GeoSolv, LLC

ENVIRONMENTAL AND HYDROGEOLOGICAL CONSULTING
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October 12, ~~1999~~ 2000

Barney M. Chan
Hazardous Materials Specialist
Alameda County Environmental Health
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-9335

Telephone: (510) 567-6765
FAX: (510) 337-9335

Subject: Groundwater Monitoring of Hydrocarbons related to the Former Underground Storage Tanks at the FORMER BILL CHUN SERVICE STATION @ 2301 SANTA CLARA AVENUE, ALAMEDA, CA 94501

Dear Barney:

This report summarizes the groundwater level measurements and laboratory results of analyses performed for gasoline constituents in groundwater obtained from eleven (11) groundwater monitoring wells.

The highest concentrations of benzene identified in groundwater in March 1997 were similar to the highest concentrations identified during this groundwater monitoring event. The only significant difference in the nature of the dissolved benzene at the site is that the center of the plume has migrated towards the east since March 1997.

No free product was identified, however, a noticeable hydrocarbon sheen was identified in groundwater monitoring wells MW-2, MW-7, and MW-11.

Sincerely,

Franklin J. Goldman
CEO/GeoSolv, LLC
Registered Geologist No. 5557
Certified Hydrogeologist No. 466

ENVIRONMENTAL PROTECTION
00 OCT 13 PM 4:07

Groundwater Flow Direction

Groundwater was encountered at depths of approximately 9 to 10 feet bgs in the vicinity of the former tank pit at the end of the rainy season. The predominant groundwater gradient direction is to the southwest (See Figure 1 for Gradient Map) and (Table 1 for Depth to Water Table Measurements). Water levels were measured with an electric water level sounder prior to sampling. A Slope Indicator water level meter was used to measure the depth to groundwater. The measurements were read to the nearest 100th of an inch. The groundwater gradient was determined by comparing water levels with elevations provided by a certified land survey. The groundwater gradient flow is to the southeast at 0.007 feet/foot.

Well Purging and Development

The wells were purged with a surge block to remove any sediment which was assumed to have collected since the last groundwater monitoring event. Very little turbidity was observed in the wells sampled. Purging of the wells was performed by the use of a 1 3/4 inch diameter steel check valve bailer with a surge block for the 2 inch diameter wells. Each well was sampled after well development which entailed the removal of approximately three (3) or more borehole volumes from each well, allowing the water level to recover to at least 80% of the original, static water level. Temperature, electrical conductivity, and pH was monitored during the bailing process, so that the three parameters demonstrated an error difference of within 10% from one another, over three consecutive readings. The recorded data was used to verify that a sufficient volume of groundwater had been removed from the each well casing so that anomalies caused by remnant well casing storage would not preclude us from obtaining a groundwater sample which would be more representative of the aquifer contaminant distribution as a whole.

Groundwater Sampling From Wells

Water samples were collected by lowering a plastic disposable bailer down the center of the well casing. Water samples were contained in 40-milliliter VOA vials for TPH-g, MTBE, and BTEX analyses. The groundwater sample collected from MW-6 was additionally analyzed for EPA Method 8010. No EPA Method 8260 was used to confirm the presence of MTBE due to interference from high concentrations of TPHg in the groundwater samples collected and analyzed. The samples were labeled and stored on ice until delivered, under chain-of-custody procedures, to McCampbell Analytical, Inc. of Pacheco, California, a State-certified analytical laboratory.

Laboratory Results of Hydrocarbons in Groundwater

TPHg and BTEX concentrations indicate decreases in wells on the west side of the site and increases in wells on the east end of the site (See Attached Laboratory Data Sheets) and (Table 2 for Lab Results).

The plumes of benzene and TPHg in groundwater are still centered in the general vicinity of the site (See Figures 2 and 3 for TPHg and benzene concentration maps).

FIELD CLEANUP

Well purge water was placed in properly labeled 55 gallon drums left on-site pending laboratory analysis to determine a legal point of disposal.

CONCLUSIONS

Dissolved benzene constituents have migrated to the east of the site.

RECOMMENDATIONS

Perform an additional round of quarterly sampling.

LIMITATIONS

This report has been prepared in accordance with generally accepted environmental, geological and engineering practices. No warranty, either expressed or implied, is made as to the professional advice presented herein. The analyses, conclusions and recommendations contained in this report are based upon site conditions as they existed at the time of the investigation and they are subject to change.

The conclusions presented in this report are professional opinions based solely upon visual observations of the site and vicinity, and interpretation of available information as described in this report. GeoSolv, LLC, recognizes that the limited scope of services performed in execution of this investigation may not be appropriate to satisfy the needs, or requirements of other state agencies, or of other users. Any use or reuse of this document or its findings, conclusions or recommendations presented herein, is done so at the sole risk of the said user.

TABLE 1
Depth to Groundwater Measurements
September 17, 2000

Well No	Depth to Groundwater from TOC (feet bgs)	TOC Elevation (feet)	Water Table Elevation (feet)
MW-1	8.96	28.49	19.53
MW-2	8.95	28.47	19.52
MW-3	9.61	28.78	19.17
MW-4	9.12	28.53	19.41
MW-5	8.89	28.33	19.44
MW-6	8.95	28.36	19.41
MW-7	9.09	28.44	19.35
MW-8	8.79	28.17	19.38
MW-9	8.03	27.45	19.42
MW-10	7.72	27.32	19.60
MW-11	9.15	28.56	19.41

TABLE 2

Analytical Results for Gasoline Indicator Chemicals in Groundwater (ppb)

Well No	TPHg	Benzene
MW-1	65,000	15,000
MW-2	560,000	10,000
MW-3	9,300	3,000
MW-4	ND	ND
MW-5	44,000	490
MW-6	10,000	110
MW-7	140,000	21,000
MW-8	ND	1.4
MW-9	ND	ND
MW-10	ND	ND
MW-11	220,000	32,000

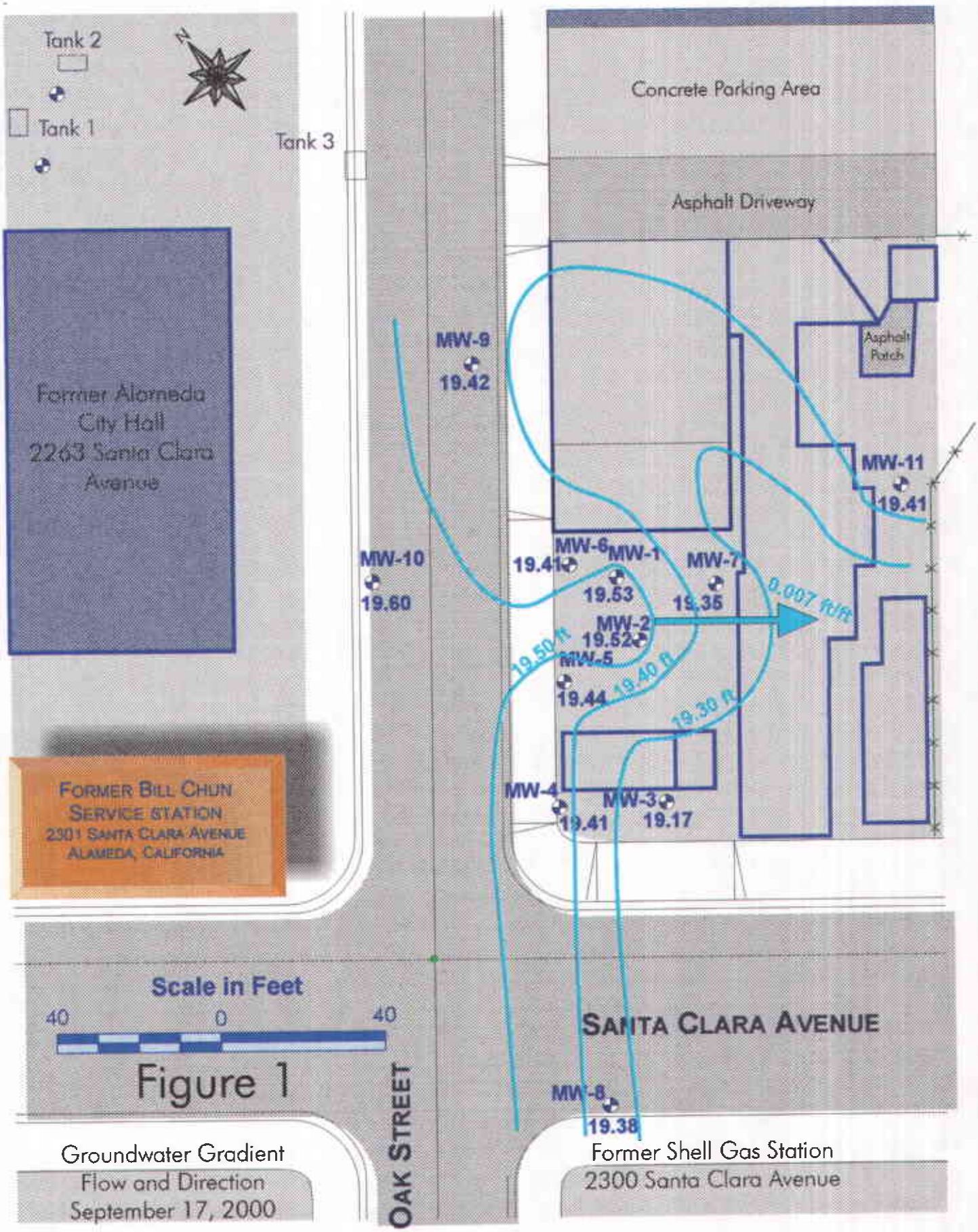


Figure 1

Groundwater Gradient
Flow and Direction
September 17, 2000

Former Shell Gas Station
2300 Santa Clara Avenue

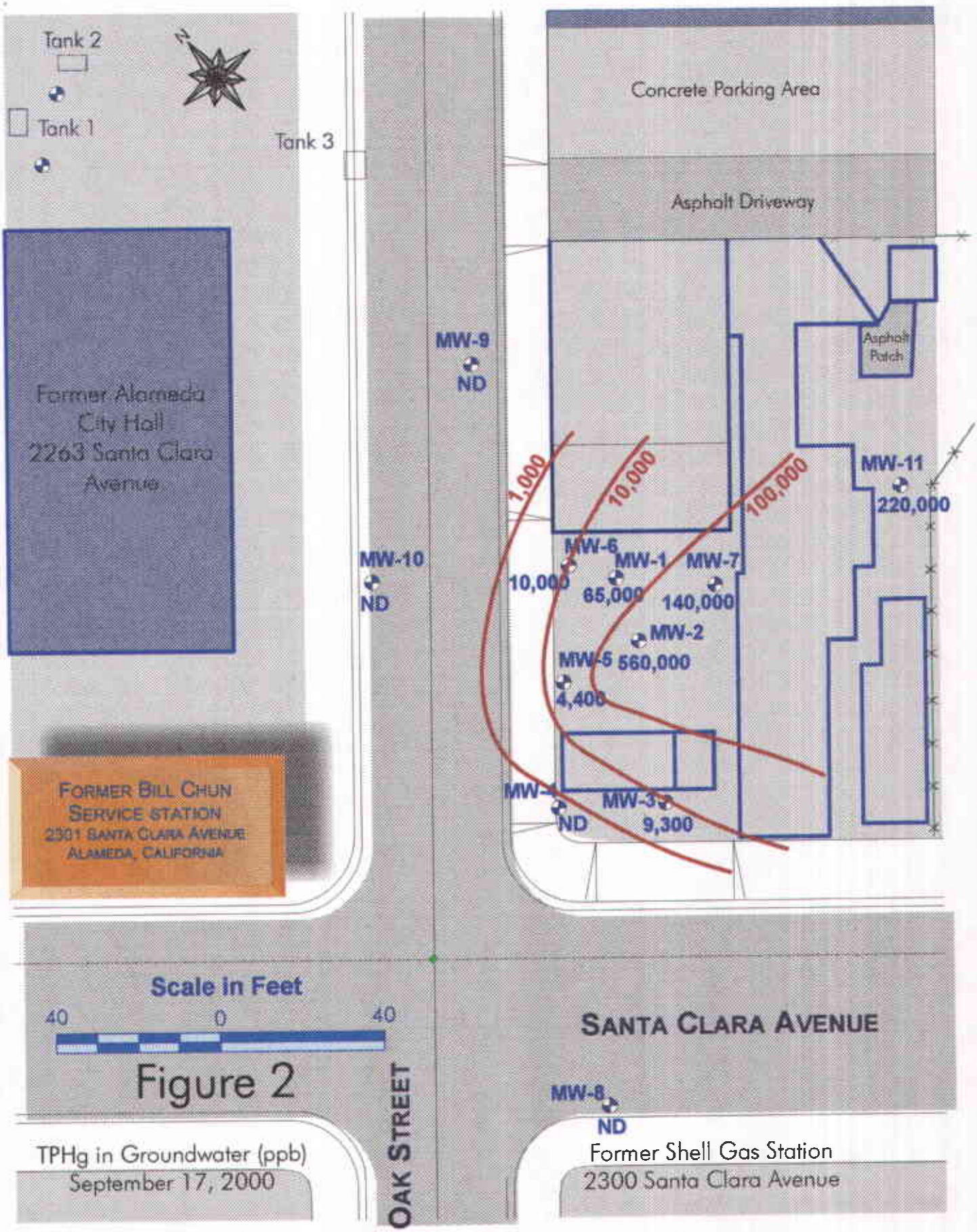
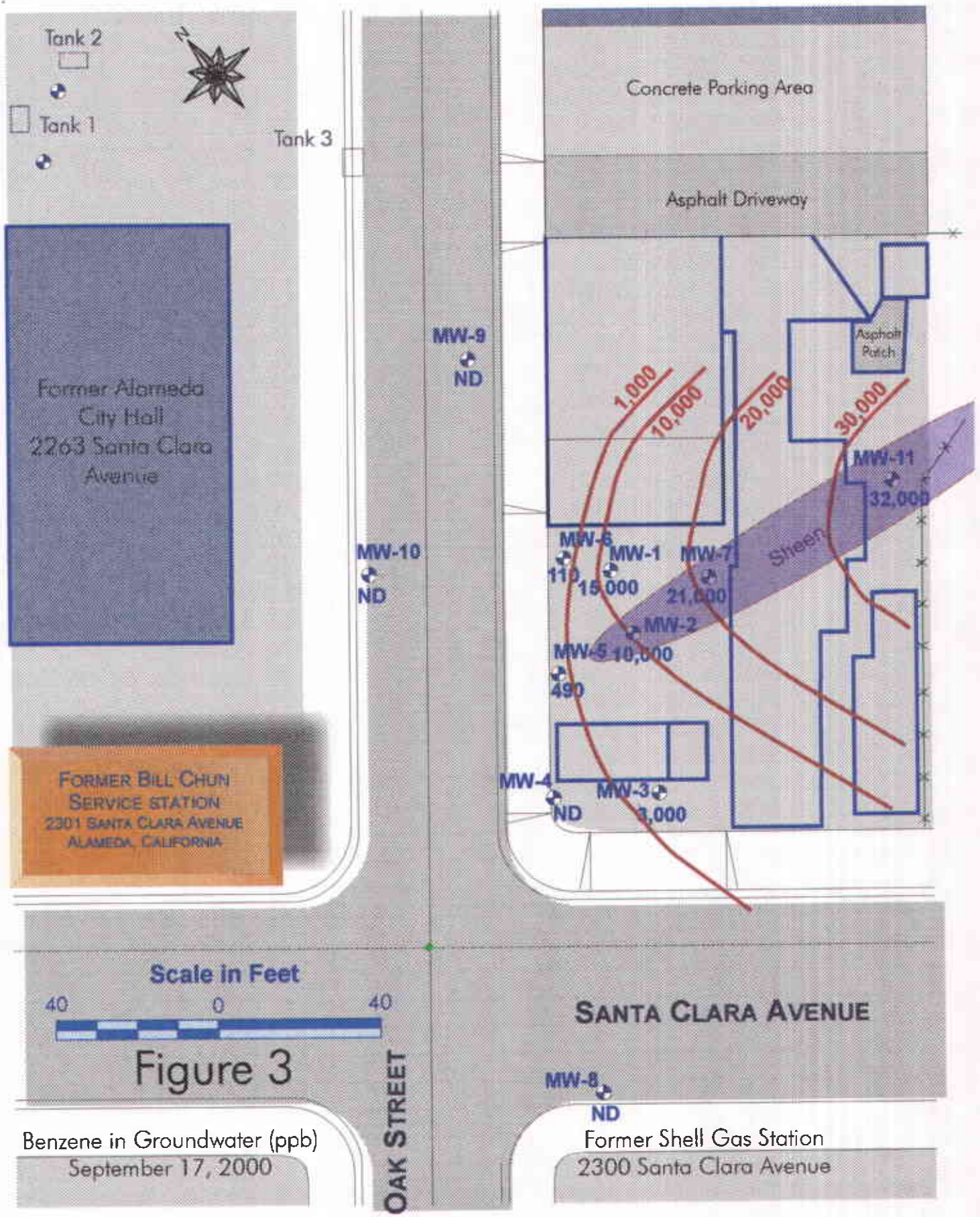


Figure 2

TPHg in Groundwater (ppb)
September 17, 2000


Tank 2
Tank 1
Tank 3
Former Alameda City Hall 2263 Santa Clara Avenue
Concrete Parking Area
Asphalt Driveway
Asphalt Patch
MW-9
ND
MW-10
ND
1,000
10,000
20,000
30,000
MW-11
32,000
MW-6
110
MW-1
15,000
MW-7
21,000
Sheen
MW-2
MW-5
10,000
490
MW-4
ND
MW-3
3,000
FORMER BILL CHUN SERVICE STATION
2301 SANTA CLARA AVENUE
ALAMEDA, CALIFORNIA
Scale in Feet
40
0
40
Figure 3
SANTA CLARA AVENUE
OAK STREET
MW-8
ND
Benzene in Groundwater (ppb)
September 17, 2000
Former Shell Gas Station
2300 Santa Clara Avenue

McCAMPBELL ANALYTICAL INC.
110 2nd Avenue South, #D7, Pacheco, CA 94553-5560
Telephone : 925-798-1620 Fax : 925-798-1622
http://www.mccampbell.com E-mail: main@mccampbell.com

GEOSOLV, LLC 643 Oregon Street Sonoma, CA 95476	Client Project ID: Chun	Date Sampled: 09/17/00
		Date Received: 09/19/00
	Client Contact: Frank Goldman	Date Extracted: 09/19/00
	Client P.O:	Date Analyzed: 09/19/00

09/27/00

Dear Frank:

Enclosed are:

1). the results of **11** samples from your **Chun** project,

2). a QC report for the above samples

3). a copy of the chain of custody, and

4). a bill for analytical services.

All analyses were completed satisfactorily and all QC samples were found to be within our control limits. If you have any questions please contact me. McCampbell Analytical Laboratories strives for excellence in quality, service and cost. Thank you for your business and I look forward to working with you again.

Yours truly,

Edward Hamilton, Lab Director

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GEOSOLV, LLC 643 Oregon Street Sonoma, CA 95476	Client Project ID: Chun	Date Sampled: 09/17/00
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	Client Contact: Frank Goldman	Date Extracted: 09/20-09/22/00
	Client P.O:	Date Analyzed: 09/20-09/22/00

Gasoline Range (C6-C12) Volatile Hydrocarbons as Gasoline*, with Methyl tert-Butyl Ether* & BTEX*

EPA methods 5030, modified 8015, and 8020 or 602; California RWQCB (SF Bay Region) method GCFID(5030)

Lab ID	Client ID	Matrix	TPH(g)+	MTBE	Benzene	Toluene	Ethyl-benzene	Xylenes	% Recovery Surrogate
47914	MW-10	W	ND	ND	ND	ND	ND	ND	101
47915	MW-9	W	ND	ND	ND	ND	ND	ND	100
47916	MW-8	W	ND	ND	1.4	ND	ND	ND	101
47917	MW-3	W	9300,a	ND<30	3000	68	170	490	101
47918	MW-4	W	ND	ND	ND	ND	ND	ND	104
47919	MW-5	W	44,000,a	ND<100	490	2600	1800	8800	95
47920	MW-2	W	560,000,a,h	ND<300	10,000	36,000	10,000	67,000	104
47921	MW-6	W	10,000,a	ND<20	110	240	420	1900	100
47922	MW-7	W	140,000,a,h	ND<200	21,000	27,000	3400	15,000	102
47923	MW-11	W	220,000,a,h	ND<800	32,000	57,000	4200	25,000	101
47924	MW-1	W	65,000,a	ND<200	15,000	6600	2300	8100	99
Reporting Limit unless otherwise stated; ND means not detected above the reporting limit		W	50 ug/L	5.0	0.5	0.5	0.5	0.5	
		S	1.0 mg/kg	0.05	0.005	0.005	0.005	0.005	

* water and vapor samples are reported in ug/L, wipe samples in ug/wipe, soil and sludge samples in mg/kg, and all TCLP and SPLP extracts in ug/L

cluttered chromatogram; sample peak coelutes with surrogate peak

+The following descriptions of the TPH chromatogram are cursory in nature and McCampbell Analytical is not responsible for their interpretation: a) unmodified or weakly modified gasoline is significant; b) heavier gasoline range compounds are significant(aged gasoline?); c) lighter gasoline range compounds (the most mobile fraction) are significant; d) gasoline range compounds having broad chromatographic peaks are significant; biologically altered gasoline?; e) TPH pattern that does not appear to be derived from gasoline (?); f) one to a few isolated peaks present; g) strongly aged gasoline or diesel range compounds are significant; h) lighter than water immiscible sheen is present; i) liquid sample that contains greater than ~5 vol. % sediment; j) no recognizable pattern.

DHS Certification No. 1644

Edward Hamilton, Lab Director

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GEOSOLV, LLC	Client Project ID: Chun	Date Sampled: 09/17/00
643 Oregon Street		Date Received: 09/19/00
Sonoma, CA 95476	Client Contact: Frank Goldman	Date Extracted: 09/21-09/22/00
	Client P.O:	Date Analyzed: 09/21-09/22/00

Volatile Halocarbons

EPA method 601 or 8010

Lab ID	47921			
Client ID	MW-6			
Matrix	W			
Compound	Concentration*			
Bromodichloromethane	ND<1.0			
Bromoform[b]	ND<1.0			
Bromomethane	ND<1.0			
Carbon Tetrachloride[c]	ND<1.0			
Chlorobenzene	ND<1.0			
Chloroethane	ND<1.0			
2-Chloroethyl Vinyl Ether[d]	ND<1.0			
Chloroform[e]	ND<1.0			
Chloromethane	ND<1.0			
Dibromochloromethane	ND<1.0			
1,2-Dichlorobenzene	ND<1.0			
1,3-Dichlorobenzene	ND<1.0			
1,4-Dichlorobenzene	ND<1.0			
Dichlorodifluoromethane	ND<1.0			
1,1-Dichloroethane	ND<1.0			
1,2-Dichloroethane	ND<1.0			
1,1-Dichloroethene	ND<1.0			
cis 1,2-Dichloroethene	ND<1.0			
trans 1,2-Dichloroethene	ND<1.0			
1,2-Dichloropropane	ND<1.0			
cis 1,3-Dichloropropene	ND<1.0			
trans 1,3-Dichloropropene	ND<1.0			
Methylene Chloride[f]	ND<3.0			
1,1,2,2-Tetrachloroethane	ND<1.0			
Tetrachloroethene	ND<1.0			
1,1,1-Trichloroethane	ND<1.0			
1,1,2-Trichloroethane	ND<1.0			
Trichloroethene	ND<1.0			
Trichlorofluoromethane	ND<1.0			
Vinyl Chloride[g]	ND<1.0			
% Recovery Surrogate	109			
Comments	j			

* water and vapor samples and all TCLP & SPLP extracts are reported in ug/L, soil and sludge samples in ug/kg, wipe samples in ug/wipe

Reporting limit unless otherwise stated: water/TCLP/SPLP extracts, ND<0.5ug/L; soils and sludges, ND<5ug/kg; wipes, ND<0.2ug/wipe

ND means not detected above the reporting limit; N/A means analyte not applicable to this analysis

(b) tribromomethane; (c) tetrachloromethane; (d) (2-chloroethoxy) ethene; (e) trichloromethane; (f) dichloromethane; (g) chloroethene; (h) a lighter than water immiscible sheen is present; (i) liquid sample that contains greater than ~5 vol. % sediment; (j) sample diluted due to high organic content.

DHS Certification No. 1644

Edward Hamilton, Lab Director

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QC REPORT

Date: 09/20/00 Matrix: Water

Extraction: N/A

Compound	Concentration: ug/L				%Recovery		RPD
	Sample	MS	MSD	Amount Spiked	MS	MSD	
SampleID: 40793				Instrument: GC-3			
Surrogate1	0.000	97.0	103.0	100.00	97	103	6.0
Xylenes	0.000	280.0	298.0	300.00	93	99	6.2
Ethyl Benzene	0.000	94.0	101.0	100.00	94	101	7.2
Toluene	0.000	97.0	106.0	100.00	97	106	8.9
Benzene	0.000	100.0	110.0	100.00	100	110	9.5
MTBE	0.000	108.0	117.0	100.00	108	117	8.0
GAS	0.000	802.8	816.4	1000.00	80	82	1.7
SampleID: 92200				Instrument: MB-1			
Oil & Grease	0.000	20.4	20.2	20.00	102	101	1.0
SampleID: 92200				Instrument: GC-2 A			
Surrogate1	0.000	105.0	98.0	100.00	105	98	6.9
TPH (diesel)	0.000	310.0	295.0	300.00	103	98	5.0

$$\%\ \text{Recovery} = \frac{(MS - Sample)}{AmountSpiked} \cdot 100$$

$$\text{RPD} = \frac{(MS - MSD)}{(MS + MSD)} \cdot 2 \cdot 100$$

RPD means Relative Percent Deviation

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QC REPORT

EPA 8010/8020/EDB

Date: 09/20/00-09/21/00 Matrix: Water

Extraction: N/A

Compound	Concentration: ug/L				%Recovery		RPD
	Sample	MS	MSD	Amount Spiked	MS	MSD	
SampleID: 92000					Instrument: GC-1		
Surrogate1	0.000	89.0	86.0	100.00	89	86	3.4
Chlorobenzene	0.000	96.0	94.0	100.00	96	94	2.1
Trichloroethane	0.000	96.0	91.0	100.00	96	91	5.3
1,1-DCE	0.000	103.0	90.0	100.00	103	90	13.5

$$\%\,\text{Recovery} = \frac{(MS - Sample)}{AmountSpiked} \cdot 100$$

$$\text{RPD} = \frac{(MS - MSD)}{(MS + MSD)} \cdot 200$$

22044 ZGI 18

GeoSolv, LLC

Environmental and Hydrogeological Consulting
640 Gregory Street, Sonoma, CA 95476
Phone (707) 996-4237 FAX (707) 996-7902
We Don't Just Work on Your Environmental Problems, We Solve Them

CHAIN OF CUSTODY RECORD

Laboratory Analysis P.O. No. _____

Laboratory Please Call Accounts Payable for P.O. No.

Date: _____ Sheet ___ Of ___

Project Name: Chun

Project Number:

Address: 2300 Santa Clara Ave Alameda

Sampler's Name: Frank Goldman

Sampler's Signature: Franklin J. Goldman

Lab Name: McCampbell

Address: Pacheco

Phone Number:

Turnaround Time: ☐ Rush ☐ 24 Hour ☐ 48 Hour ☒ 5-Day

Report to: Geosolv

Sample Number	Location	Date	Time	TPH as Gasoline 8015	TPH as Diesel 8015	TPH-G and BTEX 8015/8020 (MTBE)	BTEX & EPA 8020	Oil and Grease 5520	Volatile Organics (8010)	CAM Metals (17)	Pr. Pollutant Metals (13)	Base/Neut/Acids (Organic)	Pesticides 8140/8141	EPA 8010 plus VOC Specif include DCE	Confirm MTBE 8260		SOIL SAMPLE	WATER SAMPLE	Comments
MW-10		9/7/00	8:30 AM			X												X	Confirm the highest MTBE with EPA 8260 out of the eleven water samples
9			9:20																
8			10:10																
3			11:05																
4			12:00																
5			12:40																
2			1:20																
6			2:05											X					
7			2:55																
11		↓	3:45 PM			↓												↓	

Relinquished By	Date	Time	Received By	Date	Time
Franklin J. Goldman			Frank Goldman	9/19	1130
Frank Goldman	9/19	1225	Mark V (MAS)	9/19	12:25
Dispatched By	**Date**	**Time**	**Received in Lab By**	**Date**	**Time**
				ICE/t	

Total Number of Containers this Sheet:

Method of Shipment:

Special Shipment/Handling or Storage Requirements: VOAs | O&G | Keep on ICE

PRESERVATION

47914 +
47915 +
47916 st
47917 +
47918 st
47919 +
47920 +
47921 +
47922 +
47923 +

GeoSolv, LLC

Environmental and Hydrogeological Consulting
565 Oregon Street, Sonoma, CA 95476
Phone (707) 996-6207 FAX (707) 996-7902
We Don't Just Work on Your Environmental Problems, We Solve Them

CHAIN OF CUSTODY RECORD

Laboratory Analysis P.O. No._____
Laboratory Please Call Accounts Payable for P.O. No.
Date: _____ Sheet ___ Of ___

Project Name Chun
Project Number 2300 Santa Clara
Address Alameda

Sampler's Name: Frank Goldman
Sampler's Signature: Frank Goldman

Parameters (→ MTBE)

Sample Number / Location	Date	Time	TPH as Gasoline 8015	TPH as Diesel 8015	TPH-G and BTEX 8015/8020	BTEX & EPA 8020	Oil and Grease 5520	Volatile Organics (8010)	CAM Metals (17)	Pr. Pollutant Metals (13)	Base/Neus/Acids (Organic)	Pesticides 8140/8141		Confirm MTBE 8260		SOIL SAMPLE	WATER SAMPLE
MW-1	9/17/00	4:30 pm			X												X

Lab Name McCampbell
Address Pacheco
Phone Number
Turnaround Time: ☐ Rush ☐ 24 Hour ☐ 48 Hour ☒ 5-Day
Report to: Geosolv

Comments
Confirm the highest of the eleven water sample MTBE concentration with EPA 8260

47924 +

	VOAs	O&G	METALS	OTHER
PRESERVATION APPROPRIATE				
CONTAINERS				

NEAD GOOD CONDITION
HEAD SPACE ABSENT

Relinquished By	Date	Time	Received By	Date	Time
Frank Goldman			Frank Goldman	9/19	1130
Frank Goldman	9/19	1225	[illegible] (MP)	9/19	12:25
Dispatched By	**Date**	**Time**	**Received in Lab By**	**Date**	**Time**

Total Number of Containers this Sheet:
Method of Shipment:
Special Shipment/Handling or Storage Requirements: Keep on Ice