : 0.00 min End Time : 26.80 min
Scale Factor: -1.0 Plot Offset: 9 mV

Sample #:
Date : 7/9/98 08:01 AM
Time of Injection: 7/9/98 07:34 AM
Low Point : 9.26 mV High Point : 259.26 mV
Plot Scale: 250.0 mV

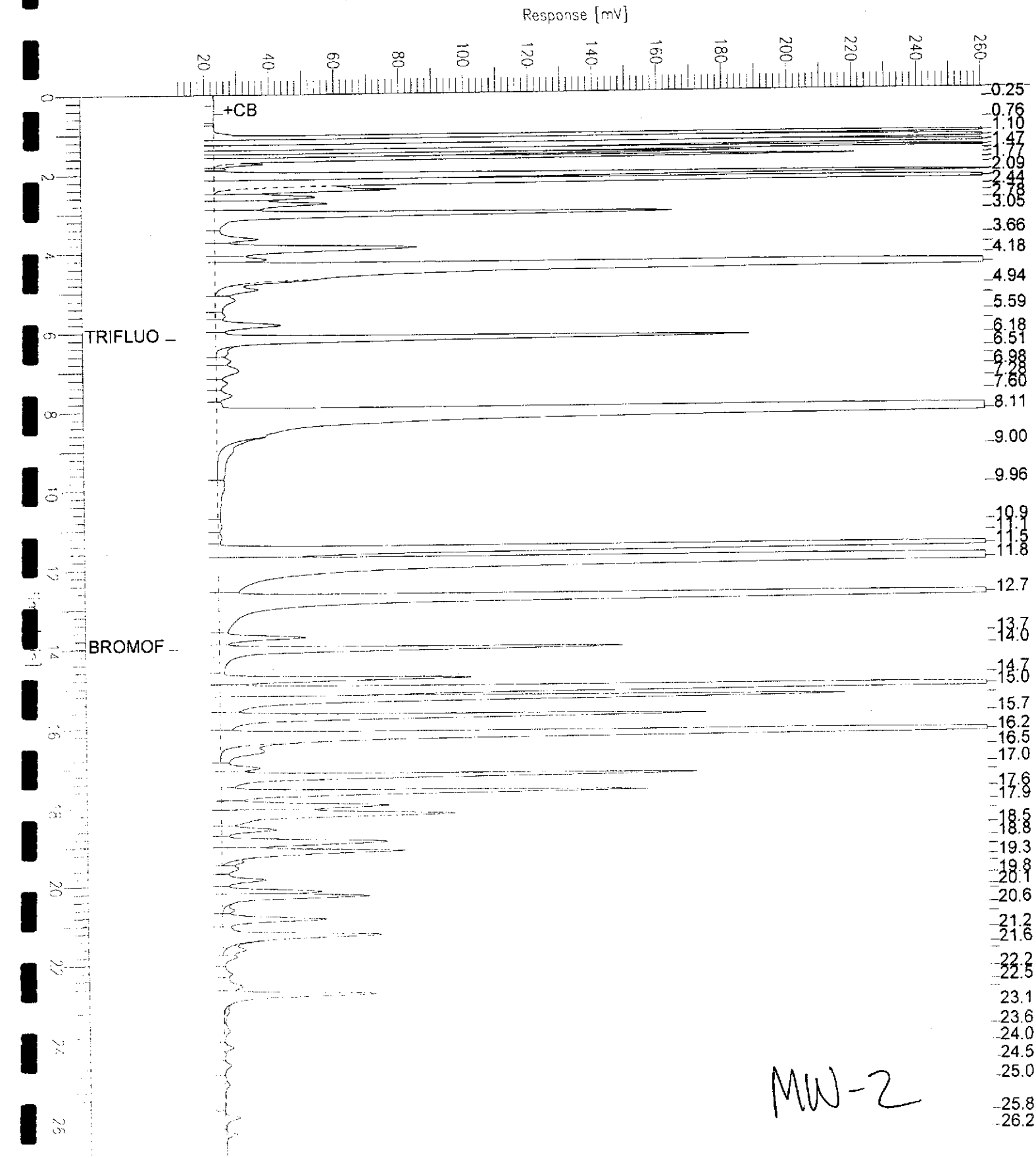


MW-1

GC05 'H' File TVH

Sample Name : RR,D,134341-002,41900,TVH ONLY,
FileName : G:\GC05\DATA\190G029.raw
Method : TVHBTXE
Start Time : 0.00 min End Time : 26.80 min
Scale Factor: -1.0 Plot Offset: 10 mV

Sample #:
Date : 7/10/98 05:29 AM
Time of Injection: 7/10/98 05:02 AM
Low Point : 10.39 mV High Point : 260.39 mV
Plot Scale: 250.0 mV

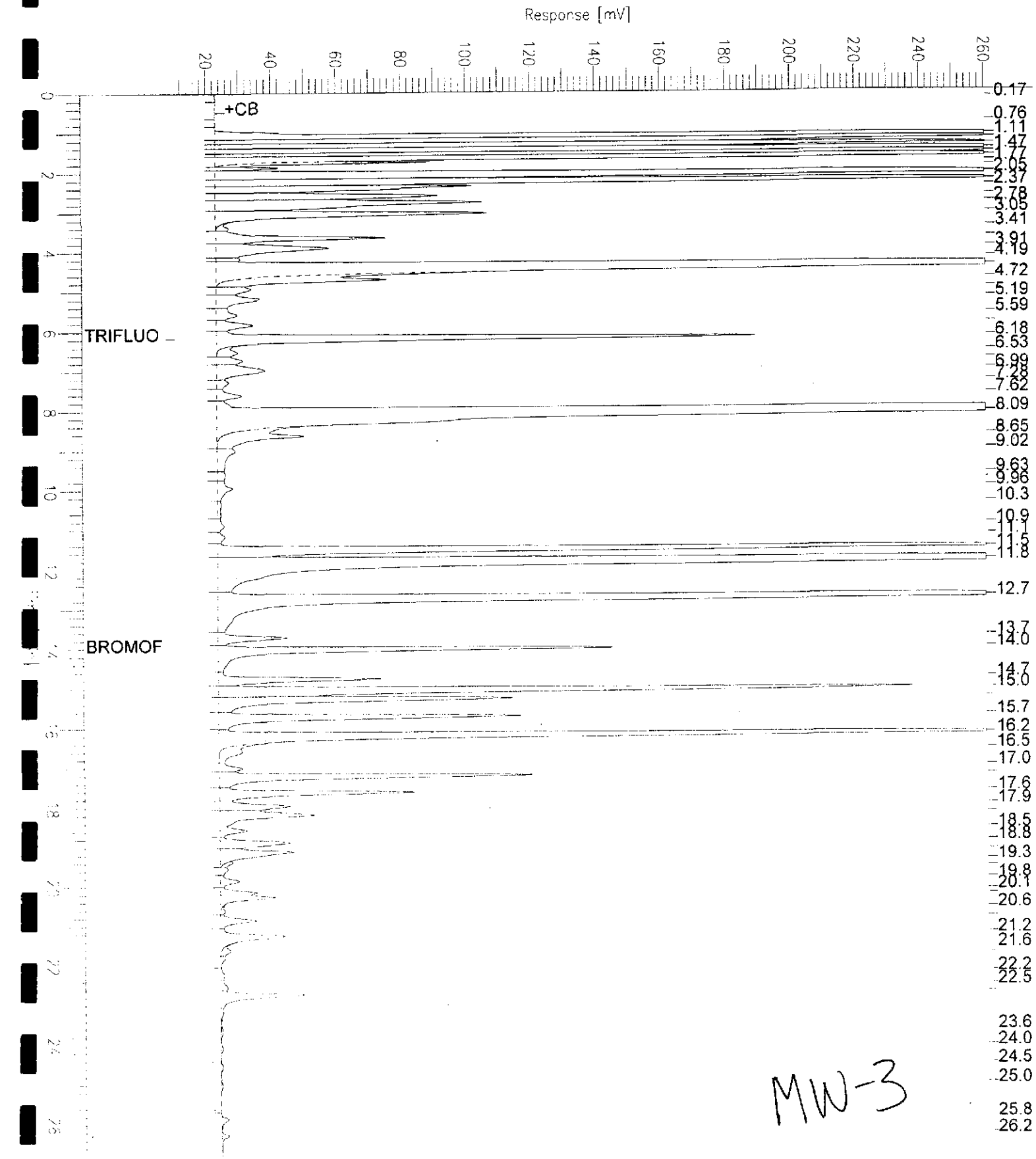


MW-2

GC05 'H' File TVH

Sample Name : RR,D,134341-003,41900,TVH ONLY,
FileName : G:\GC05\DATA\190G028.raw
Method : TVHBTXE
Start Time : 0.00 min End Time : 26.80 min
Scale Factor: -1.0 Plot Offset: 10 mV

Sample #:
Date : 7/10/98 04:52 AM
Time of Injection: 7/10/98 04:25 AM
Low Point : 10.30 mV High Point : 260.30 mV
Plot Scale: 250.0 mV

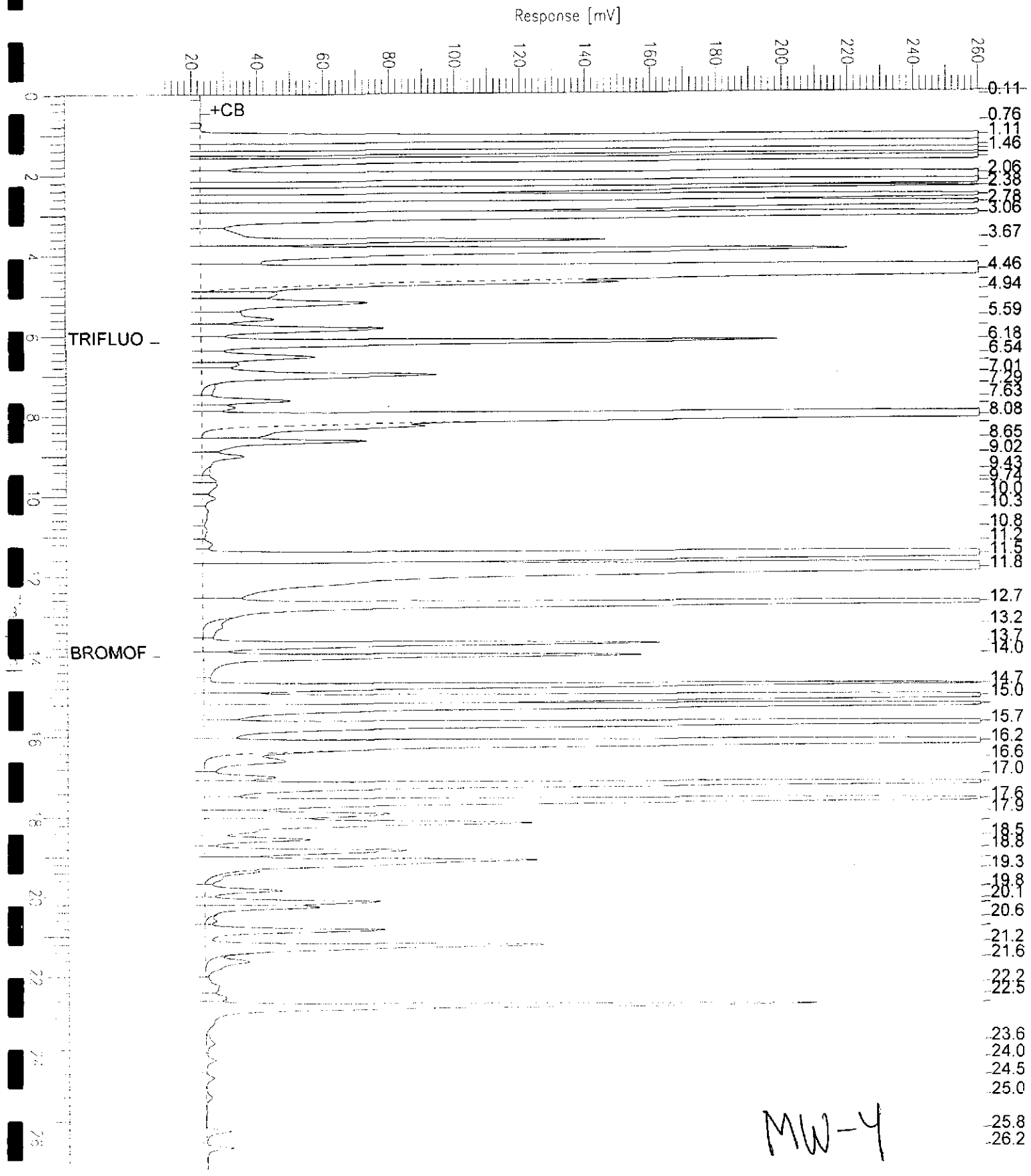


MW-3

GC05 'H' File TVH

Sample Name : RR,134341-004,41900,TVH ONLY,
FileName : G:\GC05\DATA\190G027.raw
Method : TVHBTXE
Start Time : 0.00 min End Time : 26.80 min
Scale Factor: -1.0 Plot Offset: 10 mV

Sample #:
Date : 7/10/98 04:16 AM
Time of Injection: 7/10/98 03:49 AM
Low Point : 10.20 mV High Point : 260.20 mV
Plot Scale: 250.0 mV



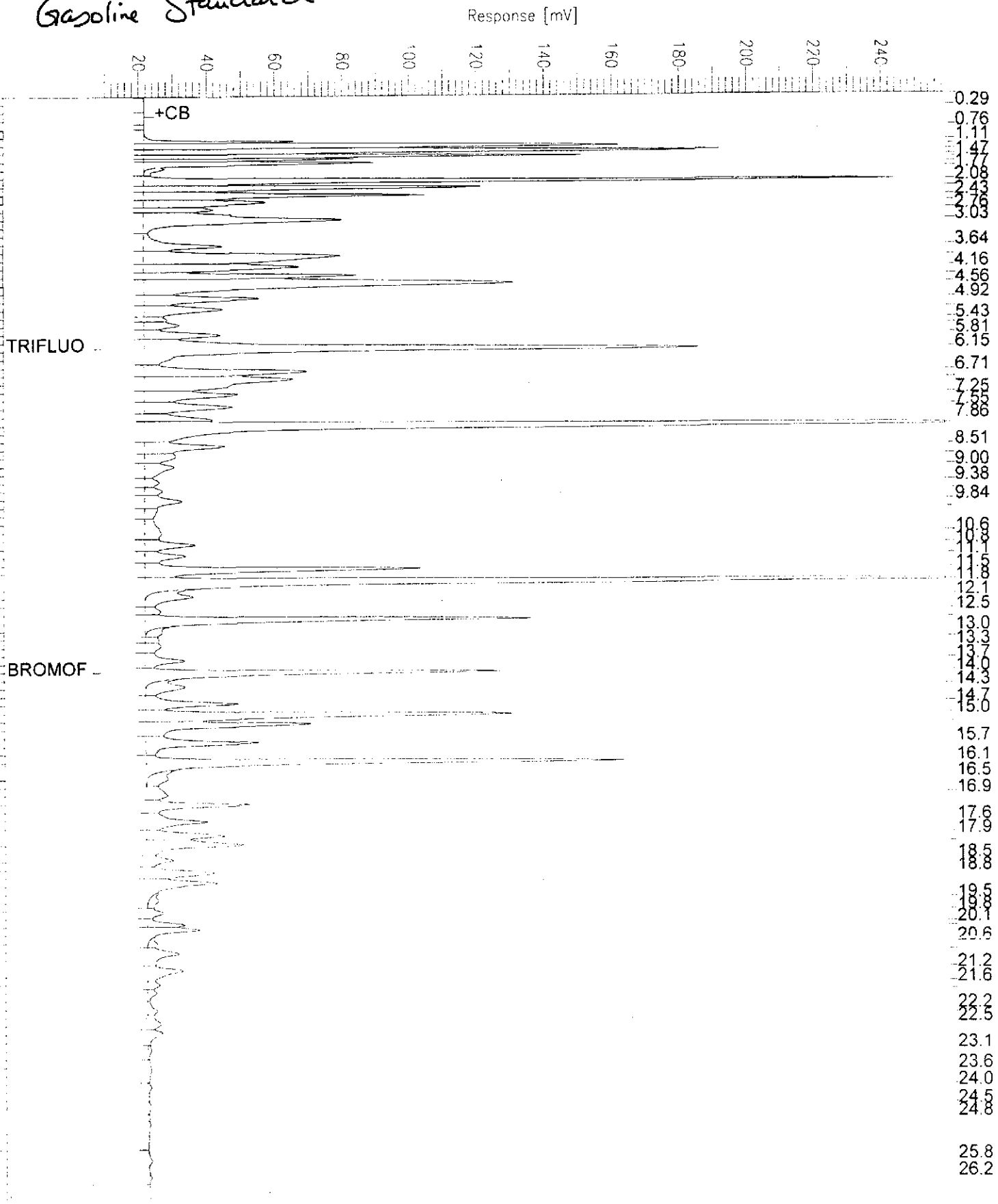
MW-4

GC05 'H' File TVH

Sample Name : CCV/LCS,QC74455,98WS6074,41900,
FileName : G:\GC05\DATA\190G001.raw
Method : TVHBTXE
Start Time : 0.00 min End Time : 26.80 min
Scale Factor: -1.0 Plot Offset: 9 mV

Sample #: GAS
Date : 7/9/98 12:10 PM
Time of Injection: 7/9/98 11:43 AM
Low Point : 9.05 mV High Point : 259.05 mV
Plot Scale: 250.0 mV

Gasoline Standard



TVH-Total Volatile Hydrocarbons

Client: Subsurface Consultants
Project#: 1039.007
Location: 327 34th St.

Analysis Method: EPA 8015M
Prep Method: EPA 5030

METHOD BLANK

Matrix: Water
Batch#: 41871
Units: ug/L
Diln Fac: 1

Prep Date: 07/08/98
Analysis Date: 07/08/98

MB Lab ID: QC74342

Analyte	Result
Gasoline C7-C12	<50

Surrogate	%Rec	Recovery Limits
Trifluorotoluene	104	59-162
Bromofluorobenzene	95	59-162

TVH-Total Volatile Hydrocarbons

Client: Subsurface Consultants
Project#: 1039.007
Location: 327 34th St.

Analysis Method: EPA 8015M
Prep Method: EPA 5030

METHOD BLANK

Matrix: Water
Batch#: 41900
Units: ug/L
Diln Fac: 1

Prep Date: 07/09/98
Analysis Date: 07/09/98

MB Lab ID: QC74457

Analyte	Result
Gasoline C7-C12	<50

Surrogate	%Rec	Recovery Limits
Trifluorotoluene	106	59-162
Bromofluorobenzene	98	59-162

TVH-Total Volatile Hydrocarbons

Client: Subsurface Consultants
Project#: 1039.007
Location: 327 34th St.

Analysis Method: EPA 8015M
Prep Method: EPA 5030

LABORATORY CONTROL SAMPLE

Matrix: Water
Batch#: 41871
Units: ug/L
Diln Fac: 1

Prep Date: 07/08/98
Analysis Date: 07/08/98

LCS Lab ID: QC74341

Analyte	Result	Spike Added	%Rec #	Limits
Gasoline C7-C12	1951	2000	98	80-119

Surrogate	%Rec	Limits
Trifluorotoluene	134	59-162
Bromofluorobenzene	103	59-162

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits
Spike Recovery: 0 out of 1 outside limits

TVH-Total Volatile Hydrocarbons

Client: Subsurface Consultants
Project#: 1039.007
Location: 327 34th St.

Analysis Method: EPA 8015M
Prep Method: EPA 5030

LABORATORY CONTROL SAMPLE

Matrix: Water
Batch#: 41900
Units: ug/L
Diln Fac: 1

Prep Date: 07/09/98
Analysis Date: 07/09/98

LCS Lab ID: QC74455

Analyte	Result	Spike Added	%Rec #	Limits
Gasoline C7-C12	2138	2000	107	80-119

Surrogate	%Rec	Limits
Trifluorotoluene	143	59-162
Bromofluorobenzene	103	59-162

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits
Spike Recovery: 0 out of 1 outside limits

TVH-Total Volatile Hydrocarbons

Client: Subsurface Consultants
Project#: 1039.007
Location: 327 34th St.

Analysis Method: EPA 8015M
Prep Method: EPA 5030

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

Field ID: ZZZZZZ
Lab ID: 134260-001
Matrix: Water
Batch#: 41871
Units: ug/L
Diln Fac: 1

Sample Date: 06/24/98
Received Date: 06/25/98
Prep Date: 07/08/98
Analysis Date: 07/08/98

MS Lab ID: QC74345

Analyte	Spike Added	Sample	MS	%Rec #	Limits
Gasoline C7-C12	2000	513.4	2433	96	71-131

Surrogate	%Rec	Limits
Trifluorotoluene	152	59-162
Bromofluorobenzene	125	59-162

MSD Lab ID: QC74346

Analyte	Spike Added	MSD	%Rec #	Limits	RPD #	Limit
Gasoline C7-C12	2000	2540	101	71-131	5	26

Surrogate	%Rec	Limits
Trifluorotoluene	150	59-162
Bromofluorobenzene	122	59-162

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits
RPD: 0 out of 1 outside limits
Spike Recovery: 0 out of 2 outside limits

TVH-Total Volatile Hydrocarbons

Client: Subsurface Consultants
Project#: 1039.007
Location: 327 34th St.

Analysis Method: EPA 8015M
Prep Method: EPA 5030

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

Field ID: ZZZZZZ
Lab ID: 134335-001
Matrix: Water
Batch#: 41900
Units: ug/L
Diln Fac: 1

Sample Date: 06/30/98
Received Date: 06/30/98
Prep Date: 07/10/98
Analysis Date: 07/10/98

MS Lab ID: QC74458

Analyte	Spike Added	Sample	MS	%Rec #	Limits
Gasoline C7-C12	2000	<50	2162	108	71-131

Surrogate	%Rec	Limits
Trifluorotoluene	152	59-162
Bromofluorobenzene	117	59-162

MSD Lab ID: QC74459

Analyte	Spike Added	MSD	%Rec #	Limits	RPD #	Limit
Gasoline C7-C12	2000	2168	108	71-131	0	26

Surrogate	%Rec	Limits
Trifluorotoluene	152	59-162
Bromofluorobenzene	119	59-162

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits
RPD: 0 out of 1 outside limits
Spike Recovery: 0 out of 2 outside limits

CHAIN OF CUSTODY FORM

134341

PAGE ___ OF ___

PROJECT NAME: 327 34th St.
JOB NUMBER: 1035.007
PROJECT CONTACT: Meg Mendoza
SAMPLED BY: Dennis Alexander

LAB: Curtis & Tompkins
TURNAROUND: Normal
REQUESTED BY: Meg Mendoza

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 → 8020MS	MTBE	Dissolved Iron	Dissolved Manganese
1	MW-1	X				7	1			X			X		06	30	98	1015	*	X	X	X	X	X
2	MW-2	X				7				X			X					1615	*	X	X	X		
3	MW-3	X				7	1			X			X					1330	*	X	X	X	X	X
4	MW-4	X				7	1			X			X					1215	*	X	X	X	X	X
5	MW-5	X				7				X			X		06	30	98	1445	*	X	X	X		

CHAIN OF CUSTODY RECORD

RELEASED BY: (Signature)	DATE / TIME	RECEIVED BY: (Signature)	DATE / TIME
Dennis Alexander	7/1/98 0955	Carol Wickham	7/1/98 1000

COMMENTS & NOTES:
* Hold any extra sample for possible future analysis
Filter / fix for FE/MN analysis
* Sample from MW-5 came from well with product - probable high concentrations!

Subsurface Consultants, Inc.
171 12TH STREET, SUITE 201, OAKLAND, CALIFORNIA 94607
(510) 268-0461 • FAX: 510-268-0137

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

ANALYTICAL REPORT

Prepared for:

Subsurface Consultants
3736 Mt. Diablo Blvd.
Suite 200
Lafayette, CA 94549

Date: 16-JUL-98
Lab Job Number: 134297
Project ID: 1039.007
Location: 327 34th St.

Reviewed by: _____

Reviewed by: _____

TVH-Total Volatile Hydrocarbons

Client: Subsurface Consultants
Project#: 1039.007
Location: 327 34th St.

Analysis Method: EPA 8015M
Prep Method: EPA 5030

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
134297-001	MW-4 @ 5'	41828	06/26/98	07/07/98	07/07/98	
134297-002	MW-4 @ 20'	41828	06/26/98	07/07/98	07/07/98	
134297-003	MW-4 @ 25'	41828	06/26/98	07/07/98	07/07/98	
134297-004	MW-5 @ 14.5'	41828	06/26/98	07/07/98	07/07/98	

Matrix: Soil

Analyte Diln Fac:	Units	134297-001 1	134297-002 1	134297-003 1	134297-004 1
Gasoline C7-C12	mg/Kg	<1	<1	<1	<1
Surrogate					
Trifluorotoluene	%REC	100	96	98	98
Bromofluorobenzene	%REC	106	102	103	103

BTXE

Client: Subsurface Consultants
Project#: 1039.007
Location: 327 34th St.

Analysis Method: EPA 8020A
Prep Method: EPA 5030

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
134297-001	MW-4 @ 5'	41828	06/26/98	07/07/98	07/07/98	
134297-002	MW-4 @ 20'	41828	06/26/98	07/07/98	07/07/98	
134297-003	MW-4 @ 25'	41828	06/26/98	07/07/98	07/07/98	
134297-004	MW-5 @ 14.5'	41828	06/26/98	07/07/98	07/07/98	

Matrix: Soil

Analyte	Units	134297-001	134297-002	134297-003	134297-004
Diln Fac:		1	1	1	1
MTBE	ug/Kg	<20	<20	62	<20
Benzene	ug/Kg	<5	<5	45	<5
Toluene	ug/Kg	<5	<5	15	<5
Ethylbenzene	ug/Kg	<5	<5	12	<5
m,p-Xylenes	ug/Kg	<5	<5	30	<5
o-Xylene	ug/Kg	<5	<5	<5	<5
Surrogate					
Trifluorotoluene	%REC	102	100	100	100
Bromofluorobenzene	%REC	107	102	104	102

TVH-Total Volatile Hydrocarbons

Client: Subsurface Consultants
Project#: 1039.007
Location: 327 34th St.

Analysis Method: EPA 8015M
Prep Method: EPA 5030

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
134297-005	MW-5 @ 20'	41828	06/26/98	07/07/98	07/07/98	
134297-006	B6 @ 15.5'	41828	06/26/98	07/08/98	07/08/98	
134297-007	B6 @ 21'	41828	06/26/98	07/08/98	07/08/98	

Matrix: Soil

Analyte	Units	134297-005	134297-006	134297-007
Diln Fac:		1	1	1
Gasoline C7-C12	mg/Kg	<1	<1	<1
Surrogate				
Trifluorotoluene	%REC	96	97	98
Bromofluorobenzene	%REC	93	99	124

BTXE

Client: Subsurface Consultants
Project#: 1039.007
Location: 327 34th St.

Analysis Method: EPA 8020A
Prep Method: EPA 5030

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
134297-005	MW-5 @ 20'	41828	06/26/98	07/07/98	07/07/98	
134297-006	B6 @ 15.5'	41828	06/26/98	07/08/98	07/08/98	
134297-007	B6 @ 21'	41828	06/26/98	07/08/98	07/08/98	

Matrix: Soil

Analyte	Units	134297-005	134297-006	134297-007
Diln Fac:		1	1	1
MTBE	ug/Kg	<20	<20	<20
Benzene	ug/Kg	<5	<5	<5
Toluene	ug/Kg	<5	<5	<5
Ethylbenzene	ug/Kg	<5	<5	<5
m,p-Xylenes	ug/Kg	<5	<5	<5
o-Xylene	ug/Kg	<5	<5	<5
Surrogate				
Trifluorotoluene	%REC	96	97	100
Bromofluorobenzene	%REC	93	98	121

BATCH QC REPORT

Curtis & Tompkins, Ltd.

TVH-Total Volatile Hydrocarbons

Client: Subsurface Consultants
Project#: 1039.007
Location: 327 34th St.

Analysis Method: EPA 8015M
Prep Method: EPA 5030

METHOD BLANK

Matrix: Soil
Batch#: 41828
Units: mg/Kg
Diln Fac: 1

Prep Date: 07/07/98
Analysis Date: 07/07/98

MB Lab ID: QC74178

Analyte	Result
Gasoline C7-C12	<1.0

Surrogate	%Rec	Recovery Limits
Trifluorotoluene	97	53-157
Bromofluorobenzene	106	53-157

BATCH QC REPORT

Curtis & Tompkins, Ltd.

BTXE

Client: Subsurface Consultants
Project#: 1039.007
Location: 327 34th St.

Analysis Method: EPA 8020A
Prep Method: EPA 5030

METHOD BLANK

Matrix: Soil
Batch#: 41828
Units: ug/Kg
Diln Fac: 1

Prep Date: 07/07/98
Analysis Date: 07/07/98

MB Lab ID: QC74178

Analyte	Result
MTBE	<20
Benzene	<5.0
Toluene	<5.0
Ethylbenzene	<5.0
m,p-Xylenes	<5.0
o-Xylene	<5.0

Surrogate	%Rec	Recovery Limits
Trifluorotoluene	104	53-126
Bromofluorobenzene	108	35-144

Lab #: 134297

BATCH QC REPORT

Curtis & Tompkins, Ltd.

TVH-Total Volatile Hydrocarbons

Client: Subsurface Consultants
Project#: 1039.007
Location: 327 34th St.

Analysis Method: EPA 8015M
Prep Method: EPA 5030

LABORATORY CONTROL SAMPLE

Matrix: Soil
Batch#: 41828
Units: mg/Kg
Diln Fac: 1

Prep Date: 07/07/98
Analysis Date: 07/07/98

LCS Lab ID: QC74175

Analyte	Result	Spike Added	%Rec #	Limits
Gasoline C7-C12	8.92	10	89	78-120

Surrogate	%Rec	Limits
Trifluorotoluene	107	53-157
Bromofluorobenzene	151	53-157

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits
Spike Recovery: 0 out of 1 outside limits

Lab #: 134297

BATCH QC REPORT

Curtis & Tompkins, Ltd.

BTXE

Client: Subsurface Consultants
Project#: 1039.007
Location: 327 34th St.

Analysis Method: EPA 8020A
Prep Method: EPA 5030

BLANK SPIKE/BLANK SPIKE DUPLICATE

Matrix: Soil
Batch#: 41828
Units: ug/Kg
Diln Fac: 1

Prep Date: 07/08/98
Analysis Date: 07/08/98

BS Lab ID: QC74176

Analyte	Spike Added	BS	%Rec	#	Limits
MTBE	100	99.57	100		65-135
Benzene	100	96.89	97		69-118
Toluene	100	100.8	101		73-118
Ethylbenzene	100	98.57	99		68-124
m,p-Xylenes	100	106.5	107		67-124
o-Xylene	100	103.5	104		73-127

Surrogate	%Rec	Limits
Trifluorotoluene	97	53-126
Bromofluorobenzene	116	35-144

BSD Lab ID: QC74177

Analyte	Spike Added	BSD	%Rec	#	Limits	RPD	#	Limit
MTBE	100	100.3	100		65-135	1		20
Benzene	100	100.6	101		69-118	4		14
Toluene	100	106.6	107		73-118	6		21
Ethylbenzene	100	102.1	102		68-124	4		22
m,p-Xylenes	100	110	110		67-124	3		22
o-Xylene	100	106.7	107		73-127	3		26

Surrogate	%Rec	Limits
Trifluorotoluene	101	53-126
Bromofluorobenzene	119	35-144

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits
RPD: 0 out of 6 outside limits
Spike Recovery: 0 out of 12 outside limits

TVH-Total Volatile Hydrocarbons

Client: Subsurface Consultants
Project#: 1039.007
Location: 327 34th St.

Analysis Method: EPA 8015M
Prep Method: EPA 5030

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

Field ID: ZZZZZZ
Lab ID: 134410-001
Matrix: Soil
Batch#: 41828
Units: mg/Kg
Diln Fac: 1

Sample Date: 07/07/98
Received Date: 07/07/98
Prep Date: 07/08/98
Analysis Date: 07/08/98

MS Lab ID: QC74179

Analyte	Spike Added	Sample	MS	%Rec #	Limits
Gasoline C7-C12	10	<1	10.83	108	38-132

Surrogate	%Rec	Limits
Trifluorotoluene	107	53-157
Bromofluorobenzene	142	53-157

MSD Lab ID: QC74180

Analyte	Spike Added	MSD	%Rec #	Limits	RPD #	Limit
Gasoline C7-C12	10	9.89	99	38-132	9	26

Surrogate	%Rec	Limits
Trifluorotoluene	107	53-157
Bromofluorobenzene	136	53-157

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits
RPD: 0 out of 1 outside limits
Spike Recovery: 0 out of 2 outside limits

TVH-Total Volatile Hydrocarbons

Client: Subsurface Consultants
Project#: 1039.007
Location: 327 34th St.

Analysis Method: EPA 8015M
Prep Method: EPA 5030

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
134297-008	B6	41815	06/26/98	07/05/98	07/05/98	

Matrix: Water

Analyte	Units	134297-008
Diln Fac:		1
Gasoline C7-C12	ug/L	92
Surrogate		
Trifluorotoluene	%REC	99
Bromofluorobenzene	%REC	121

BTXE

Client: Subsurface Consultants
Project#: 1039.007
Location: 327 34th St.

Analysis Method: EPA 8020A
Prep Method: EPA 5030

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
134297-008	B6	41815	06/26/98	07/05/98	07/05/98	

Matrix: Water

Analyte	Units	134297-008
Diln Fac:		1
MTBE	ug/L	<2
Benzene	ug/L	30
Toluene	ug/L	1.7C
Ethylbenzene	ug/L	1.4
m,p-Xylenes	ug/L	1.3
o-Xylene	ug/L	<0.5
Surrogate		
Trifluorotoluene	%REC	73
Bromofluorobenzene	%REC	100

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

TVH-Total Volatile Hydrocarbons

Client: Subsurface Consultants
Project#: 1039.007
Location: 327 34th St.

Analysis Method: EPA 8015M
Prep Method: EPA 5030

METHOD BLANK

Matrix: Water
Batch#: 41815
Units: ug/L
Diln Fac: 1

Prep Date: 07/05/98
Analysis Date: 07/05/98

MB Lab ID: QC74126

Analyte	Result
Gasoline C7-C12	<50

Surrogate	%Rec	Recovery Limits
Trifluorotoluene	114	59-162
Bromofluorobenzene	95	59-162

BTXE

Client: Subsurface Consultants
Project#: 1039.007
Location: 327 34th St.

Analysis Method: EPA 8020A
Prep Method: EPA 5030

METHOD BLANK

Matrix: Water
Batch#: 41815
Units: ug/L
Diln Fac: 1

Prep Date: 07/05/98
Analysis Date: 07/05/98

MB Lab ID: QC74126

Analyte	Result
MTBE	<2.0
Benzene	<0.5
Toluene	<0.5
Ethylbenzene	<0.5
m,p-Xylenes	<0.5
o-Xylene	<0.5

Surrogate	%Rec	Recovery Limits
Trifluorotoluene	83	53-124
Bromofluorobenzene	78	41-142

Lab #: 134297

BATCH QC REPORT

Curtis & Tompkins, Ltd.

TVH-Total Volatile Hydrocarbons

Client: Subsurface Consultants
Project#: 1039.007
Location: 327 34th St.

Analysis Method: EPA 8015M
Prep Method: EPA 5030

LABORATORY CONTROL SAMPLE

Matrix: Water
Batch#: 41815
Units: ug/L
Diln Fac: 1

Prep Date: 07/05/98
Analysis Date: 07/05/98

LCS Lab ID: QC74124

Analyte	Result	Spike Added	%Rec #	Limits
Gasoline C7-C12	2088	2000	104	80-119

Surrogate	%Rec	Limits
Trifluorotoluene	144	59-162
Bromofluorobenzene	111	59-162

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits
Spike Recovery: 0 out of 1 outside limits

BTXE

Client: Subsurface Consultants
Project#: 1039.007
Location: 327 34th St.

Analysis Method: EPA 8020A
Prep Method: EPA 5030

LABORATORY CONTROL SAMPLE

Matrix: Water
Batch#: 41815
Units: ug/L
Diln Fac: 1

Prep Date: 07/06/98
Analysis Date: 07/06/98

LCS Lab ID: QC74125

Analyte	Result	Spike Added	%Rec #	Limits
MTBE	19.83	20	99	65-135
Benzene	18.94	20	95	69-109
Toluene	20.18	20	101	72-116
Ethylbenzene	19.43	20	97	67-120
m,p-Xylenes	21.45	20	107	69-117
o-Xylene	20.72	20	104	75-122

Surrogate	%Rec	Limits
Trifluorotoluene	78	53-124
Bromofluorobenzene	108	41-142

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits
Spike Recovery: 0 out of 6 outside limits

TVH-Total Volatile Hydrocarbons

Client: Subsurface Consultants
Project#: 1039.007
Location: 327 34th St.

Analysis Method: EPA 8015M
Prep Method: EPA 5030

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

Field ID: ZZZZZZ
Lab ID: 134271-002
Matrix: Water
Batch#: 41815
Units: ug/L
Diln Fac: 1

Sample Date: 06/24/98
Received Date: 06/26/98
Prep Date: 07/05/98
Analysis Date: 07/05/98

MS Lab ID: QC74127

Analyte	Spike Added	Sample	MS	%Rec #	Limits
Gasoline C7-C12	2000	<50	2363	118	71-131

Surrogate	%Rec	Limits
Trifluorotoluene	154	59-162
Bromofluorobenzene	119	59-162

MSD Lab ID: QC74128

Analyte	Spike Added	MSD	%Rec #	Limits	RPD #	Limit
Gasoline C7-C12	2000	2296	115	71-131	3	26

Surrogate	%Rec	Limits
Trifluorotoluene	155	59-162
Bromofluorobenzene	120	59-162

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits
RPD: 0 out of 1 outside limits
Spike Recovery: 0 out of 2 outside limits

CHAIN OF CUSTODY FORM

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PAGE ____ OF ____

PROJECT NAME: 327 34th Street
JOB NUMBER: 1039.007
PROJECT CONTACT: Meg Mendoza
SAMPLED BY: John Wolfe
LAB: C+T
TURNAROUND: Normal
REQUESTED BY: Meg Mendoza

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/BTEX/MTBE
1	MW-4 @ 5'		X										X		6	2	6	8		X
2	MW-4 @ 20'		X										X		"	"	"	"		X
3	MW-4 @ 25' (SAT)		X										X		"	"	"	"		X
4	MW-5 @ 14.5'		X										X		"	"	"	"		X
5	MW-5 @ 25'		X										X		"	"	"	"		X
	~~MW-6~~ -																			
6	B6 @ 15.5'		X										X		6	2	6	8		X
7	B6 @ 21'		X										X		6	2	6	8		X
-8	B6	X				6				X			X		6	2	6	9		X

CHAIN OF CUSTODY RECORD

RELEASED BY: (Signature)	DATE / TIME	RECEIVED BY: (Signature)	DATE / TIME
John Wolfe	6/24/98 1445	K. Koch	6/29/98 1445
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.
171 12TH STREET, SUITE 201, OAKLAND, CALIFORNIA 94607
(510) 268-0461 • FAX: 510-268-0137

CytoCulture
ENVIRONMENTAL
BIOTECHNOLOGY
CytoCulture International, Inc. 1986

Client: Subsurface Consultants
Contact: Meg Mendoza
3736 Mt Diablo Blvd. Suite 200
Lafayette, CA 94549

July 8, 1998
Fax: (925)-299-7970 **Phone:** (925) 299-7960
Project Description: 327 34th Street
Project #:

SAMPLES: 3 water samples were received on 7/1/98. The samples were assayed on 7/1/98, and stored at 4°C for any follow up work.

Hydrocarbon-Degrading and Total Heterotrophic Bacteria Enumeration Assays

ANALYSIS REQUEST: Bacterial enumeration for aerobic petroleum hydrocarbon-degraders (broad range petroleum hydrocarbons: diesel and jet fuel) and total heterotrophs.

CARBON SOURCES: Petroleum hydrocarbons were added as the sole carbon and energy sources for the growth of hydrocarbon-degrading aerobic bacteria on agar plates. Chevron #2 Diesel and JP-4 Jet Fuel were blended into the agar to provide dissolved phase aliphatic and aromatic hydrocarbons in the growth matrix. Heterotrophic bacteria plates were prepared with Difco Total Plate Count Agar providing a wide range of amino acid and carbohydrate carbon sources.

PROTOCOLS:

Hydrocarbon Degraders: Sterile agar plates (100 x 15 mm) were prepared with minimal salts medium at pH 6.8 with 1.5% noble agar, without any other carbon sources or nutrients added. Diesel and jet fuel were the sole sources of carbon and energy. Triplicate plates were inoculated with 1.0 ml of sample, or a log dilution of the sample, at dilutions of 10^0, 10^{-1}, and 10^{-2}. The hydrocarbon plates were poured on 7/1/98 and counted after 7 days on 7/8/98. The plate count data are reported as colony forming units (cfu) per milliliter (ml) of sample. Each bacteria population value represents a statistical average of the plate count data obtained with inoculations for at least two of the three log dilutions tested.

Heterotrophs: Sterile agar plates (100 x 15 mm) were prepared with minimal salts medium and 2.35% plate count agar at pH 6.8 without any other carbon sources or nutrients added. Plates were inoculated with 1.0 ml of water sample, or a log dilution of the sample, in triplicate at sample dilutions of 10^{-1}, 10^{-2}, and 10^{-3}. The heterotroph plates were poured on 7/1/98 and counted after 6 days on 7/7/98. The plate count data are reported as colony forming units (**cfu**) per milliliter (**ml**) for each water sample. Each enumeration value represents a statistical average of two of the three log dilutions inoculated in plates.

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AEROBIC
Hydrocarbon-Degrading and Heterotrophic Bacteria Enumeration Results

CLIENT SAMPLE NUMBER	SAMPLE DATE	HYDROCARBON DEGRADERS (CFU/ML)	TOTAL HETEROTROPHS (CFU/ML)
MW-1	6/30/98	5.7×10^1	1.8×10^2
MW-3	6/30/98	9.4×10^1	2.4×10^2
MW-4	6/30/98	6.6×10^2	1.2×10^4

1.0×10^1 cfu/ml is the lowest detection level for this assay

Inorganic Chemistry and Nutrient Assays

ANALYSIS REQUEST: Nutrient assays for nitrogen as ammonia and phosphorus as ortho-phosphate, nitrogen as nitrate, and total sulfate.

PROTOCOL: Spectrophotometric assays were performed to determine the concentrations of ammonia-nitrogen, ortho-phosphate, nitrate-nitrogen, and sulfate. The assays follow EPA manual colorimetric protocols using precalibrated reagents and a Gilford 240 spectrophotometer. All assays conform to California CLP and Standard Water & Wastewater Methods.

Client Sample	Sample Date	Ammonia N (mg/L)	o-Phosphate (mg/L)	Nitrate N (mg/L)	Sulfate (mg/L)
MW-1	6/30/98	<0.1	2.0	<0.1	55
MW-3	6/30/98	1.4	2.4	<0.1	13
MW-4	6/30/98	0.8	1.5	0.3	14

0.1 mg/L represents the lowest detection level for ammonia, o-phosphate and nitrate assays. ND = Not Detected

Dissolved Oxygen and pH

ANALYSIS REQUEST: Analyses for dissolved oxygen and pH for water samples.

PROTOCOL: The pH levels of the water samples were measured with a HACH digital pH meter equipped with a HACH-One combination electrode, and reported as the mean of triplicate values. The dissolved oxygen levels of the water samples were measured with a YSI analog DO meter and reported as the mean of duplicate values. All assays conform to California CLP and Standard Water & Wastewater analytical method specifications. pH and DO were measured on 7/1/98.

Client Sample	Sample Date	pH	DO (mg/L)
MW-1	6/30/98	6.4	5.1
MW-3	6/30/98	6.6	3.2
MW-4	6/30/98	6.6	3.5

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Environmental Microbiologist
Laboratory Services

Randall von Wedel, Ph.D.
Principal Biochemist and
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Summary of Microbiological and Chemical Results

Project name 327 34th Street
Subsurface Consultants Project #

Sample Date 6/30/98
Reporting Date 7/8/98
Matrix groundwater

			Sample ID						
			MW-1	MW-3	MW-4				Units
Bacterial Plate Enumerations	Aerobic	*Hydrocarbon Degraders*	**5.7×10^1**	**9.4×10^1**	**6.6×10^2**				cfu/ml
		Total Heterotrophs	**1.8×10^2**	**2.4×10^2**	**1.2×10^4**				cfu/ml
	Anaerobic	*Hydrocarbon Degraders*	**NT**	**NT**	**NT**				cfu/ml
		Total Heterotrophs	**NT**	**NT**	**NT**				cfu/ml
Bacterial MPN Enumerations (Anaerobic)		*Nitrate Reducers*	**NT**	**NT**	**NT**				cells/ml
		Iron Reducers	**NT**	**NT**	**NT**				cells/ml
		Sulfate Reducers	**NT**	**NT**	**NT**				cells/ml
Nutrient / Chemical Assays		*pH*	**6.4**	**6.6**	**6.6**				
		Redox	**NT**	**NT**	**NT**				mV
		DO	**5.1**	**3.2**	**3.5**				mg/L
		NH3-N	**<0.1**	**1.4**	**0.8**				mg/L
		PO4	**2.0**	**2.4**	**1.50**				mg/L
		NO3-N	**<0.1**	**<0.1**	**0.3**				mg/L
		SO4-S	**55**	**13**	**14**				mg/L
		Fe(II)	**NT**	**NT**	**NT**				mg/L
		Alkalinity (as CaCO3)	**NT**	**NT**	**NT**				mg/L
		Sulfide	**NT**	**NT**	**NT**				mg/L
		Methane	**NT**	**NT**	**NT**				mg/L

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CHAIN OF CUSTODY FORM

Project Description: 327 34th St.	Code/P.O.:
Client: Subsurface Consultants	Client Contact: Meg Mendoza
Address to send results: 3736 Mt Diablo Blvd. Ste. 200, Lafayette, Ca. 945	
Tel: (925) 299-7960	Fax: (925) 299-7970
Sampler: Dennis Alexander	Recorder:

Sample I.D.	Sampling Date	Time	Matrix Soil	Water	Analysis CFU Hydrocarbon	CFU Heterotrophic	pH	DO	NH_3	PO_4	SO_4	NO_3	Comments
MW-1	6/30/98	10:15		X	X		X	X	X	X	X	X	D.O. = 5 ppm (In field)
MW-3		13:30		X	X		X	X	X	X	X	X	D.O. = 2.2 ppm
MW-4	V	12:15		X	X		X	X	X	X	X	X	D.O. = 2.6 ppm

Chain of Custody Record			
Relinquished by: Dennis Alexander	Date/Hr: 7/1/98 0940	Received by:	Date/Hr: 7/1/98 9:40
Relinquished by:	Date/Hr:	Received by:	Date/Hr:

Fax Note 7671 | Date 6/15 | # of pages 1
To ALVIN KAN
Co./Dept. 670-5262
From MEC MENDOZA
Phone # 925-299-7960

ALAMEDA COUNTY PUBLIC WORKS AGEN

WATER RESOURCES SECTION
951 TURNER COURT, SUITE 300, HAYWARD, CA 94545-2651
PHONE (510) 670-5575 ANDREAS GODFREY FAX (510) 670-52
(510) 670-5248 ALVIN KAN

DRILLING PERMIT APPLICATION

FOR APPLICANT TO COMPLETE

LOCATION OF PROJECT 327 34th Street
OAKLAND

California Coordinates Source ____ ft. Accuracy ± ___ ft.
CCN ____ fr. CCE ____ ft.
APN ____

CLIENT
Name STRAUCH TRUST OF 1983
Address 1300 CONCORD AVE Phone 925-825-8000
City CONCORD Zip 94520

APPLICANT
Name MEC MENDOZA
SURFACE CASE CONSTRUCTION Fax 925-299-7960
Address 3776 MT. DIABLO BLVD Phone 925-299-7960
City LAFAYETTE Zip 94549

TYPE OF PROJECT

Well Construction		Geotechnical Investigation	
Cathodic Protection	☐	General	☐
Water Supply	☐	Contamination	☐
Monitoring	☒	Well Destruction	☐

PROPOSED WATER SUPPLY WELL USE

New Domestic	☐	Replacement Domestic	☐
Municipal	☐	Irrigation	☐
Industrial	☐	Other ____	☐

DRILLING METHOD:

Mud Rotary	☐	Air Rotary	☐	Auger	☒
Cable	☐	Other	☐		

DRILLER'S LICENSE NO. 95742

WELL PROJECTS
Drill Hole Diameter 8 in. Maximum
Casing Diameter 2 in. Depth 40 ft.
Surface Seal Depth 10-15 ft. Number 2

GEOTECHNICAL PROJECTS
Number of Borings 1 Maximum
Hole Diameter 8 in. Depth 40 ft.

ESTIMATED STARTING DATE 6/26/98
ESTIMATED COMPLETION DATE 6/27/98

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

APPLICANT'S SIGNATURE Mec Mendoza DATE 6/15/98

FOR OFFICE USE

PERMIT NUMBER 98WR235
WELL NUMBER ____
APN ____

PERMIT CONDITIONS

Circled Permit Requirements Apply

(A.) GENERAL
1. A permit application should be submitted so as to arrive at the ACPWA office five days prior to proposed starting date.
(2.) Submit to ACPWA 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 SUPPLY WELLS
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.

(C.) GROUNDWATER MONITORING WELLS INCLUDING PIEZOMETERS
1. Minimum surface seal thickness is two inches of cement grout placed by tremie.
2. Minimum seal depth for monitoring wells is the maximum depth practicable or 20 feet.

D. 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.

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

F. WELL DESTRUCTION
See attached.

G. SPECIAL CONDITIONS

Drill 3 test borings, convert 2 test borings to monitoring wells.

APPROVED Alvin Kan DATE 6/15/98

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Meg Mendoza
Subsurface Consultants, Inc.
3736 Mt. Diablo Blvd. Suite 200
Lafayette, CA 94549

July 27, 1998

Fax 925-299-7970

RE: Technical Consulting Report for 327 34th St., Oakland Site, SCI Job # 1039.007

Sampling and Site Background:

Two former underground storage tanks (USTs) were located on the NE border of the site. Total Volatile Hydrocarbons as gasoline (TVH-g) were detected in groundwater samples MW-2 and MW-3, down gradient from the former USTs in 1993, 1997 and 1998. Low levels of TVH as gasoline were measured in 1998 at MW-1, but not in 1993 or 1997. Groundwater from a further down gradient monitoring well, MW-4 sampled in 1998, showed levels of TVH-g of 10000 ug/L with an altered pattern of benzene, toluene, ethylbenzene and xylene (BTEX) components. Groundwater from MW-5, down gradient from MW-4, did not contain detectable concentrations of TVH-g contamination.

TVH-g and BTEX components are readily biodegraded under the proper aerobic conditions provided that sufficient hydrocarbon-degrading bacteria, dissolved oxygen and nutrients are present, and that there are no inhibitory compounds to interfere with microbial activity.

CytoCulture reported routine microbiological and nutrient testing results on July 8, 1998 for 3 groundwater samples provided by SCI from the site (MW-1, 3, & 4). The following discussion represents CytoCulture's interpretation of the microbiological, chemical and geological data in terms of the potential for intrinsic biodegradation of the hydrocarbons present at the 327 34th St., Oakland site.

Interpretation of Microbiological and Nutrient Test Results

Microbiological and nutrient analyses were performed on groundwater samples from MW-1, MW-3, and MW-4. The lowest numbers of hydrocarbon-degrading and heterotrophic bacteria (5.7×10^1 cfu/ml and 1.8×10^2 cfu/ml respectively) were found at MW-1. This is not surprising, as MW-1 had low levels of hydrocarbons which would act as carbon sources for bacterial growth. Bacteria at this well also appear to be nitrogen limited, as both ammonia-N and nitrate-N levels were measured to be less than 0.1 mg/L. Dissolved oxygen (DO) levels at MW-1 are higher than at MW-3 and MW-4. The DO value of 5 (field DO measurements are discussed as laboratory measurements are more

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susceptible to O_2 introduction during sampling and transport) for MW-1 is more indicative of groundwater with less active microbial populations and thus less oxygen consumption. The levels of DO at MW-1, as well as the levels of *o*-phosphate and sulfate, would not be limiting to bacterial growth if sufficient carbon and nitrogen sources were present.

Slightly higher populations of hydrocarbon-degrading and heterotrophic bacteria (9.4×10^1 cfu/ml and 2.4×10^2 cfu/ml respectively) were found at MW-3. Levels of nitrogen (ammonia-N), *o*-phosphate, sulfate and DO were all sufficient at MW-3 to support bacterial growth. In addition, elevated concentrations of TVH-g and BTEX compounds would provide additional carbon sources for microbial growth at this well. The DO level of 2.2 mg/L (field) measured at this well also suggest a more active microbial population.

The enumeration plate count data, however, indicate the population of hydrocarbon-degrading aerobic bacteria might be 10 fold less than expected for the concentration of dissolved phase hydrocarbons at MW-3. Densities of hydrocarbon-degrading bacteria are usually directly correlated to hydrocarbon concentrations in groundwater. A general exception to this, as appears to be the case at this site, occurs when the majority of biodegradation activity appears to be ongoing at the fringes of the plume. For example, conditions may be less favorable for microbial activity within the contaminant plume (for reasons not apparent from this data), but may become more favorable at the edges as inhibitory compounds become more dilute, or as the DO and nutrients become more available.

Higher fringe biodegradation activity would explain why the highest microbial numbers were measured at MW-4 (6.6×10^2 cfu/ml for hydrocarbon degraders and 1.2×10^4 cfu/ml for heterotrophs). DO (2.6 mg/L measured in the field), nitrogen (ammonia-N and nitrate-N), *o*-phosphate and sulfate levels at MW-4 were all sufficient for bacterial growth at MW-4.

Further evidence for biodegradation activity at MW-4 can be gained by examining the individual BTEX and MTBE components from each groundwater sample (see appendix). By normalizing each component to the largest overall constituent (toluene) a consistent pattern can be seen in MW-2 and MW-3 of each of the BTEX components as compared to toluene. This ratios seen were 0.4 (benzene: toluene), 0.1-0.2 (ethylbenzene: toluene), 0.6-1.4 (xylene: toluene), and 0.3-0.4 (MTBE: toluene; when MTBE was present). However, for MW-4, these component ratios are drastically altered to a pattern of 2.4 (benzene: toluene), 0.9 (ethylbenzene: toluene), 0.2 (xylene: toluene), and 1.9 (MTBE: toluene).

This shift in ratios would be expected as the various BTEX components are preferentially biodegraded at different rates. MTBE can also be used as a reference for biodegradation since MTBE is typically more resistant to biodegradation under aerobic

conditions than the BTEX components. Thus, as BTEX concentrations are reduced through microbial breakdown, MTBE concentrations will remain higher in comparison. This pattern was seen by the increased ratio of MTBE: toluene of 1.9 in MW-4 (as compared to 0.3 and 0.4 for MW-2 and MW-3 respectively) during the 6/30/98 sampling.

Further evidence for biodegradation of the TVH-g is the lack of detectable hydrocarbon contamination at the down gradient well, MW-5, except for trace levels of MTBE. This suggests that the gasoline is being degraded before it migrates far from the plume, and that it is being biodegraded before it has the opportunity to migrate off site.

General Conclusions for Natural Biodegradation at the Site :

There appears to be sufficient populations of hydrocarbon, nutrients and dissolved oxygen present at the fringes of the gasoline plume (MW-4) to support biodegradation activity. In addition, contaminant data supports that biodegradation activity is occurring at MW-4, and that the gasoline and individual BTEX components are not migrating further down gradient to MW-5.

Populations of hydrocarbon-degrading bacteria from within the plume (MW-3), however, are lower than expected, and there is less evidence for biodegradation activity at MW-3. The reasons for this decreased activity are not apparent from the data provided. Further measurements of nutrients, dissolved oxygen and possible inhibitory co-contaminants (other than gasoline) would be recommended at other wells with high TVH-g concentrations to characterize the plume.

Recommendations for Monitoring Natural Biodegradation at the Site:

Monitoring of the site is recommended (on a quarterly or semi-annual basis) to monitor biodegradation activity, and to document contaminant losses. We recommend measuring populations of hydrocarbon-degrading and heterotrophic bacteria, dissolved oxygen, ammonia- N and *o*-phosphate as well as TVH-g.

Also, to provide additional support for this preliminary investigation, CytoCulture recommends that additional testing be performed at MW-2 (plume center) and MW-5 (down gradient reference site) to establish levels of hydrocarbon-degrading and heterotrophic bacteria, dissolved oxygen, ammonia- N, *o*-phosphate, nitrate-N and sulfate.

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Environmental Microbiologist
Laboratory Services

Randall von Wedel, Ph.D.
Principal Biochemist and
Director of Research

BTEX and MTBE (ug/L normalized to toluene ug/L)

MW	Sample Date	B	T	E	X	MTBE	
2	7/27/93	10000	27000	2900	20000		ug/L
	7/27/93	0.4	1.0	0.1	0.7		:Toluene
	6/30/98	7300	18000	2500	15600	5500	ug/L
	6/30/98	0.4	1.0	0.1	0.9	0.3	:Toluene
3	7/27/98	9100	24000	5300	33000		ug/L
	7/27/98	0.4	1.0	0.2	1.4		:Toluene
	10/2/98	4200	11000	1800	10600		ug/L
	10/2/98	0.4	1.0	0.2	1.0		:Toluene
	6/30/98	4800	11000	1200	7100	3900	ug/L
	6/30/98	0.4	1.0	0.1	0.6	0.4	:Toluene
4	6/30/98	2200	930	850	210	1800	ug/L
	6/30/98	2.4	1.0	0.9	0.2	1.9	:Toluene