



**FIRST QUARTER 2003
GROUNDWATER MONITORING
REPORT**

4/4/03

**GOLDEN GATE PETROLEUM
HAYWARD BULK PETROLEUM
DISTRIBUTION FACILITY
HAYWARD, CALIFORNIA**

Bonkowski & Associates, Inc.
6400 Hollis Street, Suite 4
Emeryville, California 94608

April 4, 2003

April 4, 2003
L98184



BONKOWSKI & ASSOCIATES, INC.
Geotechnical Services and
Hazardous Materials Management

Corporate Headquarters
6400 Hollis Street, Suite 4
Emeryville, California 94608
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Ms. Wenche Lier
Golden Gate Petroleum
501 Shell Avenue
Martinez, CA 94553

**Subject: First Quarter 2003 Groundwater Monitoring Report
Hayward Bulk Distribution Facility, Hayward, California**

Dear Ms. Lier:

Enclosed is the report summarizing Bonkowski & Associates, Inc. review of the first quarter 2003 groundwater monitoring data at the Hayward Bulk Petroleum Distribution Facility in Hayward, California. This report presents the results of the investigative work and chemical testing, the laboratory reports and Chain-of-Custody records, the groundwater well sampling records, and a site location map and site plan with groundwater flow direction.

We appreciate the opportunity to be of service on this project. Please call Tony Choi at (510) 450-0770 if you have any questions or need any additional information. X14

Sincerely,

Tony Choi
Assistant Project Geologist

Cynthia A. Dittmar, RG 7213
Project Engineer

Enclosure
TC: cd

cc: Mr. Scott Seery, ACHCS

GROUNDWATER MONITORING REPORT FIRST QUARTER 2003

Hayward Bulk Petroleum Distribution Facility Hayward, California

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SITE DESCRIPTION

Golden Gate Petroleum Hayward Bulk Petroleum Distribution Facility is located at 1565 Industrial Parkway West in Hayward, California (Figure 1). The facility is located along the north side of Industrial Parkway West in an area zoned for industrial and commercial use. It has been used for the retail sale of gasoline and petroleum fuel products since approximately 1960. The Site presently has three (3) 20,000-gallon fiberglass underground fuel storage tanks (USTs) and nine (9) dispenser islands that dispense diesel, unleaded regular, plus unleaded, and premium unleaded regular gasoline (Figure 2). Previous investigations of the Site have encountered groundwater in silt, silty clays, and silty sand combinations from depths of 10 to 18 feet below (Bonkowski & Associates, Inc. [B&A], 1999). Seven (7) monitor wells have been installed at the site for the purpose of groundwater monitoring. Site history information can be found in the Preliminary Site Assessment Report (B&A, 2002).

GROUNDWATER MONITORING FIELD ACTIVITIES

Dates of field activities:	March 13, 2003 (monitoring and sampling)
Wells inspected:	MW-1 through MW-7
Wells sampled:	MW-1 through MW-7
Water analyses:	TPHD and TPHMO (EPA 8015M), TPHG, BTEX, MTBE, DIPE, ETBE, TAME, Alcohols, EDB and 1,2-DCA (EPA 8260B)
Laboratory:	Excelchem Environmental Labs (Sacramento, California)
Groundwater elevations:	Ranged from -0.39 ft (MW-7) to 0.14 ft (MW-5) above mean sea level
Flow direction/gradient:	0.4-0.53 ft/ft radially away from MW-5 (towards the east)
Separate phase hydrocarbons (SPH):	None observed

GROUNDWATER MONITORING RESULTS

TPHG concentrations:	Up to 0.099 mg/l (MW-2)
TPHD concentrations:	Up to 0.28 mg/l (MW-2)
TPHMO concentrations:	<0.50 mg/l (all wells)
Benzene concentrations:	2.4 µg/l (MW-6)
Toluene and ethylbenzene concentrations:	< 0.50 µg/l in all wells
Total xylenes concentrations:	< 0.5 or < 5.0 µg/l in all wells
MTBE concentrations:	Up to 81 µg/l (MW-7)
TAME, ETBE, DIPE, 1,2-DCA, and EDB concentrations:	< 0.5 or < 5.0 µg/l in all wells
TBA concentrations:	< 5.0 µg/l in all wells

DISCUSSION

Separate phase hydrocarbons were not observed in wells MW-1 through MW-7 during first quarter 2003 monitoring activities. TPHG was detected in wells MW-2 and MW-6, where its concentration exceeded the State taste and odor threshold. TPHD was detected above Federal taste and odor threshold in wells MW-2 and MW-6. Concentrations of Benzene exceeded the California MCL in well MW-2. MTBE was detected above California secondary MCL in wells MW-2, MW-3, and MW-7. Toluene, ethylbenzene, total xylenes, TAME, ETBE, DIPE, TBA, 1,2-DCA, and EDB were not detected above laboratory reporting limits.

ATTACHMENTS

- Summary of Monitor Well Construction Details and Groundwater Elevations (Table 1)
- Groundwater Chemical Test (EPA 8015M and EPA 8260B) Results (Table 2)
- Site Location (Figure 1)
- Site Plan (Figure 2)
- Location of Former USTs (Figure 3)
- Potentiometric Surface Elevation Contour Map, March 13, 2003 (Figure 4)
- TPHD Isoconcentration Contours, December 4, 2002 (Figure 5)
- MTBE Isoconcentration Contours, December 4, 2002 (Figure 6)
- Monitor Well Sampling Forms (Appendix A)
- Laboratory Analytical Report and Chain-of-Custody Forms (Appendix B)
- Groundwater Monitoring and Sampling Protocols (Appendix C)

CERTIFICATION

This report has been prepared by the staff of Bonkowski & Associates, Inc. and has been reviewed and approved by the professionals whose signatures appear below.

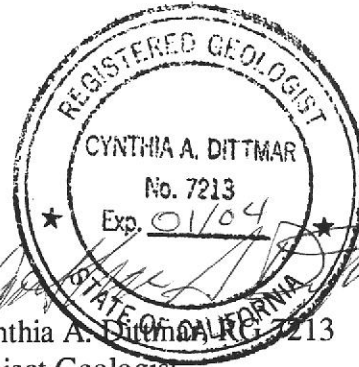
The findings, recommendations, specifications, or professional opinions are presented, within the limits prescribed by the Client, after being prepared in accordance with generally accepted engineering practice in Northern California at the time this report was prepared. No other warranty is either expressed or implied.

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BONKOWSKI & ASSOCIATES, INC.



Tony Choi
Assistant Project Geologist



Cynthia A. Dittmar
Project Geologist

**Table 1. Summary of Monitor Well Construction Details and Groundwater Elevations
Golden Gate Petroleum Hayward Cardlock, Hayward, California.**

Well No.	Well Casing Diameter (inches)	Total Depth (feet)	Geologic Units Monitored	Depth of Screened Interval (feet)	Top of Casing Elevation (feet amsl)	Depth to Water (feet)	Potentiometric Surface Elevation (feet amsl)	Date
MW-1	2	31.5	silty clay, organic-rich clay sandy clay, clay	10-30	10.43	10.52	-0.09	3/13/2003
						11.31	-0.88	12/4/2002
						11.38	-0.95	10/9/2002
MW-2	2	26.5	sandy gravel clay, sand	10-25	10.98	11.27	-0.29	3/13/2003
						12.05	-1.07	12/4/2002
						12.13	-1.15	10/9/2002
MW-3	2	26.5	base gravel, clay, gravelly sand, silty sand, sandy gravel, clay	10-25	11.17	11.46	-0.29	3/13/2003
						12.19	-1.02	12/4/2002
						12.31	-1.14	10/9/2002
MW-4	2	25	pea gravel, sand	10-25	11.36	11.69	-0.33	3/13/2003
						12.38	-1.02	12/4/2002
						12.64	-1.28	10/9/2002
MW-5	2	31.5	silty gravel, gravelly clay, silty clay, clay, sand	10-30	11.41	11.27	0.14	3/13/2003
						12.23	-0.82	12/4/2002
						12.38	-0.97	10/9/2002
MW-6	2	31.5	fill gravel, clay, clayey gravel	10-30	10.86	10.91	-0.05	3/13/2003
						11.78	-0.92	12/4/2002
						11.92	-1.06	10/9/2002

**Table 1. Summary of Monitor Well Construction Details and Groundwater Elevations
Golden Gate Petroleum Hayward Cardlock, Hayward, California.**

Well No.	Well Casing Diameter (inches)	Total Depth (feet)	Geologic Units Monitored	Depth of Screened Interval (feet)	Top of Casing Elevation (feet amsl)	Depth to Water (feet)	Potentiometric Surface Elevation (feet amsl)	Date
MW-7	2	26.5	gravel, silt, clay, sand	10-25	10.78	11.17	-0.39	3/13/2003
						11.98	-1.20	12/4/2002
						12.02	-1.24	10/9/2002

amsl - above mean sea level (National Geodetic Vertical Datum 1929)

Table 2. Groundwater Chemical Test (EPA 8015M and EPA 8260B) Results, Golden Gate Petroleum Hayward Cardlock, Hayward, California.

Sample Number	TPHG (mg/l)	TPHD (mg/l)	TPHMO (mg/l)	Benzene (µg/l)	Toluene (µg/l)	Ethyl-benzene (µg/l)	Total Xylenes (µg/l)	MTBE (µg/l)	TAME (µg/l)	ETBE (µg/l)	DIPE (µg/l)	TBA (µg/l)	Methanol (µg/l)	Ethanol (µg/l)	1,2-DCA (µg/l)	EDB (µg/l)	Date Sampled
MW-1	<0.050	<0.050	<0.50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5.0	<5.0	<20	<0.5	<0.5	3/13/2003
	<0.050	<0.050	<0.10	<0.50	<0.50	<0.50	<1.0	0.54	<0.50	<0.50	<0.50	<5.0	--	--	<0.50	<0.50	12/4/2003
	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	--	ND	ND	10/9/2002
MW-2	0.099	0.28	<0.50	2.1	<0.5	<0.5	<0.5	9.6	<0.5	<0.5	<0.5	<5.0	<5.0	<20	<0.5	<0.5	3/13/2003
	<0.050	0.29	<0.10	1.2	<0.50	<0.50	<1.0	7.8	<0.50	<0.50	<0.50	<5.0	--	--	<0.50	<0.50	12/4/2003
	ND	0.48	0.12 ^c	1.9	ND	ND	0.54	8.8	ND	ND	ND	ND	--	--	ND	ND	10/9/2002
MW-3	<0.050	0.097	<0.50	<5.0	<5.0	<5.0	<5.0	74	<5.0	<5.0	<5.0	<5.0	<5.0	<200	<5.0	<5.0	3/13/2003
	0.50	<0.050	0.56 ^c	<0.50	<0.50	<0.50	<1.0	520	1.7	<0.50	<0.50	<5.0	--	--	<0.50	<0.50	12/4/2003
	0.62 ^a	0.17 ^b	ND	ND	ND	ND	ND	890	2.9	ND	ND	7.6	--	--	ND	ND	10/9/2002
MW-4	<0.050	0.090	<0.50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5.0	<5.0	<20	<0.5	<0.5	3/13/2003
	<0.050	<0.25	5.0 ^{c,d}	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<5.0	--	--	<0.50	<0.50	12/4/2003
	ND	0.18 ^b	ND	ND	ND	ND	ND	1.0 ^d	ND	ND	ND	ND	--	--	ND	ND	10/9/2002
MW-5	<0.050	<0.050	<0.50	<0.5	<0.5	<0.5	<0.5	1.3	<0.5	<0.5	<0.5	<5.0	<5.0	<20	<0.5	<0.5	3/13/2003
	<0.050	<0.050	0.22 ^d	<0.50	<0.50	<0.50	<1.0	2.0	<0.50	<0.50	<0.50	<5.0	--	--	<0.50	<0.50	12/4/2003
	ND	ND	ND	ND	ND	ND	ND	0.59	ND	ND	ND	ND	--	--	ND	ND	10/9/2002
MW-6	0.066	0.098	<0.50	2.4	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5.0	<5.0	<20	<0.5	<0.5	3/13/2003
	<0.050	0.053 ^b	<0.10	<0.50	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<5.0	--	--	<0.50	<0.50	12/4/2003
	<0.50	0.73	0.16 ^c	110	11	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	--	--	ND	ND	10/9/2002

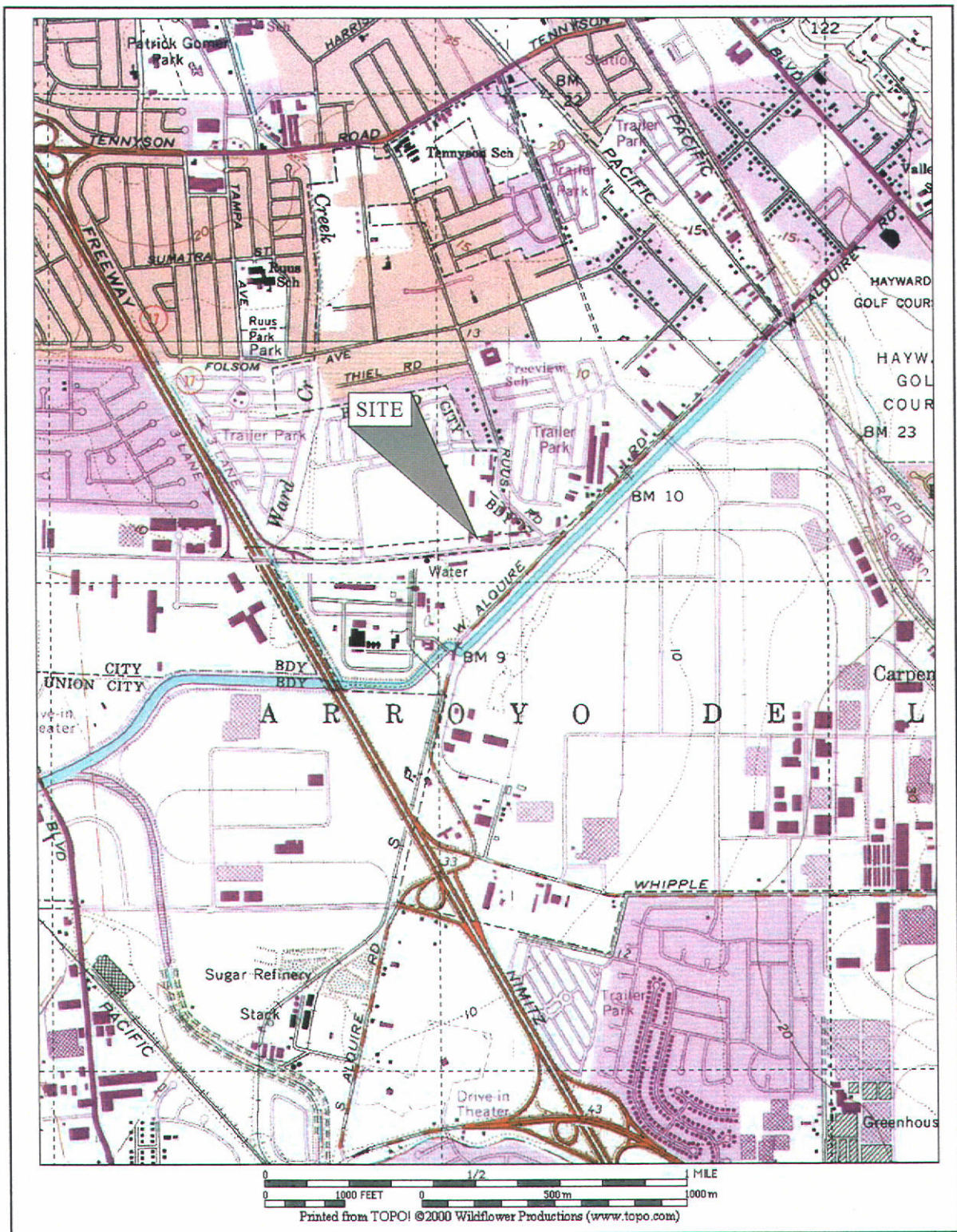
Table 2. Groundwater Chemical Test (EPA 8015M and EPA 8260B) Results,
Golden Gate Petroleum Hayward Cardlock, Hayward, California.

Sample Number	TPHG (mg/l)	TPHD (mg/l)	TPHMO (mg/l)	Benzene (µg/l)	Toluene (µg/l)	Ethyl-benzene (µg/l)	Total Xylenes (µg/l)	MTBE (µg/l)	TAME (µg/l)	ETBE (µg/l)	DIPE (µg/l)	TBA (µg/l)	Methanol (µg/l)	Ethanol (µg/l)	1,2-DCA (µg/l)	EDB (µg/l)	Date Sampled
MW-7	<0.050	0.064	<0.50	<0.5	<0.5	<0.5	<0.5	81	<0.5	<0.5	<0.5	<5.0	<5.0	<20	<0.5	<0.5	3/13/2003
	<0.050	0.14 ^b	<0.10	<0.50	<0.50	<0.50	<1.0	170	1.7	<0.50	<0.50	<5.0	--	--	<0.50	<0.50	12/4/2003
	0.34 ^a	0.49	0.13 ^c	ND	ND	ND	ND	480	5.1	ND	ND	ND	--	--	ND	ND	10/9/2002
Regulatory Standard	0.005 ¹	0.1 ²		1.0 ³	42 ²	29 ²	17 ²	5 ⁴							12 ⁵		

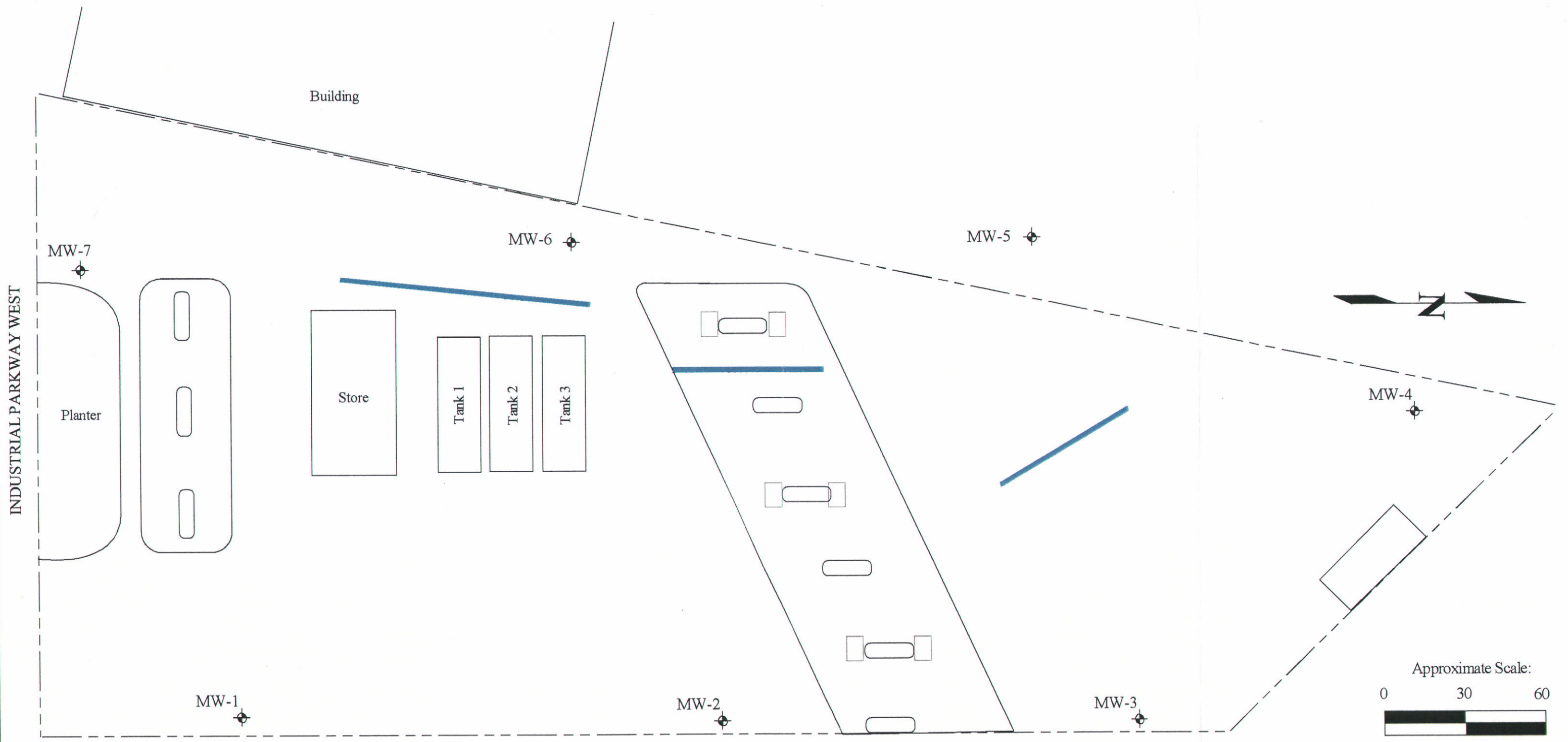
- 1 -- Taste and odor threshold (SWRCB)
- 2 -- Taste and odor threshold (U.S. EPA)
- 3 -- California Primary MCL
- 4 -- California Secondary MCL
- 5 -- California Action Level

- ^a Hydrocarbon pattern does not resemble gasoline.
- ^b Hydrocarbon pattern does not resemble diesel.
- ^c Hydrocarbon pattern does not resemble motor oil.
- ^d Coeluting compounds interfered with surrogate recovery


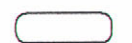


- <0.50 -- Not detected above lab reporting limit of 0.50
- ND -- Not detected above lab reporting limit
- Not analyzed



Project No. L98184	Golden Gate Petroleum	SITE LOCATION 1565 INDUSTRIAL PARKWAY WEST HAYWARD, CALIFORNIA	Figure 1
Bonkowski & Associates, Inc.			



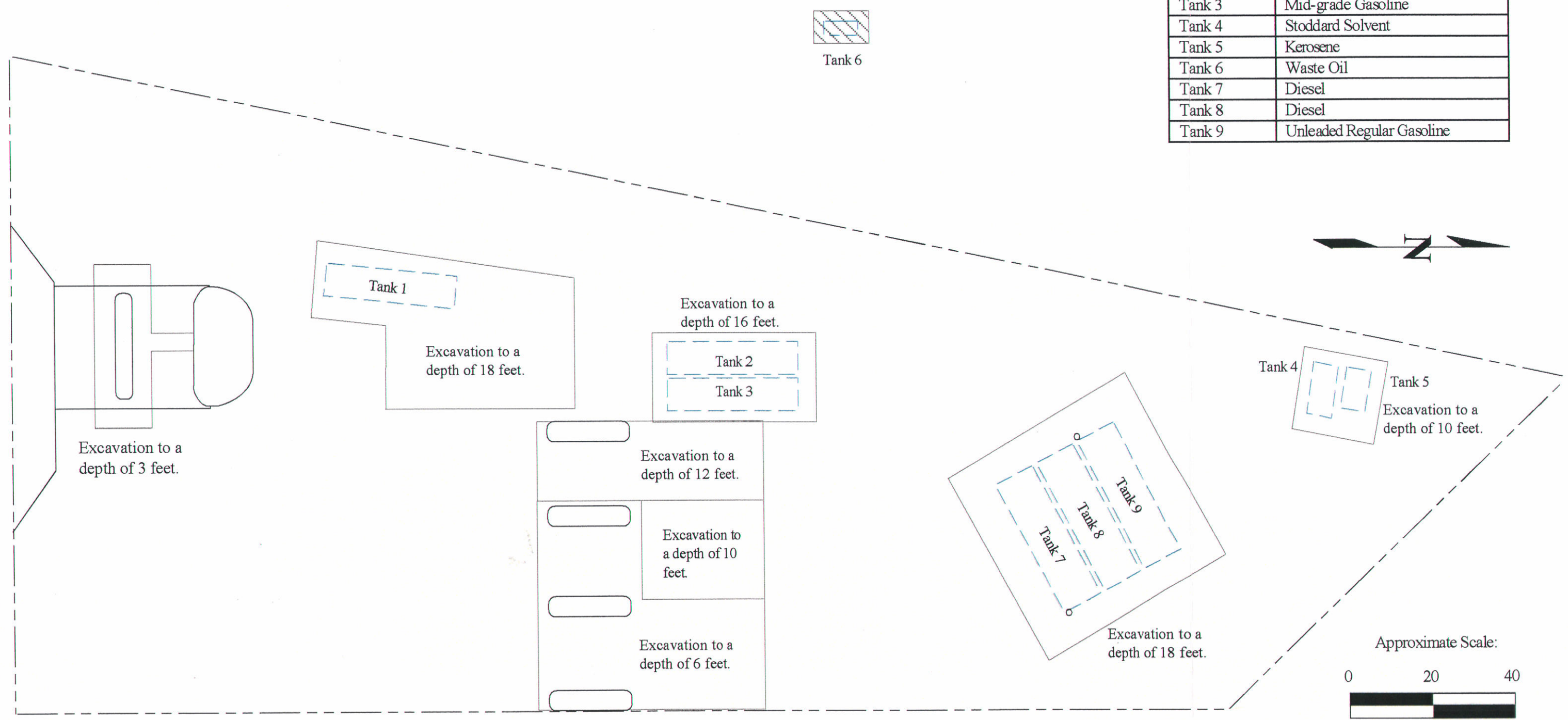
LEGEND

- MW-1  Monitor well
-  Dispenser Island
-  Conopy footing
-  Collector Trench

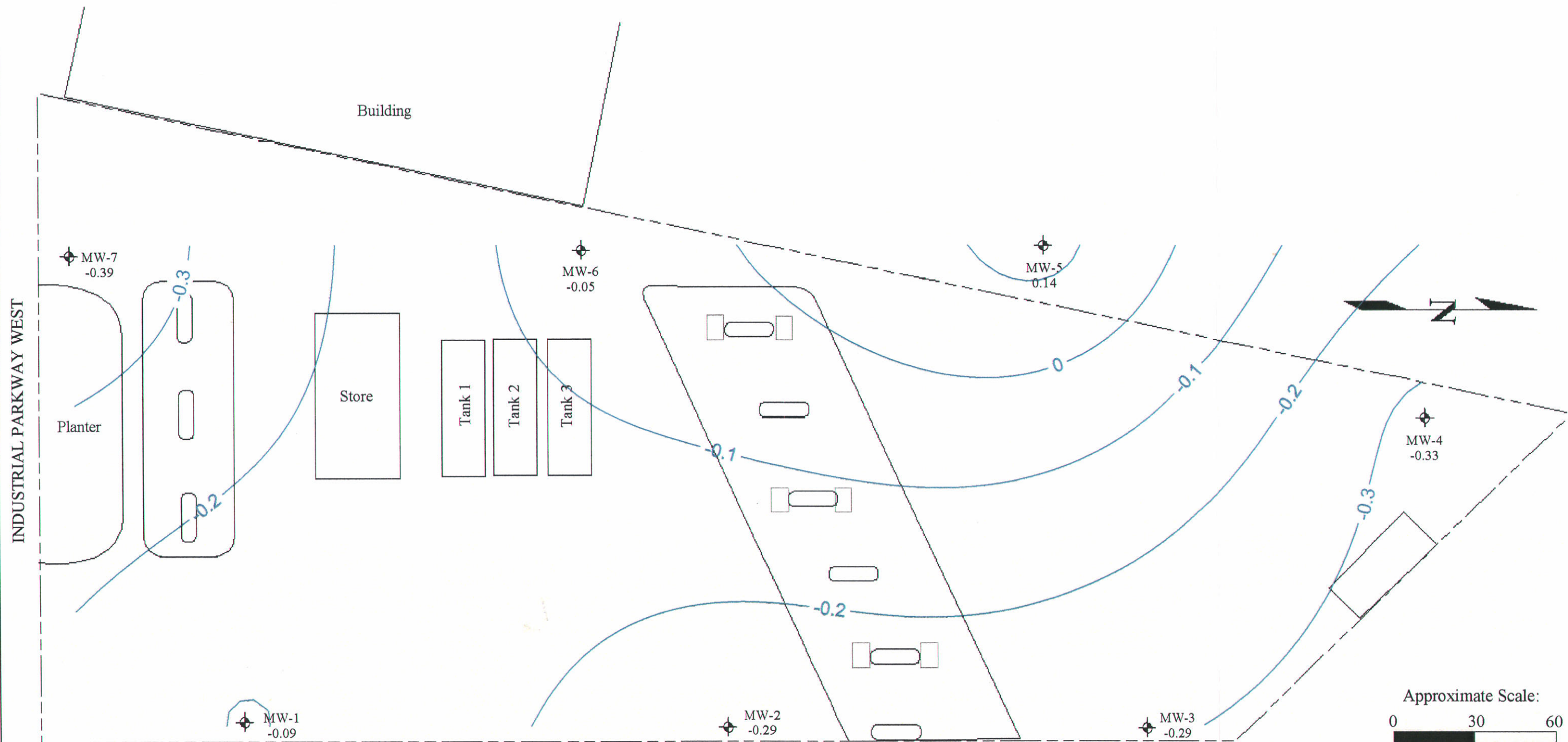
Project No. L98184	Golden Gate Petroleum	SITE PLAN 1565 INDUSTRIAL PARKWAY WEST HAYWARD, CALIFORNIA	Figure 2
Bonkowski & Associates, Inc.			

INDUSTRIAL PARKWAY WEST

Tank	Contents
Tank 1	Premium Gasoline
Tank 2	Red Diesel
Tank 3	Mid-grade Gasoline
Tank 4	Stoddard Solvent
Tank 5	Kerosene
Tank 6	Waste Oil
Tank 7	Diesel
Tank 8	Diesel
Tank 9	Unleaded Regular Gasoline

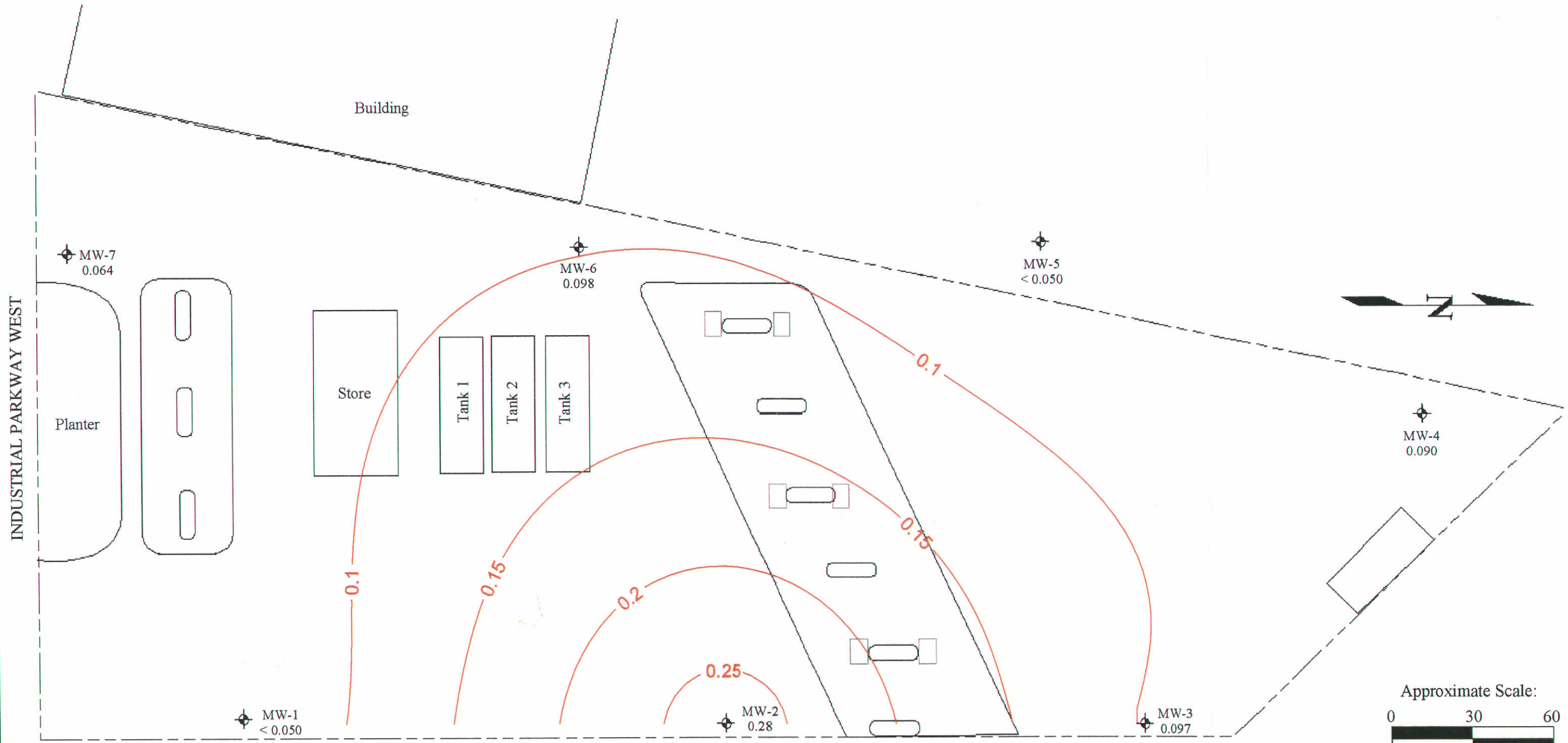


Project No. L98184	Golden Gate Petroleum	LOCATION OF FORMER USTS 1565 INDUSTRIAL PARKWAY WEST HAYWARD, CALIFORNIA	Figure 3
Bonkowski & Associates, Inc.			



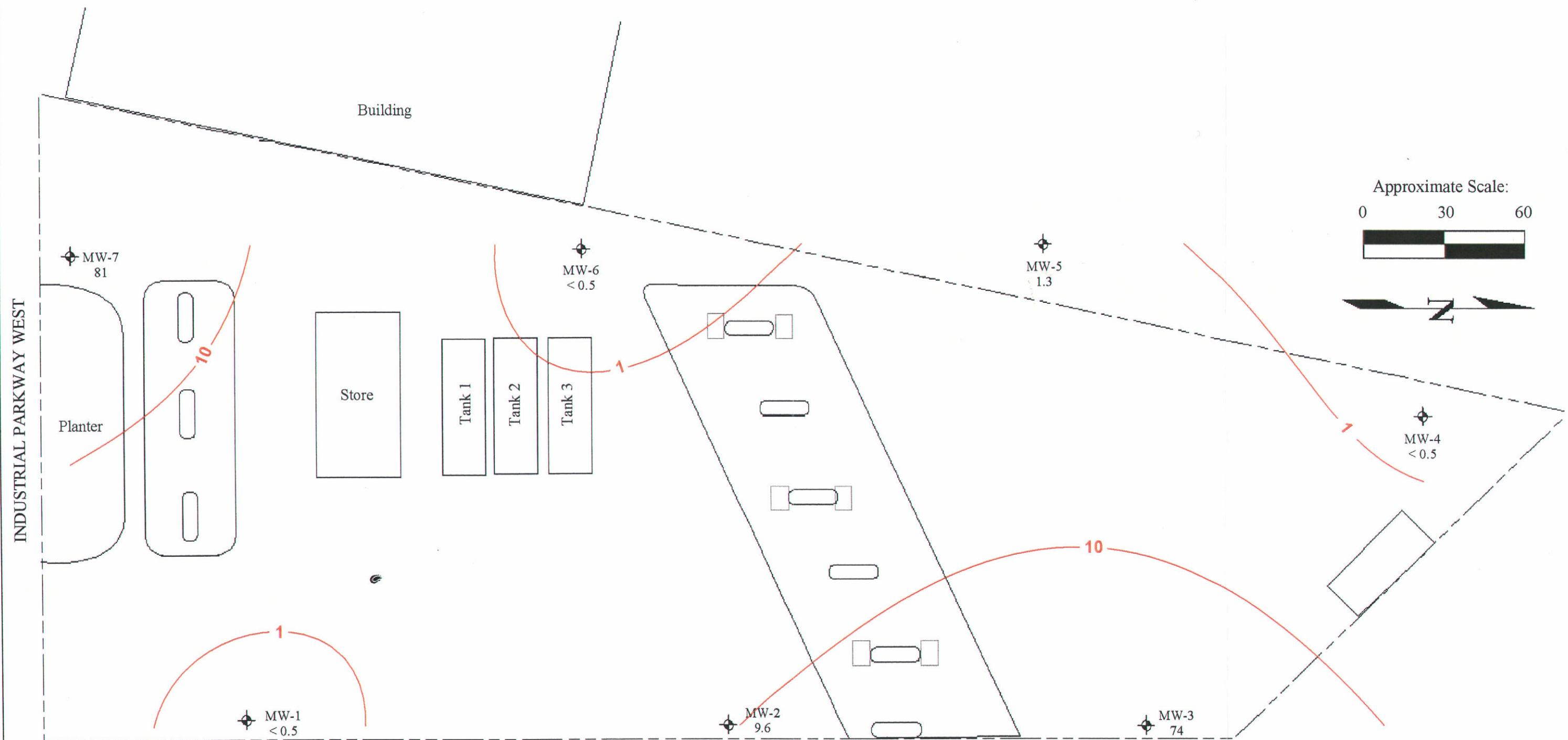
- LEGEND**
- MW-1 Monitor well
 - 1.07 Potentiometric Surface Elevation Above Mean Sea Level (National Geodetic Vertical Datum 1929)
 - Dispenser Island
 - Canopy Footing

Project No. L98184	Golden Gate Petroleum	POTENTIOMETRIC SURFACE ELEVATION CONTOUR MAP MARCH 13, 2003	Figure 4
Bonkowski & Associates, Inc.		1565 INDUSTRIAL PARKWAY WEST HAYWARD, CALIFORNIA	







- LEGEND**
- MW-1 Monitor well
 - 5.5 Groundwater TPHD Concentration (mg/l)
 - Groundwater TPHD Isoconcentration Contour (mg/l)
 - Dispenser Island
 - Canopy Footing

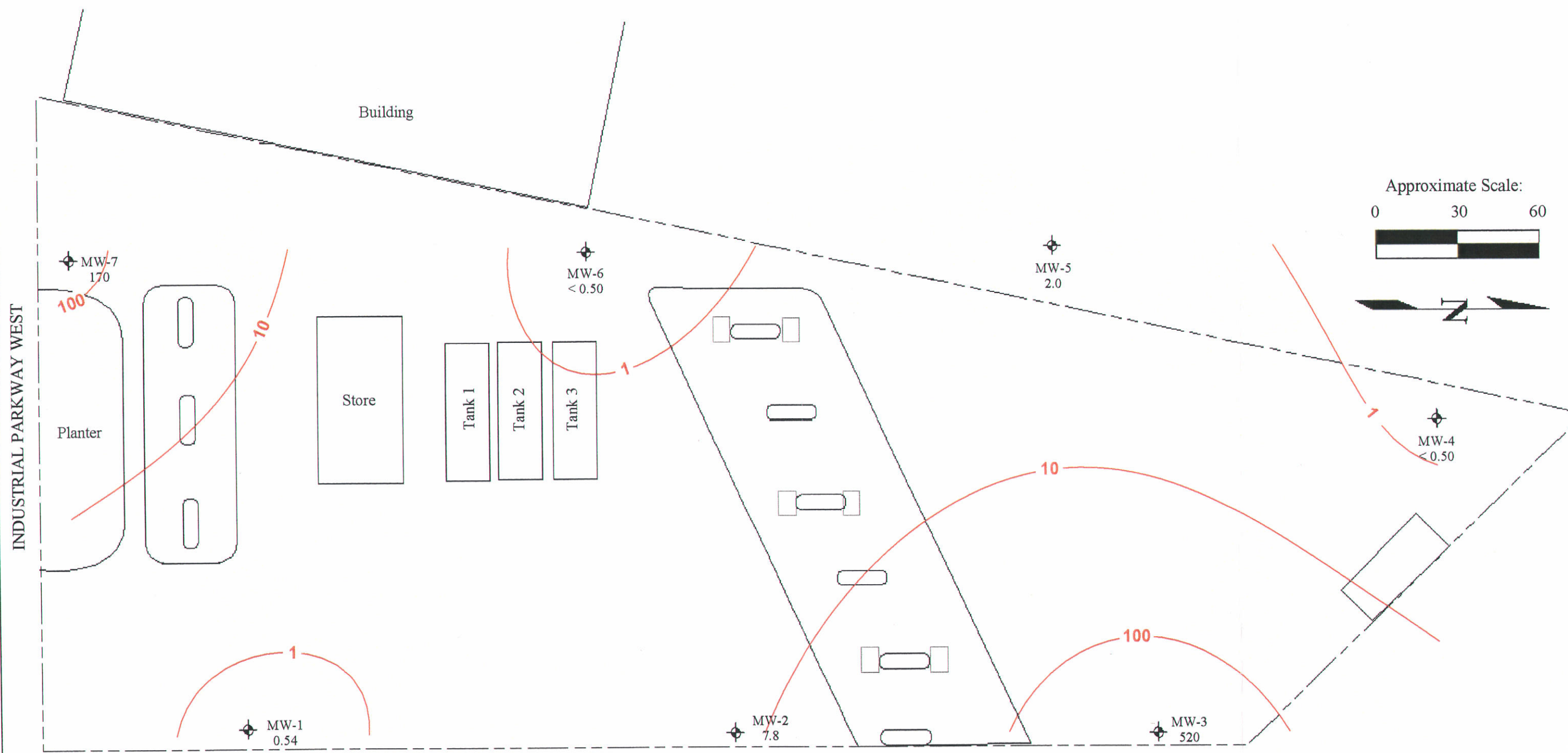
Project No. L98184	Golden Gate Petroleum	TPHD ISOCONCENTRATION CONTOURS MARCH 13, 2003	Figure 5
Bonkowski & Associates, Inc.		1565 INDUSTRIAL PARKWAY WEST HAYWARD, CALIFORNIA	







LEGEND

- MW-1  Monitor well
- 5.5 Groundwater MTBE Concentration (ug/l)
-  5.5 Groundwater MTBE Isoconcentration Contour (ug/l)
-  Dispenser Island
-  Canopy Footing

Project No. L98184	Golden Gate Petroleum	MTBE ISOCONCENTRATION CONTOURS MARCH 13, 2003	Figure 6
Bonkowski & Associates, Inc.		1565 INDUSTRIAL PARKWAY WEST HAYWARD, CALIFORNIA	



LEGEND

- MW-1  Monitor well
- 5.5 Groundwater MTBE Concentration (ug/l)
-  5.5 Groundwater MTBE Isoconcentration Contour (ug/l)
-  Dispenser Island
-  Canopy Footing

Project No. L98184	Golden Gate Petroleum	MTBE ISOCONCENTRATION CONTOURS DECEMBER 4, 2002	Figure 7
Bonkowski & Associates, Inc.		1565 INDUSTRIAL PARKWAY WEST HAYWARD, CALIFORNIA	

MONITOR WELL SAMPLING

File No./Site: GGP - Hayward - L98184 Well No.: MW-1
 Field Tech.: T. CHA Date: 3/13/03

DATA FROM IMMEDIATELY BEFORE AND AFTER DEVELOPMENT

Depth to water measured from TOC (ft.):	Total depth of casing (ft.): 30
Before Purging: 10.52	Linear feet of water: 19.48
After Purging: —	Area of casing x-sect: 0.0218 ft ²
Thickness of FP (ft): ∅	Volume of water in 1 casing (ft ³): 0.92
Total purging time (min.) 12	1 ft ³ = 7.48 gal.
Begin: 0842	Volume of water in 1 casing (gal): 3.18
End: 0854	

Time	Cumulative Volume Removed (gal)	Water Temp (°F)	Conductivity (µS/cm) (µohm/cm)	pH of Water	* Water Appearance	** Primary Particulate
0842	0.25	59.5	3,570	7.29	CL	
0845	0.45 ^R	61.6	2,290	7.36	CL	
0848	0.3965 ^R	62.2	2,170	7.35	CL	
0851	0.85	62.3	2,130	7.33	CL	
0854	1.05	62.4	2,120	7.37	CL	

* Appearance 3 CONSECUTIVE
 CL = clear READINGS WITHIN
 CO = cloudy 5% PARAMETERS
 TU = turbid STABILIZED

** Particle
 S = sand
 ML = silt
 CL = clay

Comments: PUMP INTAKE SET @ ~17' BTWC & FLOW RATE @ ~250 ML/MIN. EQUIL. COND. ESTABLISHED. USE MICROPURGE METHODS. LOWER FLOW TO ≤ 0.1 ML/MIN FOR UJAS

NO FP OBSERVED

COLLECT GW SAMPLE # W198184 - MW-1

IN 3x40ML WAXY LAMBER

Top of Casing Elevation:

Time Sampled: 0900

Groundwater Elevation:

MONITOR WELL SAMPLING

File No./Site: GGP - Hayward - L98184

Well No.: MW-2

Field Tech.: T. CHOI

Date: 3/13/03

DATA FROM IMMEDIATELY BEFORE AND AFTER DEVELOPMENT

Depth to water measured from TOC (ft.):	Total depth of casing (ft.): 25
Before Purging: <u>11.27</u>	Linear feet of water: <u>13.73</u>
After Purging: <u>—</u>	Area of casing x-sect: <u>0.0218 ft²</u>
Thickness of FP (ft): <u>Ø</u>	Volume of water in 1 casing (ft ³): <u>0.30</u>
Total purging time (min.) <u>9</u>	1 ft ³ = 7.48 gal.
Begin: <u>0925</u>	Volume of water in 1 casing (gal): <u>2.2</u>
End: <u>0934</u>	

Time	(gal) Cumulative Volume Removed	Water Temp (°F)	→ MS/cm Conductivity (µohm/cm)	pH of Water	* Water Appearance	** Primary Particulate
0925	0.25	61.5	4,420	6.80	CL	
0928	0.65	62.3	4,580	6.80	CL	
0931	1.05	62.6	4,630	6.81	CL	
0934	1.45	62.8	4,640	6.82	CL	
3 CONSECUTIVE READINGS WITHIN ± 15% PARAMETERS STABILIZED						

* Appearance

CL = clear
CO = cloudy
TU = turbid

** Particle

S = sand
ML = silt
CL = clay

Comments: PUMP INTAKE SET @ ~17' BTWC. MICROPURGE FLOW RATE SET @ ~500 ML/MIN
EQUILIBRIUM CONDITIONS ESTABLISHED. LOWER FLOW RATE TO ~100 ML/MIN FOR VOPS

NO FREE PRODUCT OBSERVED

COLLECT GW SAMPLE # W98184 MW-2

ON 2x40 ML WA PRES W/HCI 4x1 LAMBER Top of Casing Elevation:

Time Sampled: 0937

Groundwater Elevation:

MONITOR WELL SAMPLING

File No./Site: GGP - Hayward - L98184

Well No.: MW-3

Field Tech.: T. CHOI

Date: 3/13/03

DATA FROM IMMEDIATELY BEFORE AND AFTER DEVELOPMENT

Depth to water measured from TOC (ft.):	Total depth of casing (ft.): 25
Before Purging: 11.46	Linear feet of water: 13.54
After Purging: —	Area of casing x-sect: 0.0218 ft ²
Thickness of FP (ft): ∅	Volume of water in 1 casing (ft ³): 0.30
Total purging time (min.) 9	1 ft ³ = 7.48 gal.
Begin: 1005	Volume of water in 1 casing (gal): 2.2
End: 1014	

Time	(gal) Cumulative Volume Removed	Water Temp (°F)	→ $\mu S/cm$ Conductivity ($\mu mho/cm$)	pH of Water	* Water Appearance	** Primary Particulate
1005	0.25	64.0	2,450	7.20	CL	
1008	0.5	62.9	2,360	7.27	CL	
1011	0.75	62.5	2,360	7.20	CL	
1014 1014	1.0	63.2	2,350	7.19	CL	
3 CONSECUTIVE READINGS WITHIN ±15% . PARAMETERS STABILIZED						

* Appearance

CL = clear
CO = cloudy
TU = turbid

** Particle

S = sand
ML = silt
CL = clay

Comments: SET PUMP INTAKE @ ~17' BTOK & MICROPURGE @ ~30ML/MIN. EQUIL. CONDITIONS

ESTABLISHED. LOWER FLOW RATE TO 50.1L/MIN TO COLLECT VOA'S

NO FREE PRODUCT OBSERVED

COLLECT GW SAMPLE # W198184-MW-3

IN 2x40ML VOA'S w/HCl & 1x1 LAMBER

Top of Casing Elevation: _____

Time Sampled: 1017

Groundwater Elevation: _____

MONITOR WELL SAMPLING

File No./Site: GGP - Hayward - L98184 Well No.: MW-4
 Field Tech.: T. Choi Date: 3/13/03

DATA FROM IMMEDIATELY BEFORE AND AFTER DEVELOPMENT

Depth to water measured from TOC (ft.):	Total depth of casing (ft.): 25
Before Purging: 11.69	Linear feet of water: 13.3
After Purging: —	Area of casing x-sect: 0.0218 ft ²
Thickness of FP (ft): ∅	Volume of water in 1 casing (ft ³): 0.29
Total purging time (min.) 9	1 ft ³ = 7.48 gal.
Begin: 1041	Volume of water in 1 casing (gal): 2.2
End: 1050	

Time	(gal) Cumulative Volume Removed	Water Temp (°F)	→ 250/cm Conductivity (µohm/cm)	pH of Water	* Water Appearance	** Primary Particulate
1041	0.25	63.8	864	6.95	CL	
1044	0.65	67.0	778	6.97	CL	
1047	1.05	66.2	760	6.93	CL	
1050	1.45	67.0	760	6.91	CL	
3 CONSECUTIVE READINGS W/IN ±15% PARAMETERS STABILIZED						

* Appearance

CL = clear
 CO = cloudy
 TU = turbid

** Particle

S = sand
 ML = silt
 CL = clay

Comments: SET PUMP INTAKE @ ~17' BTOC & MICROPURGE @ ~0.5L/MIN. EQUIL. COND. EST.

LOWER FLOW TO 5.0 L/MIN TO COLLECT VOA'S

NO FREE PRODUCT OBSERVED

COLLECT GW SAMPLE #WL98184-MW-4

IN 2x40ML VOA PRES. W/HCL & 1x1 LAMBER Top of Casing Elevation:

Time Sampled: 1055

Groundwater Elevation:

MONITOR WELL SAMPLING

File No./Site: GGP - Hayward - L98184

Well No.: MW-5

Field Tech.: F. Choi

Date: 3/13/03

DATA FROM IMMEDIATELY BEFORE AND AFTER DEVELOPMENT

Depth to water measured from TOC (ft.):	Total depth of casing (ft.): 30
Before Purging: 11.27	Linear feet of water: 18.7
After Purging: —	Area of casing x-sect: 0.0218 ft ²
Thickness of FP (ft): ∅	Volume of water in 1 casing (ft ³): 0.4
Total purging time (min.) 9	1 ft ³ = 7.48 gal.
Begin: 1110	Volume of water in 1 casing (gal): 3.1
End: 1119	

Time	(gal) ¹ Cumulative Volume Removed	Water Temp (°F)	→ 78.5/cm Conductivity (μohm/cm)	pH of Water	* Water Appearance	** Primary Particulate
1110	0.25	66.2	4,430	6.83	CL	
1113	0.56	66.4	4,800	6.83	CL	
1116	0.87	66.8	4,350	6.83	CL	
1119	1.18	66.3	4,850	6.82	CL	
3 CONSECUTIVE READINGS W/IN 15% . PARAMETERS STABILIZED						

* Appearance

CL = clear
CO = cloudy
TU = turbid

** Particle

S = sand
ML = silt
CL = clay

Comments: PUMP INTAKE SET @ ~20' BTOC. MICROPURGE @ ~400ML/MIN. TO GET EQUIL.

COND. EST. . LOWER FLOW RATE TO < 0.1 L/MIN TO COLLECT WWS

NO FREE PRODUCT OBSERVED

COLLECT GW SAMPLE # W198184-MW-5

IN 2x40ML WBS PRES. W/HCL & XILAMBER Top of Casing Elevation:

Time Sampled: 1120

Groundwater Elevation:

MONITOR WELL SAMPLING

File No./Site: GGP - Hayward - L98184

Well No.: MW-6

Field Tech.: T. CHOI

Date: 3/13/03

DATA FROM IMMEDIATELY BEFORE AND AFTER DEVELOPMENT

Depth to water measured from TOC (ft.):	Total depth of casing (ft.): 30
Before Purging: <u>10.91</u>	Linear feet of water: <u>19.1</u>
After Purging: <u>—</u>	Area of casing x-sect: <u>0.0218 ft²</u>
Thickness of FP (ft): <u>Ø</u>	Volume of water in 1 casing (ft ³): <u>0.42</u>
Total purging time (min.) <u>9</u>	1 ft ³ = 7.48 gal.
Begin: <u>1142</u>	Volume of water in 1 casing (gal): <u>3.1</u>
End: <u>1151</u>	

Time	Cumulative Volume Removed (gal)	Water Temp (°F)	Conductivity (µS/cm) (µmhm/cm)	pH of Water	* Water Appearance	** Primary Particulate
1142	0.1	68.0	3,040	7.19	CL	
1145	0.4	68.3	2,870	7.21	CL	
1148	0.7	68.0	2,870	7.20	CL	
1151	1.0	68.2	2,860	7.19	CL	
3 CONSECUTIVE READINGS WITHIN ±15%, PARAMETERS STABILIZED						

* Appearance

CL = clear
CO = cloudy
TU = turbid

** Particle

S = sand
ML = silt
CL = clay

Comments: PUMP INTAKE SET @ ~20' BTOC. MICROPURGE @ ~400ML/MIN. EQUIL. COND.

ESTABLISHED LOWER FLOW TO ~0.1 L/MIN TO COLLECT 10A'S

NO FREE PRODUCT OBSERVED. SLIGHT ODOR SMELLED

COLLECT GW SAMPLE #16L98184-MW-5

IN 2x40ML VOA'S PRES. W/ HCl + 1x11-LAUBER Top of Casing Elevation:

Time Sampled: 1155

Groundwater Elevation:

MONITOR WELL SAMPLING

File No./Site: GGP - Hayward - L98184

Well No.: MW-7

Field Tech.: T. CHOI

Date: 3/13/03

DATA FROM IMMEDIATELY BEFORE AND AFTER DEVELOPMENT

Depth to water measured from TOC (ft.):	Total depth of casing (ft.): 25
Before Purging: <u>11.17</u>	Linear feet of water: <u>13.8</u>
After Purging: <u>—</u>	Area of casing x-sect: <u>0.0218 ft²</u>
Thickness of FP (ft): <u>Ø</u>	Volume of water in 1 casing (ft ³): <u>0.3</u>
Total purging time (min.) <u>9</u>	1 ft ³ = 7.48 gal.
Begin: <u>1213</u>	Volume of water in 1 casing (gal): <u>2.3</u>
End: <u>1222</u>	

Time	(gal) Cumulative Volume Removed	Water Temp (°F)	→ $\mu S/cm$ Conductivity ($\mu ohm/cm$)	pH of Water	* Water Appearance	** Primary Particulate
1213	0.25	69.5	3,050	6.82	CL	
1216	0.65	68.1	3,030	6.83	CL	
1219	1.05	66.4	3,070	6.91	CL	
1222	1.45	66.9	3,170	6.90	CL	
3 CONSECUTIVE READINGS WITHIN $\pm 15\%$: PARAMETERS STABILIZED						

* Appearance

CL = clear
CO = cloudy
TU = turbid

** Particle

S = sand
ML = silt
CL = clay

Comments: SET PUMP INTAKE @ ~17' BTOC. MICROPURGE @ ~500 ML/MIN. ESTABLISH

EQUILIBRIUM CONDITION. LOWER FLOW RATE TO ~50.1 L/MIN TO COLLECT VOA's

NO FREE PRODUCT OBSERVED

COLLECT GW SAMPLE # W98184-MW-7

IN 2x40 ML VOA w/HC1 & 1x11 LAMBER Top of Casing Elevation:

Time Sampled: 1225

Groundwater Elevation:

EXCELCHEM ENVIRONMENTAL LABS



500 Giuseppe Court, Suite 3
Roseville, CA 95678

Phone#: (916) 773-3664 Fax#: (916) 773-4784

ANALYSIS REPORT

Attention: Tony Choi
Bonkowski & Assoc.
6400 Hollis St. Suite 4
Emeryville, CA 94608

Project: L98184 Task 8
Method: EPA 8015m

Date Sampled: 03/13/03
Date Received: 03/14/03
TPHg Analyzed: 03/20/03
TPHd Analyzed: 03/21/03
TPHo Analyzed: 03/21/03
Methanol Analyzed: 03/18/03

Client Sample I.D.	WL98184-MW-1		WL98184-MW-2		WL98184-MW-3		WL98184-MW-4	
LAB. NO.	W0303386		W0303387		W0303388		W0303389	
ANALYTE	R/L	Results	R/L	Results	R/L	Results	R/L	Results
Methanol	5.0	ND	5.0	ND	5.0	ND	5.0	ND
TPH as Gasoline	50	ND	50	99	50	ND	50	ND
TPH as Diesel	50	ND	50	280	50	97	50	90
TPH as Oil	500	ND	500	ND	500	ND	500	ND

Client Sample I.D.	WL98184-MW-5		WL98184-MW-6		WL98184-MW-7	
LAB. NO.	W003390		W0303391		W0303392	
ANALYTE	R/L	Results	R/L	Results	R/L	Results
Methanol	5.0	ND	5.0	ND	5.0	ND
TPH as Gasoline	50	ND	50	66	50	ND
TPH as Diesel	50	ND	50	98	50	64
TPH as Oil	500	ND	500	ND	500	ND

QA/QC %RECOVERY		
	LCS	LCSD
Benzene	93	89
Toluene	87	86
Ethylbenzene	86	84
Total Xylenes	87	86
TPH as Diesel	101	103
TPH as Oil	110	105

TPHg QA/QC Analyzed: 03/19/03
TPHd QA/QC Analyzed: 03/21/03
TPHo QA/QC Analyzed: 03/25/03

QA/QC %RECOVERY		
	LCS	LCSD
Benzene	89	87
Toluene	90	88
Ethylbenzene	95	84
Total Xylenes	88	87

TPHg QA/QC Analyzed: 03/20/03

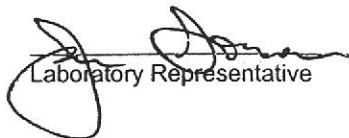
QA/QC %RECOVERY		
	LCS	LCSD
Methanol	103	93

QA/QC Analyzed: 03/18/03

ND = Not detected. Compound(s) may be present at concentrations below the reporting limit.

R/L = Reporting Limit

Water samples reported in µg/L


Laboratory Representative

03/25/03
Date Reported

EXCELCHEM ENVIRONMENTAL LABS



500 Giuseppe Court, Suite 3
Roseville, CA 95678

Phone#: (916) 773-3664 Fax#: (916) 773-4784

ANALYSIS REPORT

Attention: Tony Choi
Bonkowski & Assoc.
6400 Hollis St. Suite 4
Emeryville, CA 94608

Date Sampled:
Date Received:
Date Analyzed:

03/13/03
03/14/03
03/21/03


Project: L98184 Task 8
Method: EPA 8260B

Client Sample I.D.	WL9818-MW-1		WL98184-MW-2		WL98184-MW-3		WL9818-MW-4	
LAB. NO.	W0303386		W0303387		W0303388		W0303389	
ANALYTE	R/L	Results	R/L	Results	R/L	Results	R/L	Results
Ethanol	20	ND	20	ND	200	ND	20	ND
Benzene	0.5	ND	0.5	2.1	5.0	ND	0.5	ND
Toluene	0.5	ND	0.5	ND	5.0	ND	0.5	ND
Ethylbenzene	0.5	ND	0.5	ND	5.0	ND	0.5	ND
m.p-xylene	0.5	ND	0.5	ND	5.0	ND	0.5	ND
o-xylene	0.5	ND	0.5	ND	5.0	ND	0.5	ND
tert-Butanol	5.0	ND	5.0	ND	50	ND	5.0	ND
MTBE	0.5	ND	0.5	9.6	5.0	74	0.5	ND
Diisopropyl ether	0.5	ND	0.5	ND	5.0	ND	0.5	ND
Ethyl tert-butyl ether	0.5	ND	0.5	ND	5.0	ND	0.5	ND
tert-Amyl methyl ether	0.5	ND	0.5	ND	5.0	ND	0.5	ND
1,2-Dichloroethane	0.5	ND	0.5	ND	5.0	ND	0.5	ND
1,2-Dibromoethane	0.5	ND	0.5	ND	5.0	ND	0.5	ND
SURROGATE %RECOVERY								
Dibromoflouromethane	94		96		96		96	
Toluene-d8	97		97		94		96	
4-Bromofluorobenzene	107		98		110		103	

ND = Not detected. Compound(s) may be present at concentrations below the reporting limit.

R/L = Reporting Limit

Water samples reported in µg/L


Laboratory Representative

03/25/03
Date Reported

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Roseville, CA 95678

Phone#: (916) 773-3664 Fax#: (916) 773-4784

ANALYSIS REPORT

Attention: Tony Choi
Bonkowski & Assoc.
6400 Hollis St. Suite 4
Emeryville, CA 94608

Date Sampled: 03/13/03
Date Received: 03/14/03
Date Analyzed: 03/21/03

Project: L98184 Task 8
Method: EPA 8260B

Client Sample I.D.	WL98184-MW-5		WL98184-MW-6		WL98184-MW-7	
LAB. NO.	W0303390		W0303391		W0303392	
ANALYTE	R/L	Results	R/L	Results	R/L	Results
Ethanol	20	ND	20	ND	20	ND
Benzene	0.5	ND	0.5	2.4	0.5	ND
Toluene	0.5	ND	0.5	ND	0.5	ND
Ethylbenzene	0.5	ND	0.5	ND	0.5	ND
m.p-xylene	0.5	ND	0.5	ND	0.5	ND
o-xylene	0.5	ND	0.5	ND	0.5	ND
tert-Butanol	5.0	ND	5.0	ND	5.0	ND
MTBE	0.5	1.3	0.5	ND	0.5	81
Diisopropyl ether	0.5	ND	0.5	ND	0.5	ND
Ethyl tert-butyl ether	0.5	ND	0.5	ND	0.5	ND
tert-Amyl methyl ether	0.5	ND	0.5	ND	0.5	ND
1,2-Dichloroethane	0.5	ND	0.5	ND	0.5	ND
1,2-Dibromoethane	0.5	ND	0.5	ND	0.5	ND
SURROGATE %RECOVERY						
Dibromoflouromethane	96		97		96	
Toluene-d8	96		96		96	
4-Bromofluorobenzene	106		103		106	

QA/QC %RECOVERY		
	LCS	LCSD
1,1-Dichloroethene	86	81
Benzene	93	89
Trichloroethene	95	89
Toluene	92	87
Chlorobenzene	89	87

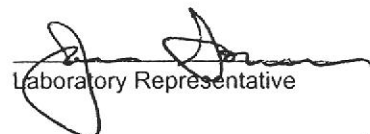
QA/QC Analyzed: 03/20/03

ND = Not detected. Compound(s) may be present at concentrations below the reporting limit.

R/L = Reporting Limit

Water samples reported in µg/L

Soil samples reported in mg/Kg


Laboratory Representative

03/25/03
Date Reported

Groundwater Monitoring and Sampling Protocols

Prior to purging and sampling a well, the static water level is measured to the nearest 0.01 feet with an electronic water sounder. After measuring the depth to water and checking for floating product, the monitor wells are purged and a sample collected from each well. The pH, temperature, and conductivity of the purge water are measured during well purging. Groundwater is sampled after three consecutive pH, temperature, and conductivity readings have been measured to within 15% of one another or until approximately three casing volumes have been purged. Reading are taken at least three minutes apart. Groundwater samples are then collected using new, disposable polyethylene bailers or by using low flow sampling techniques with new, disposable tubing (flow rates ≤ 0.5 liters per minute). Care is taken to minimize volatilization when transferring groundwater into appropriately preserved sample containers for volatile organic compounds. After labeling, samples are placed in a cooler containing ice and transported using chain-of-custody procedures to a state certified analytical laboratory.