R04

Tetra Tech EM Inc.

135 Main Street, Suite 1800 ◆ San Francisco, CA 94105 ◆ (415) 543-4880 ◆ FAX (415) 543-5480

4868

August 29, 2001

Barney Chan
Hazardous Materials Specialist
Alameda County Health Care Services Agency
Environmental Health Services
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577

Subject: **Submittal of 2000 Groundwater Report for J. W. Silveira Company Underground Storage Tank Site at 1200 20th Avenue in Oakland, California**

Dear Mr.Chan:

Enclosed please find one copy of the 2000 Groundwater Report for 1200 20th Avenue. The purpose of this report is to provide the analytical results for the year 2000 groundwater monitoring, which was conducted at the J. W. Silveira Company underground storage tank (UST) site at 1200 20th Avenue in Oakland, California. The data for all four quarters of the year 2000 sampling at the site are summarized in the report, and the data for the fourth quarter of the year 2000 are discussed separately, as well (because these data have not yet been presented in report form to you). The sampling dates for each quarter of the year 2000 were February 9, May 23, September 27, and December 18, 2000.

Thank you for your assistance. Please call me at (775) 333-8466 with any questions.

Sincerely,

Hal Dawson

Hal Dawson
Project Manager/Geologist

cc: J.W. Silveira Company
Shapiro Buchman Provine & Patton LLP
File

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4884/504

2000 GROUNDWATER REPORT

1200 20th AVENUE
OAKLAND, CALIFORNIA

Prepared for:
J.W. Silveira Company
499 Embarcadero Street
Oakland, California 94606

TETRA TECH EM Inc.
135 Main Street, Suite 1800
San Francisco, California 94105

CONTENTS

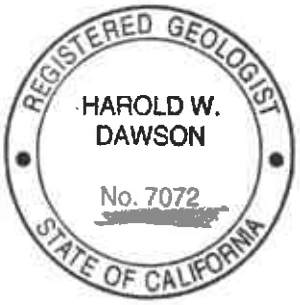
1.0 APPROVAL PAGE

This 2000 Groundwater Report for the underground storage tank (UST) site located at 1200 20th Avenue, in Oakland, California, was prepared for J.W. Silveira Company, the owner of the site. Should you have any questions regarding this report, please feel free to contact me at (775) 333-8466. Reno NV 89502

Sincerely,

1325 Airmotive Way
Suite 200
fax (775) 322-3987

Harold W. Dawson



Harold W. Dawson
TtEMI Project Manager
California Registered Geologist #7072

2.0 INTRODUCTION

The purpose of this report is to provide the analytical results for the year 2000 groundwater monitoring which was conducted at the J. W. Silveira Company UST site at 1200 20th Avenue in Oakland, California. The fourth quarter results are discussed separately, as they have not been presented in a report to J. W. Silveira Company as of this time. Following presentation of the fourth quarter analytical results, the data for all four quarters of the year 2000 sampling at the site are summarized. The sampling dates for each quarter of the year 2000 were February 9, May 23, September 27, and December 18, 2000.

3.0 SITE BACKGROUND

The UST site is located at the east corner of the intersection of 20th Avenue and Solano Way in Oakland, California (Figure 1). Two USTs were previously located at the site. The two 600-gallon USTs, which reportedly contained gasoline, were removed in January 1994. The physical size of both of the tanks (estimated during the removal activities) was 8 feet long by 3.5 feet in diameter. During removal of the USTs, it was noted that the single-walled steel tanks had rusted through and had leaked. The approximate surface area of the removal excavation was about 20 feet by 10 feet. Approximately 80 cubic yards of soil was over-excavated and transported off site for disposal. The bottom of the excavation was approximately 15 feet below the ground surface (bgs). The exact depth to the bottom of the USTs was not recorded during the removal activities; the estimated depth to the bottom of the former USTs is 6 to 8 feet bgs.

Six soil samples were collected from the sidewalls and the bottom of the removal excavation. The soil samples were analyzed for benzene, toluene, ethylbenzene, and xylenes (BTEX), total petroleum hydrocarbons (TPH) as gasoline (TPH-g), TPH as diesel (TPH-d), and total lead. The highest concentrations of BTEX and TPH-g were detected along 20th Avenue at the western end of the removal excavation. Groundwater was not encountered during removal of the USTs. As part of the UST removal action activities, three groundwater monitoring wells (MW-1, MW-2, and MW-3) were installed at the site (Figure 2). Two additional soil borings were also advanced to determine if soil and groundwater contamination was present south of the former UST location. No contamination was detected in the soil borings.

4.0 GROUNDWATER SAMPLING ACTIVITIES

For the fourth quarterly sampling event in the year 2000, the three monitoring wells at the site were sampled on December 18, 2000. The depth to groundwater was measured at each well with an electronic depth probe. The monitoring well cap was removed from the top of each well, and the groundwater table was allowed to equilibrate before the depth to groundwater was

measured. Each well was purged and sampled with a dedicated disposable bailer. During the purging of each monitoring well, a Horiba U10 water quality meter was used to measure the following physical parameters of the groundwater: pH, temperature, electrical conductivity, dissolved oxygen, and turbidity. Copies of the groundwater field sampling sheets are provided in Appendix A. These physical parameters were monitored to determine when the groundwater within the well casing of each well was representative of the groundwater surrounding the monitoring well. After the physical parameters of the groundwater had stabilized, groundwater samples were collected from each well. The samples were placed in appropriate sample containers provided by the laboratory. After each sample was labeled, the sample was stored in a cooler of ice under chain-of-custody control. The groundwater samples were received by Curtis & Tompkins Analytical Laboratories (C&T), in Berkeley, California, on December 19, 2000. C&T is a California State-certified laboratory. The three sets of samples were analyzed for BTEX, methyl tertiary-butyl ether (MTBE), and TPH-g.

4.1 GROUNDWATER GRADIENT

The groundwater elevations were calculated for each of the monitoring wells using the measured depth to groundwater and the top of casing elevation of each well at the site. The depth to groundwater was measured from the top of casing of each monitoring well. The fourth quarter groundwater elevation measurments at the site are presented in Table 1. The groundwater flow direction and gradient at the site were calculated using these data. The groundwater flow direction in December 2000 was calculated to be north 13 degrees east (N13E). Figure 3 shows the direction of groundwater gradient and the groundwater elevations for each of the monitoring wells, as measured in December 2000. The direction of groundwater flow is nearly opposite to the direction of the ground surface slope at the site. Although MW-2 is located at a higher elevation than the location of the former USTs, this well is down gradient (with respect to groundwater flow) from the location of the former USTs. The groundwater gradient for the fourth quarter was calculated to be 0.038 feet/foot (ft/ft).

Table 2 shows all of the measured groundwater elevations for the four quarters of the year 2000 from the three monitoring wells. The groundwater flow directions calculated from these data ranged from N13E in December to N29E in September (Figure 4), and the range of groundwater gradients ranged from the lowest (0.038 ft/ft) in December, to the highest (0.06 ft/ft) in February. The direction of groundwater flow and the groundwater gradient for the year 2000 are consistent with those calculated using previous water-level measurements from the three wells at the site.

4.2 GROUNDWATER ANALYTICAL RESULTS

The year 2000 fourth quarter analytical results for the site show that BTEX and TPH-g were detected in the groundwater sample collected from MW-1 (sample number JW2-21); MBTE was not detected in this groundwater sample. BTEX, MTBE, and TPH-g were not detected in the groundwater samples collected from MW-2 (sample number JW2-22) and MW-3 (sample number JW2-23). Table 3 presents the analytical results for the fourth quarter (December 2000) sampling event at the site. The detected concentrations of benzene, toluene, ethylbenzene, and total xylenes in the groundwater sample from MW-1 were 500, 26, 130, and 130 micrograms per liter (ug/L), respectively. The concentration of TPH-g detected in groundwater at MW-1 was 3,200 ug/L. The complete laboratory data package and chain-of-custody for the December 2000 sampling event is presented in Appendix B.

For the four quarters of groundwater sampling at the site during the year 2000, only the samples from MW-1 contained detectable concentrations of TPH-g and BTEX. Tables 4, 5, and 6 show the groundwater results for MW-1, MW-2, and MW-3, respectively, for the four quarters of the year 2000, as well as all of the analytical data from February 1995 to the year 2000. During the year 2000, TPH-g was only detected in MW-1 at concentrations ranging from 3,000 to 18,000 ug/L, and benzene was only detected in MW-1 at concentrations ranging from 280 to 3,700 ug/L. Toluene, ethylbenzene, xylenes, and MTBE were not detected in any of the groundwater samples from the three monitoring wells during the year 2000 quarterly monitoring. In addition, no detectable concentrations of BTEX or TPH-g have been present in groundwater samples from wells MW-2 and MW-3 since July 1998.

5.0 CONCLUSIONS AND RECOMMENDATIONS

This report presents the analytical results for the three wells at the site for the December 2000 quarterly groundwater monitoring event, and a summary of the data for the four quarters of groundwater sampling during the year 2000. No groundwater contaminants were detected in wells MW-2 and MW-3. Monitoring well MW-1 still contains elevated levels of TPH-g and BTEX compounds. MTBE is not present in the groundwater at the site.

In previous discussions with the Alameda County Health Care Services Agency (ACHCSA), it was recommended that the groundwater contamination in MW-1 be addressed through some form of remediation so that site closure can be attained. After the December 2000 groundwater sampling event, TtEMI inserted a series of oxygen-releasing compound (ORC) socks into MW-1. The ORC socks remained in the monitoring well for approximately 6 months, and were removed in June 2001 prior to the next round of groundwater sampling (which will be conducted

in late August 2001). The ORC socks will be replaced after the next sampling event until a determination can be made as to the effectivness of the ORC socks on the groundwater contamination in the area of MW-1.

Based on the anlytical results for the year 2000 groundwater monitoring at the site, TtEMI makes the following recommendations:

- That sampling for MTBE be discontinued at the site. The data for the four quarters of the year 2000 show that MTBE contamination is not present in groundwater at the site. Further sampling for MTBE is not necessary.
- That the frequency of sampling of wells MW-2 and MW-3 be reduced to once every other year. Sampling of these wells should continue until the site is closed, or until any amount of groundwater contamination is detected in the wells. Groundwater contamination is not present within these monitoring wells at this time. The reduced frequency of groundwater sampling will not affect the overall characterization of the site. The depth to groundwater in wells MW-2 and MW-3 will still be recorded each time groundwater sampling occurs at MW-1 in the future.
- That the ORC socks, which will be replaced in MW-1 after the late August 2001 sampling event, be allowed to release oxygen into groundwater in the well for no more than 9 months, such that the next sampling event for MW-1 be conducted in approximately June 2002.

FIGURES

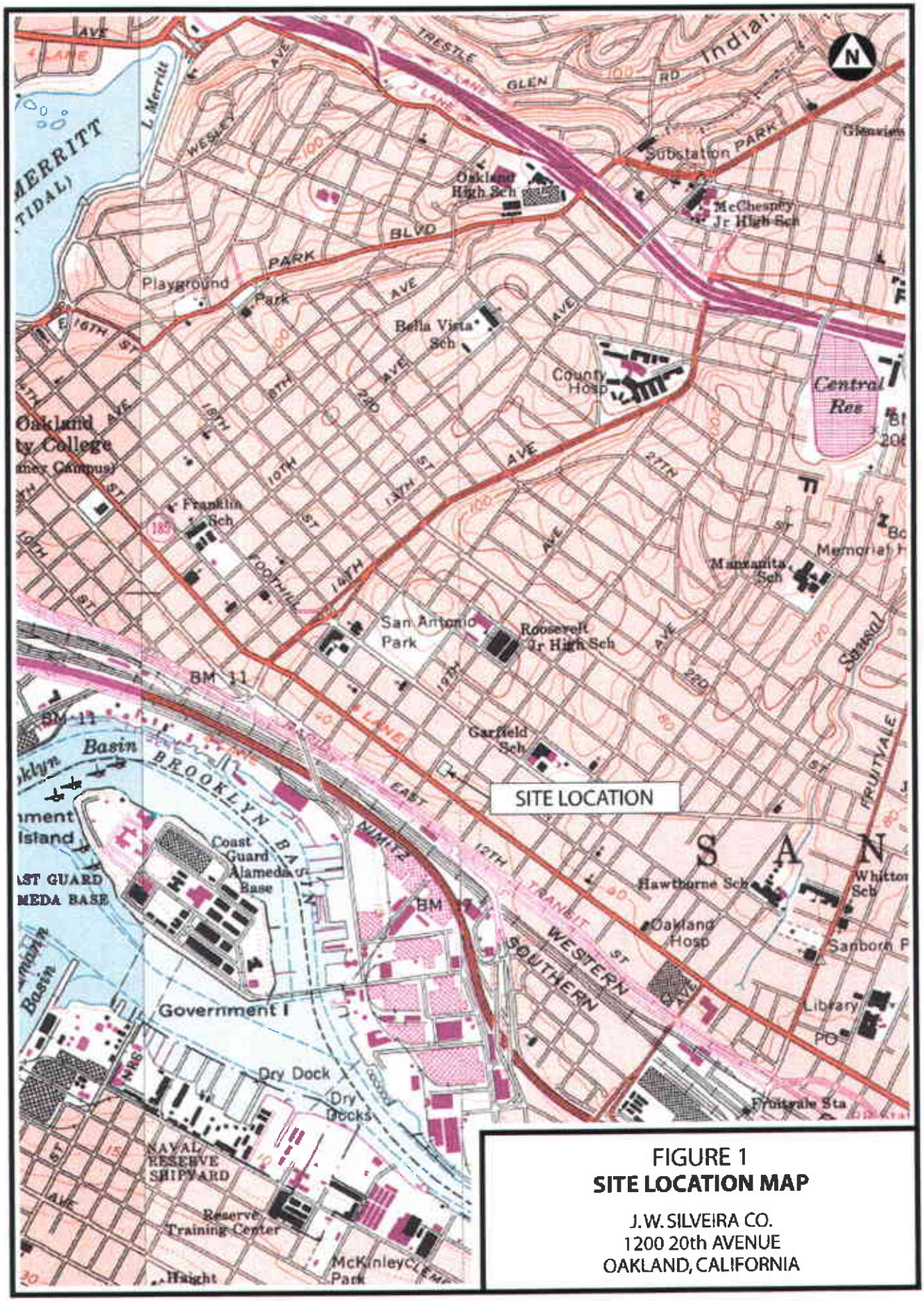
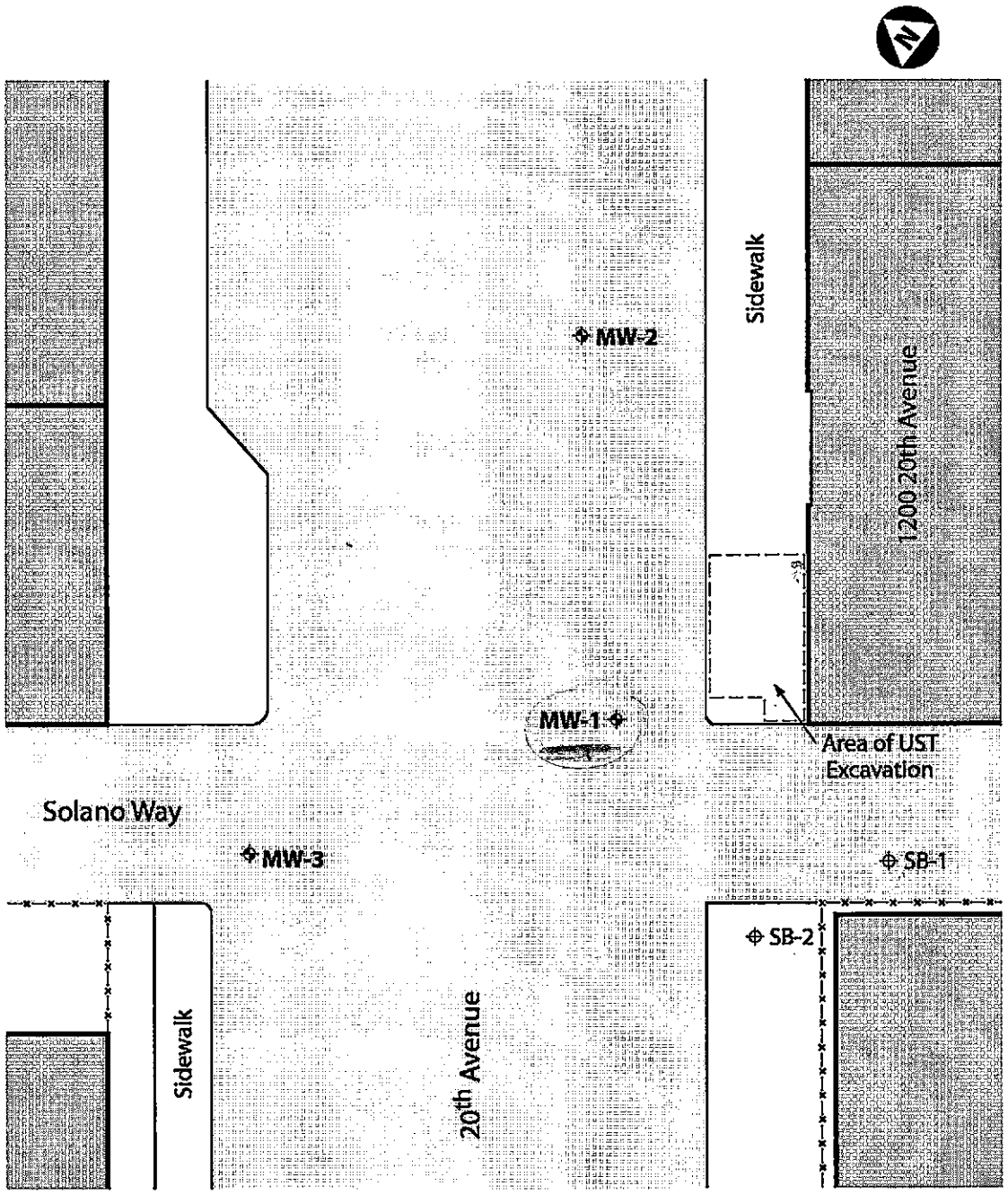


FIGURE 1
SITE LOCATION MAP

J.W. SILVEIRA CO.
1200 20th AVENUE
OAKLAND, CALIFORNIA



Notes:

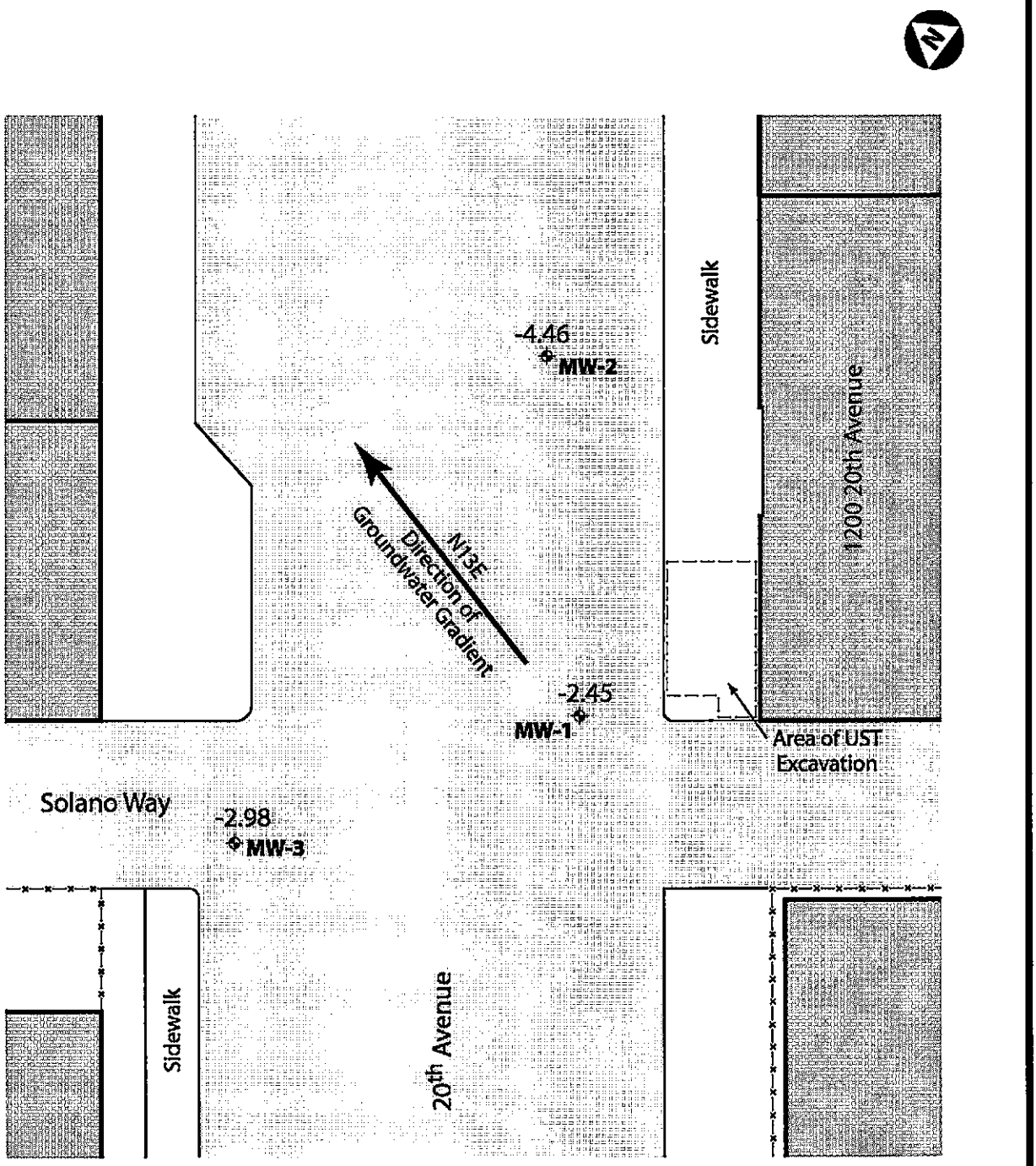
- Monitoring Well (MW)
- Soil Boring (SB)

Scale: 1 inch = 20 feet

0 10 20 30 40

FIGURE 2
MONITORING WELL AND SOIL BORING LOCATIONS
J.W. SILVEIRA CO.
1200 20th AVENUE
OAKLAND, CALIFORNIA

Tetra Tech EM Inc.



Notes:

◆ Monitoring Well (MW)

2.98 Groundwater elevation in feet above mean sea level

Scale: 1 inch = 20 feet

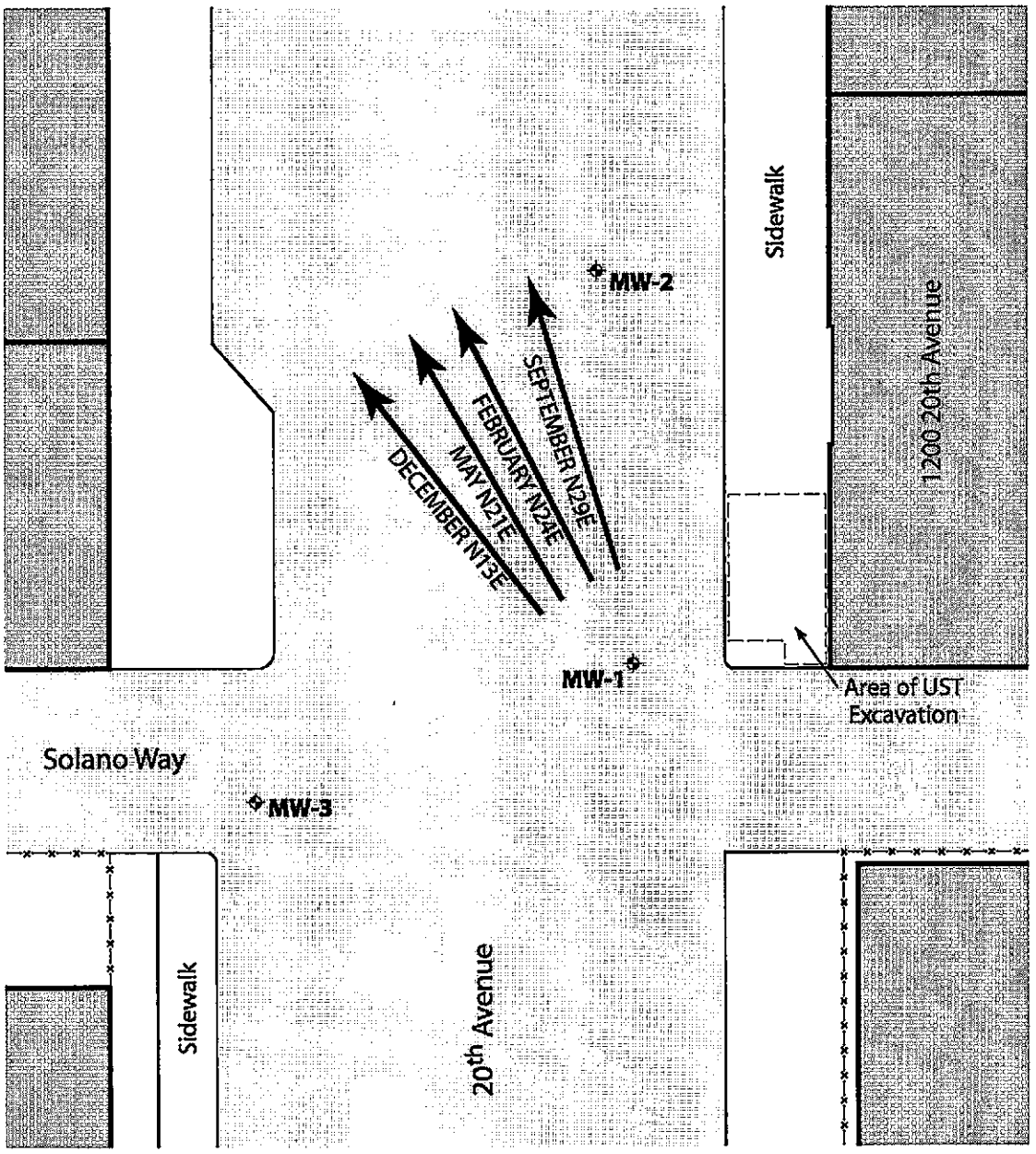
0 10 20 30 40

FIGURE 3

FOURTH QUARTER GROUNDWATER GRADIENT

J.W. SILVEIRA CO.
1200 20th AVENUE
OAKLAND, CALIFORNIA

Tetra Tech EM Inc.



Notes:

◆ Monitoring Well (MW)

Scale: 1 inch = 20 feet

0 10 20 30 40

FIGURE 4

2000

GROUNDWATER GRADIENTS

J.W. SILVEIRA CO.
1200 20th AVENUE
OAKLAND, CALIFORNIA

TABLES

TABLE 1
FOURTH QUARTER
GROUNDWATER ELEVATIONS
1200 20TH AVENUE, OAKLAND

Date	Groundwater Elevations (msl)		
	MW-1	MW-2	MW-3
12/18/00	-2.45	-4.94	-2.98

Notes:
MW-1 TOC Elevation: 17.15 ft
MW-2 TOC Elevation: 20.11 ft
MW-3 TOC Elevation: 16.06 ft
TOC top of casing
msl mean sea level

TABLE 2
2000 GROUNDWATER ELEVATIONS
1200 20TH AVENUE, OAKLAND

Date	Groundwater Elevations (msl)		
	MW-1	MW-2	MW-3
2/9/00	0.07	-2.50	-0.10
5/23/00	0.42	-2.03	0.15
9/27/00	-2.78	-4.94	-2.66
12/18/00	-2.45	-4.94	-2.98

Notes:
MW-1 TOC Elevation: 17.15 ft
MW-2 TOC Elevation: 20.11 ft
MW-3 TOC Elevation: 16.06 ft
TOC top of casing
msl mean sea level

TABLE 3
FOURTH QUARTER GROUNDWATER RESULTS
VOC AND TPH COMPOUNDS IN GROUNDWATER
1200 20TH AVENUE, OAKLAND

Analyte	Monitoring Well		
VOC (ug/L)	MW-1	MW-2	MW-3
Benzene	500	*ND*	*ND*
Toluene	26	*ND*	*ND*
Ethylbenzene	130	*ND*	*ND*
m,p-Xylenes	130	*ND*	*ND*
o-Xylene	38	*ND*	*ND*
MTBE	*ND*	*ND*	*ND*
TPH (ug/L)	MW-1	MW-2	MW-3
Gasoline	3,200	*ND*	*ND*

Notes:

ug/L	micrograms per Liter
ND	not detected
TPH	total petroleum hydrocarbons
VOC	volitile organic compound

MW-1 is water sample JW2-21
MW-2 is water sample JW2-22
MW-3 is water sample JW2-23

TABLE 4
MONITORING WELL MW-1
VOC AND TPH COMPOUNDS IN GROUNDWATER
FEBRUARY 1995 TO DECEMBER 2000
1200 20TH AVENUE, OAKLAND

Date	TPH (ug/L)	VOC (ug/L)				
	Gasoline	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE
Feb-95	1,900	92	39	57	260	- -
Jun-95	4,100	410	32	14	180	- -
Oct-95	1,300	180	22	32	81	- -
Feb-96	1,700	200	21	41	120	- -
Jun-96	1,900	160	7	34	31	- -
Sep-96	4,700	460	66	190	680	- -
Jan-97	2,200	230	35	100	330	- -
Jul-98	23,000	3,500	450	1,000	3,100	- -
Apr-99	14,000	2,600	560	340	1,600	- -
Feb-00	3,000	280	17	92	118	*ND*
May-00	18,000	3,700	430	770	2,440	*ND*
Sep-00	4,300	1,200	59	420	330	*ND*
Dec-00	3,200	500	26	130	130	*ND*

Notes:

ug/L	micrograms per Liter
- -	not analyzed
ND	not detected
TPH	total petroleum hydrocarbons
VOC	volitile organic compound

TABLE 5
MONITORING WELL MW-2
VOC AND TPH COMPOUNDS IN GROUNDWATER
FEBRUARY 1995 TO DECEMBER 2000
1200 20TH AVENUE, OAKLAND

Date	TPH (ug/L)	VOC (ug/L)				
	Gasoline	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE
Feb-95	*ND*	*ND*	*ND*	*ND*	*ND*	--
Jun-95	*ND*	1.8	*ND*	1.1	0.62	--
Oct-95	55	2.2	*ND*	1.5	*ND*	--
Feb-96	*ND*	3.3	2.7	0.99	2.4	--
Jun-96	*ND*	*ND*	0.6	*ND*	1.2	--
Sep-96	*ND*	9.3	0.57	1.3	1.9	--
Jan-97	*ND*	2.6	*ND*	*ND*	0.76	--
Jul-98	*ND*	*ND*	*ND*	*ND*	*ND*	--
Apr-99	*ND*	*ND*	*ND*	*ND*	*ND*	--
Feb-00	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*
May-00	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*
Sep-00	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*
Dec-00	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*

Notes:

ug/L	micrograms per Liter
--	not analyzed
ND	not detected
TPH	total petroleum hydrocarbons
VOC	volitile organic compound

TABLE 6
MONITORING WELL MW-3
VOC AND TPH COMPOUNDS IN GROUNDWATER
FEBRUARY 1995 TO DECEMBER 2000
1200 20TH AVENUE, OAKLAND

Date	TPH (ug/L)	VOC (ug/L)				
	Gasoline	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE
Feb-95	*ND*	*ND*	*ND*	*ND*	*ND*	- -
Jun-95	160	0.6	*ND*	0.6	0.72	- -
Oct-95	130	5.8	*ND*	3.2	*ND*	- -
Feb-96	54	5.6	2.8	2.9	8.1	- -
Jun-96	*ND*	*ND*	*ND*	*ND*	*ND*	- -
Sep-96	96	12	7.1	4	6.2	- -
Jan-97	*ND*	*ND*	*ND*	*ND*	*ND*	- -
Jul-98	*ND*	*ND*	*ND*	*ND*	*ND*	- -
Apr-99	*ND*	*ND*	*ND*	*ND*	*ND*	- -
Feb-00	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*
May-00	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*
Sep-00	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*
Dec-00	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*

Notes:

ug/L	micrograms per Liter
- -	not analyzed
ND	not detected
TPH	total petroleum hydrocarbons
VOC	volitile organic compound

APPENDIX A

GROUNDWATER SAMPLING SHEETS

GROUNDWATER SAMPLING RECORD

DATE 12-18-00 PAGE 1 OF 2

MONITORING WELL NO. MW1
PROJECT JW SILVEIRA
SITE 2, 1200 20th AVE
PROJECT NO. P11Ø6.04

TOTAL GALLONS TO BE PURGED
PURGING METHOD BAILER
SAMPLING METHOD BAILER

Time	Volume of Water Removed (gallons)	Discharge Rate (gal/min)	Field Parameters Measured: pH	Specific Conductivity (ms/cm)	Turbidity (ntu)	Dissolved Oxygen (mg/L)	Temp. (°C)			• Water Level (feet)	Comments
1514			6.45	1.17	10	3.24	20.0				
1523	3		6.58	1.17	174	3.23	19.9				
1532	6		6.58	1.15	275	3.41	19.8				
1540	9		6.58	1.15	240	3.35	19.7				
1549	12		6.57	1.15	245	3.39	19.7				

FIELD EQUIPMENT	SERIAL NUMBER	RENTAL COMPANY
HORIBA U-10	U-10.10	EQUIPCO
WATER LEVEL	107-100PZ	"

SAMPLE ID: JW2-21 @1555
ANALYSIS: BTEX, MTBE, TPH-P
COC NUMBER: 5005

SAMPLING PERSONNEL:
H. DAWSON
R. GLENN

TETRA TECH EM INC.
• SAN FRANCISCO •

GROUNDWATER SAMPLING RECORD

DATE 12-18-00 PAGE 2 OF 2

MONITORING WELL NO. MW 1

PROJECT JW SILVEIRA

SITE 2, 1200 20TH AVE

PROJECT NO. P1106.04

CASING DIAMETER 2 inches

BOREHOLE DIAMETER 8.25 inches

TOP OF CASING ELEVATION 17.15 feet

WATER LEVEL 19.60 feet btoc 1510 @

WATER LEVEL ELEVATION -2.45 feet msl

STANDING WATER COLUMN 9.22 feet

WELL VOLUMES TO BE PURGED _____

MINUMUM PURGE VOLUME _____ gallons

ACTUAL VOLUME PURGED _____ gallons

VOLUME CALCULATED BY:

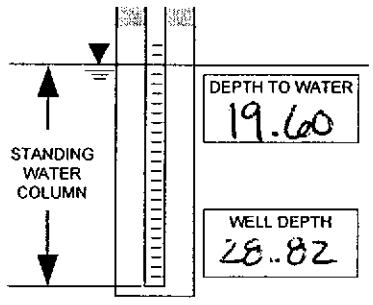
R. GLENN

PURGE VOLUME CALCULATION

One Well Volume = Casing Volume + Annulus Volume

One Well Volume = 7.18 gal + 1.57 gal

One Well Volume = 8.75 gallons



Casing Volume = Standing Water Column (ft) x Pipe Volume (gal/linear ft)[a]

Casing Volume = 9.22 ft x 0.17 gal/linear ft

Casing Volume = 1.57 gallons

NOTE:
a Refer to Table 1
b Refer to Table 2
c Assuming Sand Pack Porosity of 30%

Annulus Volume = [(Standing Water Column (ft) x Borehole Volume (gal/linear ft)[b]) - Casing Volume] x 0.3[c]

Annulus Volume = [(9.22 ft x 2.78 gal/linear ft) - 1.57 gal] x 0.3

Annulus Volume = 7.18 gallons

Table 1
Pipe Volume of Schedule 40 PVC Pipe

Diameter (inches)	OD (inches)	ID (inches)	Volume (gal/linear ft)	Diameter (inches)	OD (inches)	ID (inches)	Volume (gal/linear ft)
1.25	1.660	1.380	0.08	4	4.500	4.026	0.66
2	2.375	2.067	0.17	6	6.625	6.065	1.50
3	3.500	3.068	0.38	8	8.625	7.981	2.60

Table 2
Volume of Borehole

Diameter (inches)	Volume (gal/linear ft)	Diameter (inches)	Volume (gal/linear ft)	Diameter (inches)	Volume (gal/linear ft)
7.25	2.14	8.25	2.78	9.25	3.52
7.75	2.45	8.75	3.12	10.25	4.29

GROUNDWATER SAMPLING RECORD

DATE 12-18-00 PAGE 1 OF 2

MONITORING WELL NO. MW2
PROJECT JW SILVEIRA
SITE 2, 1200 & 20TH AVE
PROJECT NO. P1106.04

TOTAL GALLONS TO BE PURGED
PURGING METHOD BAILER
SAMPLING METHOD BAILER

Time	Volume of Water Removed (gallons)	Discharge Rate (gal/min)	Field Parameters Measured: pH	Specific Conductivity (ms/cm)	Turbidity (ntu)	Dissolved Oxygen (mg/L)	Temp. (°C)			Water Level (feet)	Comments
1425			6.42	.760	10	6.21	19.2				
1432	2		6.44	.761	111	6.38	19.2				
1439	4		6.44	.758	104	6.26	19.1				
1447	6		6.45	.755	166	6.19	19.1				
1456	8		6.45	0.754	167	6.30	19.2				

FIELD EQUIPMENT	SERIAL NUMBER	RENTAL COMPANY
HORIBA U-10	V[redacted]-10.10	EQUIPCO
WATER LEVEL	101-100P2	"

SAMPLE ID: JW2-22@1500
ANALYSIS: BTEX, MTBE, TPH-P
COC NUMBER: 5005

SAMPLING PERSONNEL:
H. DAWSON
R. GLENN

TETRA TECH EM INC.
• SAN FRANCISCO •

GROUNDWATER SAMPLING RECORD

DATE 12-18-00 PAGE 2 OF 2

MONITORING WELL NO. MW2
PROJECT JW SILVEIRA
SITE 2, 1200 20th AVE
PROJECT NO. P1106.04
CASING DIAMETER 2 inches
BOREHOLE DIAMETER 8.25 inches
TOP OF CASING ELEVATION 20.11 feet
WATER LEVEL 24.57 feet btoc @
WATER LEVEL ELEVATION -4.46 feet msl

STANDING WATER COLUMN 6.63 feet
WELL VOLUMES TO BE PURGED
MINUMUM PURGE VOLUME gallons
ACTUAL VOLUME PURGED gallons

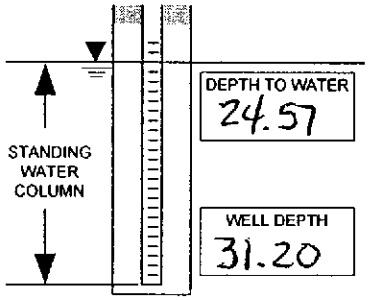
VOLUME CALCULATED BY:
R. Green

PURGE VOLUME CALCULATION

One Well Volume = Casing Volume + Annulus Volume

One Well Volume = 5.19 gal + 1.13 gal

One Well Volume = 6.32 gallons



Casing Volume = Standing Water Column (ft) x Pipe Volume (gal/linear ft)[a]

Casing Volume = 6.63 ft x 0.17 gal/linear ft

Casing Volume = 1.13 gallons

NOTE:
a Refer to Table 1
b Refer to Table 2
c Assuming Sand Pack Porosity of 30%

Annulus Volume = [(Standing Water Column (ft) x Borehole Volume (gal/linear ft)[b]) - Casing Volume] x 0.3[c]

Annulus Volume = [(6.63 ft x 2.78 gal/linear ft) - 1.13 gal] x 0.3

Annulus Volume = 5.19 gallons

Table 1
Pipe Volume of Schedule 40 PVC Pipe

Diameter (inches)	OD (inches)	ID (inches)	Volume (gal/linear ft)	Diameter (inches)	OD (inches)	ID (inches)	Volume (gal/linear ft)
1.25	1.660	1.380	0.08	4	4.500	4.026	0.66
2	2.375	2.067	0.17	6	6.625	6.065	1.50
3	3.500	3.068	0.38	8	8.625	7.981	2.60

Table 2
Volume of Borehole

Diameter (inches)	Volume (gal/linear ft)	Diameter (inches)	Volume (gal/linear ft)	Diameter (inches)	Volume (gal/linear ft)
7.25	2.14	8.25	2.78	9.25	3.52
7.75	2.45	8.75	3.12	10.25	4.29

GROUNDWATER SAMPLING RECORD

DATE 12-18-00 PAGE 1 OF 2

MONITORING WELL NO. MW3

PROJECT JW SILVEIRA

SITE 2, 1200 20TH AVE

PROJECT NO. P1106-04

TOTAL GALLONS TO BE PURGED _____

PURGING METHOD BAILER

SAMPLING METHOD BAILER

Time	Volume of Water Removed (gallons)	Discharge Rate (gal/min)	Field Parameters Measured: pH	Specific Conductivity (ms/cm)	Turbidity (ntu)	Dissolved Oxygen (mg/L)	Temp. (°C)			• Water Level (feet)	Comments
1023			6.49	1.45	21	7.22	19.5				
1032	3		6.70	1.43	429	7.26	19.9				
1050	6		6.74	1.33	198	7.33	19.8				
1100	9		6.72	1.33	680	7.30	19.8				
1107	12		6.71	1.29	999	7.32	19.8				

FIELD EQUIPMENT	SERIAL NUMBER	RENTAL COMPANY
HORIBA U-10		
Water Level		

SAMPLE ID: JW2-23 @ 1120

ANALYSIS: BTEX, MTBE, TPH-P

COC NUMBER: 5005

SAMPLING PERSONNEL:

H. DAWSON

R. GLENN

TETRA TECH EM INC.
• SAN FRANCISCO •

GROUNDWATER SAMPLING RECORD

DATE 12-18-00 PAGE 2 OF 2

MONITORING WELL NO. MW3

PROJECT JW SILVEIRA

SITE 2, 1200 20th AVE

PROJECT NO. P1006.04

CASING DIAMETER 2 inches

BOREHOLE DIAMETER 8.25 inches

TOP OF CASING ELEVATION 16.06 feet

WATER LEVEL ~~2.98~~ 19.04 feet btoc @ 1015 @

WATER LEVEL ELEVATION -2.98 feet msl

STANDING WATER COLUMN 10.11 feet

WELL VOLUMES TO BE PURGED _____

MINUMUM PURGE VOLUME _____ gallons

ACTUAL VOLUME PURGED _____ gallons

VOLUME CALCULATED BY:

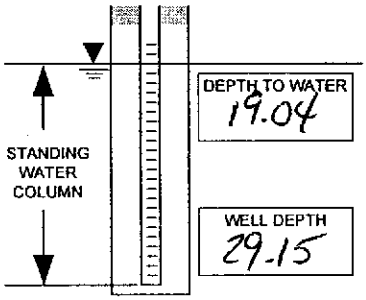
R. GLENN

PURGE VOLUME CALCULATION

One Well Volume = Casing Volume + Annulus Volume

One Well Volume = 1.72 gal + 7.92 gal

One Well Volume = 9.64 gallons



Casing Volume = Standing Water Column (ft) x Pipe Volume (gal/linear ft)[a]

Casing Volume = 10.11 ft x 0.17 gal/linear ft

Casing Volume = 1.72 gallons

NOTE:
a Refer to Table 1
b Refer to Table 2
c Assuming Sand Pack Porosity of 30%

Annulus Volume = [(Standing Water Column (ft) x Borehole Volume (gal/linear ft)[b]) - Casing Volume] x 0.3[c]

Annulus Volume = [(10.11 ft x 2.78 gal/linear ft) - 1.72 gal] x 0.3

Annulus Volume = 7.92 gallons

Table 1
Pipe Volume of Schedule 40 PVC Pipe

Diameter (inches)	OD (inches)	ID (inches)	Volume (gal/linear ft)	Diameter (inches)	OD (inches)	ID (inches)	Volume (gal/linear ft)
1.25	1.660	1.380	0.08	4	4.500	4.026	0.66
2	2.375	2.067	0.17	6	6.625	6.065	1.50
3	3.500	3.068	0.38	8	8.625	7.981	2.60

Table 2
Volume of Borehole

Diameter (inches)	Volume (gal/linear ft)	Diameter (inches)	Volume (gal/linear ft)	Diameter (inches)	Volume (gal/linear ft)
7.25	2.14	8.25	2.78	9.25	3.52
7.75	2.45	8.75	3.12	10.25	4.29

APPENDIX B

LABORATORY DATA AND CHAIN-OF-CUSTODY

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

Laboratory Number 149311

Tetra Tech EMI
135 Main Street
Suite 1800
San Francisco, CA 94105

Project#: P1106.04
Location: JW SILVEIRA

Sample ID	Lab ID
JW3-21	149311-001
JW3-22	149311-002
JW3-23	149311-003
JW2-21	149311-004
JW2-22	149311-005
JW2-23	149311-006

This data package has been reviewed for technical correctness and completeness. Release of this data has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signatures. The results contained in this report meet all requirements of NELAC and pertain only to those samples which were submitted for analysis.

Signature: _____ Operations Manager Date: 1/24/01

Signature: _____ Project Manager Date: 1/24/01

CA ELAP # 1459

Curtis & Tompkins, Ltd.

Laboratory Number: **149311**
Client: **Tetra Tech EMI**
Project#: **P1106.04**
Location: **JW SILVEIRA**

Receipt Date: **12/19/00**

CASE NARRATIVE

This hardcopy data package contains sample and QC results for six water samples that were received on December 19, 2000. The samples were received cold and intact.

Total Volatile Hydrocarbons by EPA 8015M: High Trifluorotoluene surrogate recovery was observed in sample **JW2-21** (CT#149311-004). This outlier is due to the hydrocarbon peaks coeluting with the surrogate peak.

No other analytical problems were encountered.

BTXE by EPA 8021B: No analytical problems were encountered.

Curtis & Tompkins, Ltd.

Chain of Custody

Tetra Tech EM Inc.
San Francisco Office
135 Main St. Suite 1800
San Francisco, CA 94105
415-543-4880
Fax 415-543-5480

Chain of Custody Record

Page 1 of 1

Project name: JW SILVEIRA	PO#	Lab: C&T	
Project number: P1106.04	TtEMI technical contact: SARA WOOLEY	Field samplers: HAL & ROY	
	TtEMI project manager: HAL DAWSON	Field samplers' signatures:	

Sample ID	Sample Description/Notes	Date	Time	Matrix	No./Container Types: 40 ml VOA	1 Liter Amber	1 Liter Poly	Brass Tube	Glass Jar	Preservative Added: HCl	HCl	Analysis Required: CLP VOA	CLP SVOA	CLP Pest/PCBs	CLP Metals	TPH Purgeables	TPH Extractables	CONTAMINANTS OF CONCERN
JW2-21	MW-1	12-18-00	1555	WATER	3											X	X	X
JW2-22	MW-2	↓	1504	↓	3											X	X	X
JW2-23	MW-3	↓	1120	↓	3											X	X	X

Received ☑ On Ice ☑ Intact ☑ Cold ☐ Ambient

	Name (print)	Company Name	Date	Time
Relinquished by: Roy D. Glenn	Roy GLENN	TT EMI	12-19-02 12-18-00	
Received by: Pat Flynn	Pat Flynn	C&T	12-19-00	10:05
Relinquished by:				
Received by:				
Relinquished by:				
Received by:				
Relinquished by:				
Received by:				

Turnaround time/remarks:

WHITE–Laboratory Copy YELLOW–Project Office Copy

SOP Volume: Client Services
Section 1.1.2
Page: 1 of 1
Effective Date: 10-May-99
Revision: 1 Number 3 of 3
Filename: F:\QC\Forms\QC\Cooler.wpd

Curtis & Tompkins, Ltd.

COOLER RECEIPT CHECKLIST

Login#: 149311 Date Received: 12/19/00 Number of Coolers: 1
Client: Tetra Tech EMI Project: JW Silveira

A. Preliminary Examination Phase
Date Opened: 12/19/00 By (print): James Brentford (sign) [signature]

1. Did cooler come with a shipping slip (airbill, etc.)? ... YES (NO)
   If YES, enter carrier name and airbill number: _____
2. Were custody seals on outside of cooler? ... YES (NO)
   How many and where? _____ Seal date: _____ Seal name: _____
3. Were custody seals unbroken and intact at the date and time of arrival? ... YES NO
4. Were custody papers dry and intact when received? ... (YES) NO
5. Were custody papers filled out properly (ink, signed, etc.)? ... (YES) NO
6. Did you sign the custody papers in the appropriate place? ... (YES) NO
7. Was project identifiable from custody papers? ... (YES) NO
   If YES, enter project name at the top of this form.
8. If required, was sufficient ice used? Samples should be 2-6 degrees C. ... (YES) NO
   Type of ice: wet ice Temperature: Chilled

B. Login Phase
Date Logged In: 12/19 By (print): [signature] (sign) James Brentford

1. Describe type of packing in cooler: foamies
2. Did all bottles arrive unbroken? ... (YES) NO
3. Were labels in good condition and complete (ID, date, time, signature, etc.)? ... (YES) NO
4. Did bottle labels agree with custody papers? ... (YES) NO
5. Were appropriate containers used for the tests indicated? ... (YES) NO
6. Were correct preservatives added to samples? ... (YES) NO
7. Was sufficient amount of sample sent for tests indicated? ... (YES) NO
8. Were bubbles absent in VOA samples? If NO, list sample Ids below ... (YES) NO
9. Was the client contacted concerning this sample delivery? ... YES NO
   If YES, give details below.
   Who was called? _____ By whom? _____ Date: _____

Additional Comments:

000006

Curtis & Tompkins, Ltd.

Results & QC Summary

Curtis & Tompkins, Ltd.

Gasoline by GC/FID CA LUFT

Lab #:	149311	Prep:	EPA 5030
Client:	Tetra Tech EMI	Analysis:	EPA 8015M
Project#:	STANDARD		
Field ID:	JW2-21	Batch#:	60491
Lab ID:	149311-004	Sampled:	12/18/00
Matrix:	Water	Received:	12/19/00
Units:	ug/L	Analyzed:	12/29/00
Diln Fac:	1.000		

Analyte	Result	RL
Gasoline C7-C12	3,200 G	50

Surrogate	%REC	Limits
Trifluorotoluene (FID)	174 *	59-135
Bromofluorobenzene (FID)	109	60-140

*= Value outside of QC limits; see narrative
G= Pattern resembles gasoline
RL= Reporting Limit

000011

Gasoline by GC/FID CA LUFT

Lab #:	149311	Prep:	EPA 5030
Client:	Tetra Tech EMI	Analysis:	EPA 8015M
Project#:	STANDARD		
Field ID:	JW2-22	Batch#:	60491
Lab ID:	149311-005	Sampled:	12/18/00
Matrix:	Water	Received:	12/19/00
Units:	ug/L	Analyzed:	12/29/00
Diln Fac:	1.000		

Analyte	Result	RL
Gasoline C7-C12	ND	50

Surrogate	%REC	Limits
Trifluorotoluene (FID)	102	59-135
Bromofluorobenzene (FID)	112	60-140

ND= Not Detected
RL= Reporting Limit

Gasoline by GC/FID CA LUFT

Lab #:	149311	Prep:	EPA 5030
Client:	Tetra Tech EMI	Analysis:	EPA 8015M
Project#:	STANDARD		
Field ID:	JW2-23	Batch#:	60491
Lab ID:	149311-006	Sampled:	12/18/00
Matrix:	Water	Received:	12/19/00
Units:	ug/L	Analyzed:	12/29/00
Diln Fac:	1.000		

Analyte	Result	RL
Gasoline C7-C12	ND	50

Surrogate	%REC	Limits
Trifluorotoluene (FID)	105	59-135
Bromofluorobenzene (FID)	105	60-140

ND= Not Detected
RL= Reporting Limit

Benzene, Toluene, Ethylbenzene, Xylenes

Lab #:	149311	Prep:	EPA 5030
Client:	Tetra Tech EMI	Analysis:	EPA 8021B
Project#:	STANDARD		
Field ID:	JW2-21	Batch#:	60524
Lab ID:	149311-004	Sampled:	12/18/00
Matrix:	Water	Received:	12/19/00
Units:	ug/L	Analyzed:	12/30/00
Diln Fac:	5.000		

Analyte	Result	RL
MTBE	ND	10
Benzene	500	2.5
Toluene	26	2.5
Ethylbenzene	130	2.5
m,p-Xylenes	130	2.5
o-Xylene	38	2.5

Surrogate	%REC	Limits
Trifluorotoluene (PID)	132	56-142
Bromofluorobenzene (PID)	119	55-149

ND= Not Detected
RL= Reporting Limit

Benzene, Toluene, Ethylbenzene, Xylenes

Lab #:	149311	Prep:	EPA 5030
Client:	Tetra Tech EMI	Analysis:	EPA 8021B
Project#:	STANDARD		
Field ID:	JW2-22	Batch#:	60491
Lab ID:	149311-005	Sampled:	12/18/00
Matrix:	Water	Received:	12/19/00
Units:	ug/L	Analyzed:	12/29/00
Diln Fac:	1.000		

Analyte	Result	RL
MTBE	ND	2.0
Benzene	ND	0.50
Toluene	ND	0.50
Ethylbenzene	ND	0.50
m,p-Xylenes	ND	0.50
o-Xylene	ND	0.50

Surrogate	%REC	Limits
Trifluorotoluene (PID)	114	56-142
Bromofluorobenzene (PID)	115	55-149

ND= Not Detected
RL= Reporting Limit

Benzene, Toluene, Ethylbenzene, Xylenes

Lab #:	149311	Prep:	EPA 5030
Client:	Tetra Tech EMI	Analysis:	EPA 8021B
Project#:	STANDARD		
Field ID:	JW2-23	Batch#:	60491
Lab ID:	149311-006	Sampled:	12/18/00
Matrix:	Water	Received:	12/19/00
Units:	ug/L	Analyzed:	12/29/00
Diln Fac:	1.000		

Analyte	Result	RL
MTBE	ND	2.0
Benzene	ND	0.50
Toluene	ND	0.50
Ethylbenzene	ND	0.50
m,p-Xylenes	ND	0.50
o-Xylene	ND	0.50

Surrogate	%REC	Limits
Trifluorotoluene (PID)	112	56-142
Bromofluorobenzene (PID)	114	55-149

ND= Not Detected
RL= Reporting Limit

060019

Gasoline by GC/FID CA LUFT

Lab #:	149311	Prep:	EPA 5030
Client:	Tetra Tech EMI	Analysis:	EPA 8015M
Project#:	STANDARD		
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC133746	Batch#:	60491
Matrix:	Water	Analyzed:	12/28/00
Units:	ug/L		

Analyte	Spiked	Result	%REC	Limits
Gasoline C7-C12	2,000	2,049	102	73-121

Surrogate	%REC	Limits
Trifluorotoluene (FID)	112	59-135
Bromofluorobenzene (FID)	101	60-140

Benzene, Toluene, Ethylbenzene, Xylenes

Lab #:	149311	Prep:	EPA 5030
Client:	Tetra Tech EMI	Analysis:	EPA 8021B
Project#:	STANDARD		
Matrix:	Water	Batch#:	60491
Units:	ug/L	Analyzed:	12/28/00
Diln Fac:	1.000		

Type: BS Lab ID: QC133749

Analyte	Spiked	Result	%REC	Limits
MTBE	20.00	19.41	97	51-125
Benzene	20.00	20.68	103	67-117
Toluene	20.00	20.31	102	69-117
Ethylbenzene	20.00	20.74	104	68-124
m,p-Xylenes	40.00	41.36	103	70-125
o-Xylene	20.00	20.33	102	65-129

Surrogate	%REC	Limits
Trifluorotoluene (PID)	110	56-142
Bromofluorobenzene (PID)	110	55-149

Type: BSD Lab ID: QC133750

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
MTBE	20.00	20.10	101	51-125	4	20
Benzene	20.00	20.88	104	67-117	1	20
Toluene	20.00	20.16	101	69-117	1	20
Ethylbenzene	20.00	20.64	103	68-124	0	20
m,p-Xylenes	40.00	42.00	105	70-125	2	20
o-Xylene	20.00	20.60	103	65-129	1	20

Surrogate	%REC	Limits
Trifluorotoluene (PID)	112	56-142
Bromofluorobenzene (PID)	113	55-149

000022

RPD= Relative Percent Difference

Benzene, Toluene, Ethylbenzene, Xylenes

Lab #:	149311	Prep:	EPA 5030
Client:	Tetra Tech EMI	Analysis:	EPA 8021B
Project#:	STANDARD		
Matrix:	Water	Batch#:	60524
Units:	ug/L	Analyzed:	12/30/00
Diln Fac:	1.000		

Type: BS Lab ID: QC133881

Analyte	Spiked	Result	%REC	Limits
MTBE	20.00	19.60	98	51-125
Benzene	20.00	19.93	100	67-117
Toluene	20.00	19.11	96	69-117
Ethylbenzene	20.00	20.64	103	68-124
m,p-Xylenes	40.00	42.77	107	70-125
o-Xylene	20.00	20.47	102	65-129

Surrogate	%REC	Limits
Trifluorotoluene (PID)	114	56-142
Bromofluorobenzene (PID)	114	55-149

Type: BSD Lab ID: QC133882

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
MTBE	20.00	19.73	99	51-125	1	20
Benzene	20.00	20.31	102	67-117	2	20
Toluene	20.00	19.06	95	69-117	0	20
Ethylbenzene	20.00	20.75	104	68-124	1	20
m,p-Xylenes	40.00	43.42	109	70-125	2	20
o-Xylene	20.00	20.70	103	65-129	1	20

Surrogate	%REC	Limits
Trifluorotoluene (PID)	110	56-142
Bromofluorobenzene (PID)	110	55-149

000023

RPD= Relative Percent Difference

Gasoline by GC/FID CA LUFT

Lab #:	149311	Prep:	EPA 5030
Client:	Tetra Tech EMI	Analysis:	EPA 8015M
Project#:	STANDARD		
Type:	BLANK	Diln Fac:	1.000
Lab ID:	QC133745	Batch#:	60491
Matrix:	Water	Analyzed:	12/28/00
Units:	ug/L		

Analyte	Result	RL
Gasoline C7-C12	ND	50

Surrogate	%REC	Limits
Trifluorotoluene (FID)	102	59-135
Bromofluorobenzene (FID)	108	60-140

ND= Not Detected
RL= Reporting Limit

Benzene, Toluene, Ethylbenzene, Xylenes

Lab #:	149311	Prep:	EPA 5030
Client:	Tetra Tech EMI	Analysis:	EPA 8021B
Project#:	STANDARD		
Type:	BLANK	Diln Fac:	1.000
Lab ID:	QC133745	Batch#:	60491
Matrix:	Water	Analyzed:	12/28/00
Units:	ug/L		

Analyte	Result	RL
MTBE	ND	2.0
Benzene	ND	0.50
Toluene	ND	0.50
Ethylbenzene	ND	0.50
m,p-Xylenes	ND	0.50
o-Xylene	ND	0.50

Surrogate	%REC	Limits
Trifluorotoluene (PID)	108	56-142
Bromofluorobenzene (PID)	108	55-149

ND= Not Detected
RL= Reporting Limit

Benzene, Toluene, Ethylbenzene, Xylenes

Lab #:	149311	Prep:	EPA 5030
Client:	Tetra Tech EMI	Analysis:	EPA 8021B
Project#:	STANDARD		
Type:	BLANK	Diln Fac:	1.000
Lab ID:	QC133880	Batch#:	60524
Matrix:	Water	Analyzed:	12/30/00
Units:	ug/L		

Analyte	Result	RL
MTBE	ND	2.0
Benzene	ND	0.50
Toluene	ND	0.50
Ethylbenzene	ND	0.50
m,p-Xylenes	ND	0.50
o-Xylene	ND	0.50

Surrogate	%REC	Limits
Trifluorotoluene (PID)	110	56-142
Bromofluorobenzene (PID)	110	55-149

000026

ND= Not Detected
RL= Reporting Limit