San Francisco Regional Office

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Clayton
ENVIRONMENTAL
CONSULTANTS

#6207

October 2, 1997

Mr. Barney Chan
Department of Environmental Health
Alameda County Health Agency
1131 Harbor Bay Parkway, Second Floor
Alameda, California 94502

Clayton Project No. 70-97203.00.500

Subject: Report on Fourth Quarter 1996 Groundwater Sampling and Analysis for the Monitoring Wells at 5051 Coliseum Way, Oakland, California

Dear Mr. Chan:

Enclosed please find the above-referenced report, which presents the results of the sampling and analysis conducted on December 13, 1996 by Geomatix at the subject property. If you have any questions or comments, please call me at (510) 426-2686.

Sincerely,

Dwight R. Hoenig
Vice President, Western Regional Director
Environmental Management and Remediation
San Francisco Regional Office

DRH/

cc: Tim Colvig, Lempres and Wulfsberg
Patrick Sullivan, Forensic Management Associates

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Monitoring Well Sampling and Analysis at 5051 Coliseum Way Oakland, California

Clayton Project No. 70-97203.00.500
October 2, 1997

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Section **Page**

1.0 INTRODUCTION

Geomatrix conducted monitoring well sampling and analysis at 5051 Coliseum Way in Oakland, California (Figure 1) in December 1996. Clayton Environmental Consultants has since been appointed the consultant for the above site and adjacent sites 4930, 5050, and 5200 Coliseum Way, Oakland, California.

This report summarizes the results of groundwater monitoring conducted on December 13, 1996 by Geomatrix. Samples were collected from the eight groundwater monitoring wells, MWA-1 through MWA-3, and MW-4 through MW-8 at the subject site (Figure 2).

2.0 SITE SETTING

The following Site Setting information was obtained from the Geomatrix "Site Characterization Report" dated June 1996.

The 5051 Coliseum Way site is located adjacent to Interstate 880 approximately 0.5 miles east from San Leandro Bay in Oakland, California (Figure 1 and Figure 2). The surrounding area has a long history of industrial usage. The 5051 Coliseum Way site encompasses approximately 5 acres of relatively flat ground approximately 10 feet above mean sea level elevation. Regionally, groundwater generally flows west towards San Francisco Bay.

The 5051 Coliseum Way site is divided into a north area and south area by a cyclone fence. The area north of the fence is unpaved and previously was used by PG&E for temporary storage of construction materials. Two electrical transmission towers are located on this north area. The area south of the fence is paved and used for weekend parking.

A tidally-influenced stormwater drainage channel runs from north to south along the western perimeter of the 5051 Coliseum Way site, eventually draining into San Leandro Bay. The drainage channel is open and concrete-lined along the northwestern perimeter of the site, and is open and unlined along the southwestern perimeter of the property, prior to entering a culvert which runs under Interstate 880.

PG&E Substation J is located across the drainage channel northwest from the 5051 Coliseum Way site, and Interstate 880 is located immediately southwest from the subject site. Southeast of the 5051 Coliseum Way site there is an additional parking area, an EBMUD pump station and a small drainage ditch. Coliseum Way runs along the northeastern edge of the subject site, and further northeast of Coliseum Way are buildings associated with a former Volvo-GM truck maintenance facility and a mini-storage facility. The former Volvo-GM truck maintenance facility property, located at 750 50th Avenue and 5050 Coliseum Way, is the location of a former lithopone manufacturing facility. This property, referred to as the Volvo-GM site, is an environmental site under the jurisdiction of the ACDHS. The mini-storage facility at 5200 Coliseum Way was also part of the former lithopone manufacturing facility.

3.0 SITE HYDROLOGY

Groundwater depth measurements and wellhead elevations used in the preparation of this report were provided by Geomatrix. The depth to groundwater was measured in each monitoring well prior to well purging and sample collection. A summary of current and prior measurements is included in Table 1. Field sampling survey forms containing information on field conditions are included as Appendix A to this report.

Based on data collected in December 1996 at the 4930, 5050, 5051, and 5200 Coliseum Way sites, the general groundwater flow direction is west-southwest, with a hydraulic gradient of about 0.010 ft/ft (Figures 2 and 3). Groundwater elevations in the 5051 Coliseum Way monitoring wells vary significantly, from several feet below sea level in MW-7 to a few feet above sea level in MWA-2. These conditions may be reflective of true groundwater conditions (either a pumping well or an aquiclude adjacent to MW-7) or these anomalous groundwater elevations may have resulted from problems with well construction or well development.

4.0 SAMPLING

Groundwater samples were analyzed by the following method:

- USEPA Method 150.1 for pH.
- USEPA Method 160.1 for Total Dissolved Solids (TDS)
- USEPA Method 6010, 7060, and 7740 for Metals

5.0 LABORATORY ANALYSIS

Laboratory analysis of groundwater samples from the monitoring wells revealed pH levels ranging from 5.5 to 7.5; TDS concentrations ranging from 1,600 milligrams per liter (mg/L) to 18,100 mg/L; and the presence of silver, arsenic, barium, cadmium, cobalt, copper, molybdenum, nickel, lead, antimony, vanadium, and zinc above the method detection limits. A summary of current analytical results is included in Table 2. Copies of the analytical reports for the December 1996 monitoring event are enclosed as Appendix B to this report.

This report prepared by:

James E. Gribi, R.G.
Senior Geologist

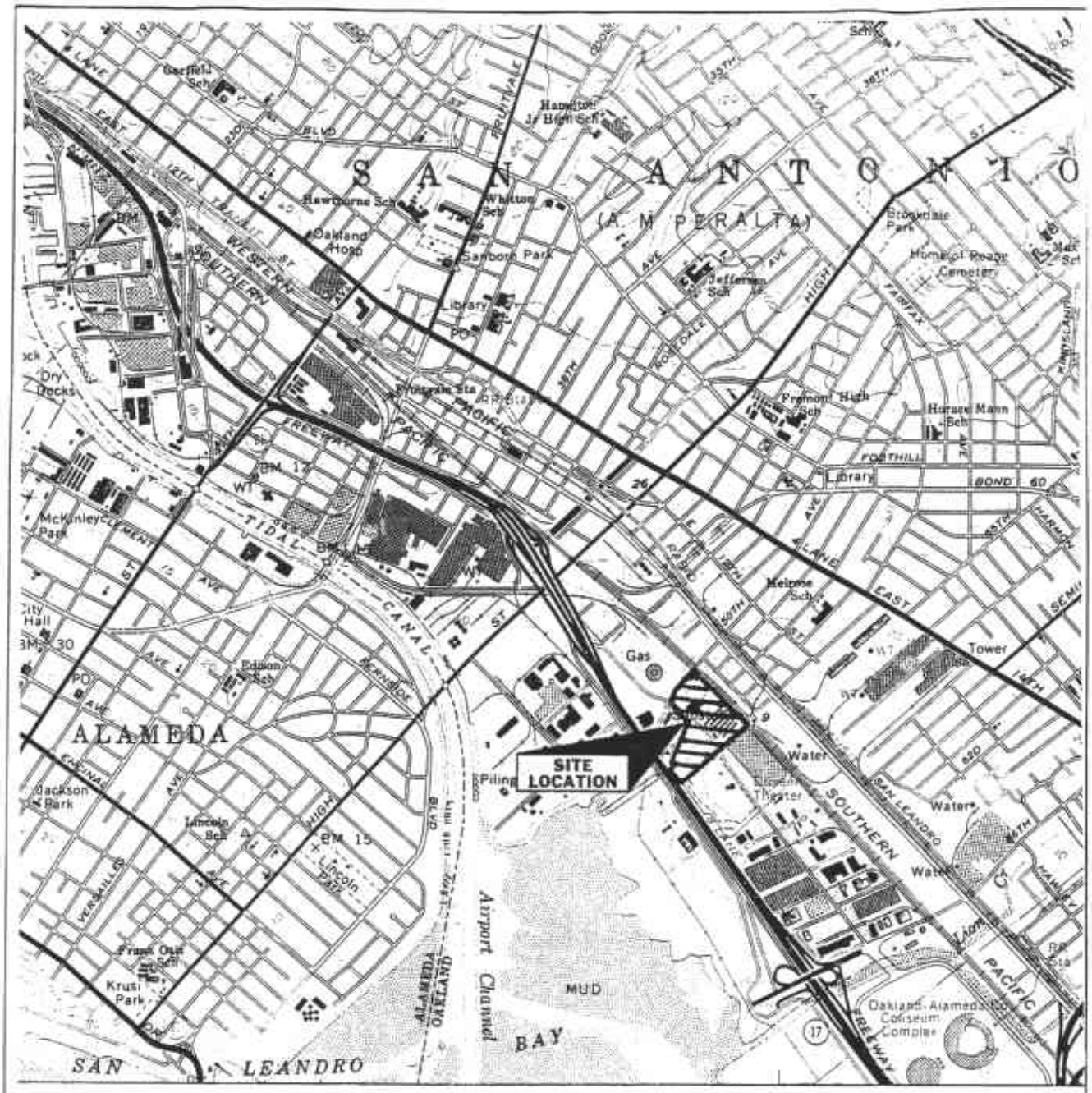
This report reviewed by:

Richard W. Day, CEG, CHG
Supervisor, Geosciences/Remediation
Environmental Management and Remediation
San Francisco Regional Office

This report reviewed by:

Dwight R. Hoenig
Vice President, Western Regional Director
Environmental Management and Remediation
San Francisco Regional Office

October 2, 1997



SITE LOCATION MAP

50th AVENUE STORM DRAIN
OAKLAND, CALIFORNIA

Clayton Project No. 70-97203.00.500

Figure
1
02/27/97
FIG500.CDR

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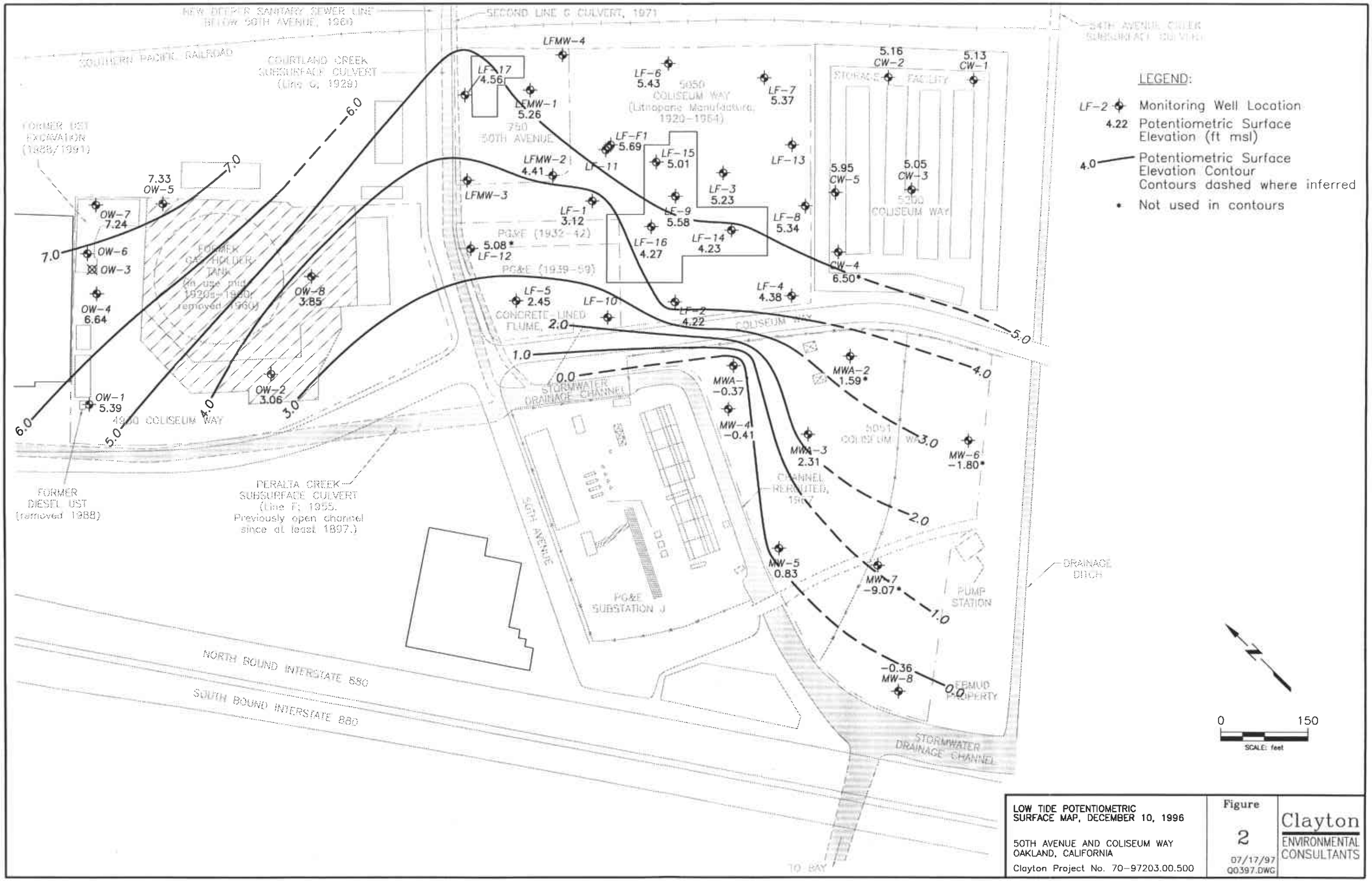
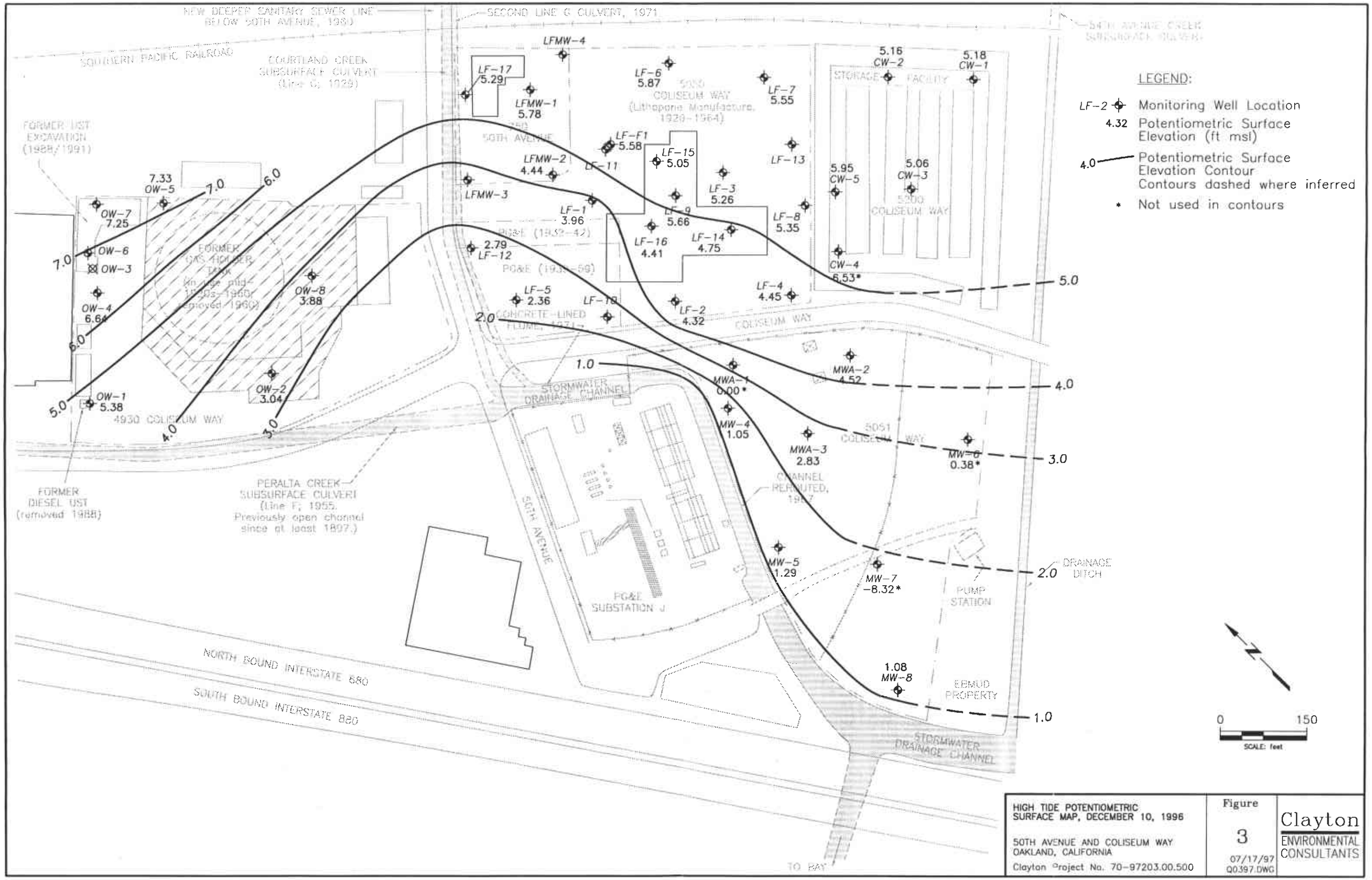


LEGEND:

- LF-2 ⊕ Monitoring Well Location
- 4.22 Potentiometric Surface Elevation (ft msl)
- 4.0 — Potentiometric Surface Elevation Contour Contours dashed where inferred
- • Not used in contours

LOW TIDE POTENTIOMETRIC SURFACE MAP, DECEMBER 10, 1996 50TH AVENUE AND COLISEUM WAY OAKLAND, CALIFORNIA Clayton Project No. 70–97203.00.500	Figure 2 07/17/97 Q0397.DWG	Clayton ENVIRONMENTAL CONSULTANTS



HIGH TIDE POTENTIOMETRIC SURFACE MAP, DECEMBER 10, 1996

50TH AVENUE AND COLISEUM WAY
OAKLAND, CALIFORNIA

Clayton Project No. 70-97203.00.500

Figure 3

07/17/97
Q0397.DWG

Clayton ENVIRONMENTAL CONSULTANTS

TABLE 1
Groundwater Level Measurement Data
5051 Coliseum Way, Oakland, California

Monitoring Well	Measurement Date	Top of Casing Elevation (ft, msl)	Depth to Groundwater (ft)	Groundwater Elevation (ft, msl)
MWA-1	19-Dec-95[1]	9.27	9.70	-0.43
	19-Dec-95[2]	9.27	9.64	-0.37
	10-Dec-96[1]	9.27	9.27	0.00
	10-Dec-96[2]	9.27	9.64	-0.37
	13-Dec-96	9.27	9.25	0.02
MWA-2	19-Dec-95[1]	7.79	3.95	3.84
	19-Dec-95[2]	7.79	3.95	3.84
	10-Dec-96[1]	7.79	3.27	4.52
	10-Dec-96[2]	7.79	6.20	1.59
	13-Dec-96	7.79	6.00	1.79
MWA-3	19-Dec-95[1]	10.50	8.23	2.27
	19-Dec-95[2]	10.50	8.22	2.28
	10-Dec-96[1]	10.50	7.67	2.83
	10-Dec-96[2]	10.50	8.19	2.31
	13-Dec-96	10.50	7.94	2.56
MW-4	19-Dec-95[1]	10.27	9.95	0.32
	19-Dec-95[2]	10.27	11.45	-1.18
	10-Dec-96[1]	10.27	9.22	1.05
	10-Dec-96[2]	10.27	10.68	-0.41
	13-Dec-96	10.27	10.00	0.27
MW-5	19-Dec-95[1]	9.45	8.51	0.94
	19-Dec-95[2]	9.45	8.49	0.96
	10-Dec-96[1]	9.45	8.16	1.29
	10-Dec-96[2]	9.45	8.62	0.83
	13-Dec-96	9.45	8.50	0.95
MW-6	19-Dec-95[1]	7.14	5.98	1.16
	19-Dec-95[2]	7.14	5.76	1.38
	10-Dec-96[1]	7.14	6.76	0.38
	10-Dec-96[2]	7.14	8.94	-1.80
	13-Dec-96	7.14	8.85	-1.71

TABLE 1
Groundwater Level Measurement Data
5051 Coliseum Way, Oakland, California

Monitoring Well	Measurement Date	Top of Casing Elevation (ft, msl)	Depth to Groundwater (ft)	Groundwater Elevation (ft, msl)
MW-7	19-Dec-95[1]	8.78	17.96	-9.18
	19-Dec-95[2]	8.78	17.91	-9.13
	10-Dec-96[1]	8.78	17.10	-8.32
	10-Dec-96[2]	8.78	17.85	-9.07
	13-Dec-96	8.78	17.97	-9.19
MW-8	19-Dec-95[1]	6.69	6.09	0.60
	19-Dec-95[2]	6.69	6.09	0.60
	10-Dec-96[1]	6.69	5.61	1.08
	10-Dec-96[2]	6.69	7.05	-0.36
	13-Dec-96	6.69	6.44	0.25

All measurements are with reference to top of PVC casing of each well.
[1] = High Tide Measurement
[2] = Low Tide Measurement

TABLE 2
Groundwater Analytical Results
5051 Coliseum Way, Oakland, California

Monitoring Well	Sample Date	pH (S.U.)	TDS (mg/L)	Ag (mg/L)	As (mg/L)	Ba (mg/L)	Be (mg/L)	Cd (mg/L)	Co (mg/L)	Cr (mg/L)	Cu (mg/L)
MWA-1	2-Jun-95	NA	NA	< 0.05	< 0.02	0.01	< 0.02	2.7	< 0.05	< 0.1	0.57
	12-Dec-95	NA	NA	< 0.05	0.011	< 0.1	< 0.02	2.8	0.11	< 0.1	1
	13-Dec-96	5.6	7,400	0.008	0.010	0.01	< 0.002	3.1	0.14	< 0.01	1.4
	13-Dec-96 (D)	5.6	7,500	0.010	0.011	0.02	< 0.002	3.1	0.17	< 0.01	1.5
MWA-2	2-Jun-95	NA	NA	< 0.005	1.1	0.19	< 0.002	0.012	0.012	< 0.01	< 0.01
	12-Dec-95	NA	NA	< 0.005	1.2	0.56	< 0.002	< 0.005	0.009	< 0.01	< 0.01
	13-Dec-96	7.0	1,600	0.006	1.1	1.6	< 0.002	0.040	0.006	< 0.01	< 0.01
MWA-3	2-Jun-95	NA	NA	< 0.005	0.012	0.05	< 0.002	0.01	0.006	< 0.01	< 0.01
	12-Dec-95	NA	NA	< 0.005	0.018	0.12	< 0.002	0.07	0.04	< 0.01	< 0.01
	13-Dec-96	7.0	2,400	< 0.005	0.030	0.12	< 0.002	0.016	0.009	< 0.01	< 0.01
MW-4	11-Dec-95	NA	NA	< 0.05	0.005	< 0.1	< 0.2	< 0.05	1.2	< 0.1	< 0.1
	13-Dec-96	5.5	7,100	< 0.05	0.013	0.10	< 0.02	0.38	< 0.05	< 0.01	< 0.01
MW-5	11-Dec-95	NA	NA	< 0.005	0.009	0.21	< 0.002	< 0.005	< 0.005	< 0.01	< 0.01
	13-Dec-96	7.2	3,600	< 0.005	0.005	0.73	< 0.02	< 0.005	< 0.005	< 0.01	< 0.01
MW-6	11-Dec-95	NA	NA	< 0.005	< 0.002	0.24	< 0.002	< 0.005	0.009	< 0.01	< 0.01
	13-Dec-96	7.5	4,300	< 0.005	0.008	0.35	< 0.002	< 0.005	< 0.005	< 0.01	< 0.01
MW-7	11-Dec-95	NA	NA	< 0.005	< 0.002	0.1	< 0.002	< 0.005	0.014	< 0.01	0.02
	13-Dec-96	6.8	18,100	0.006	0.007	0.22	< 0.002	< 0.005	0.019	< 0.01	< 0.01
MW-8	11-Dec-95	NA	NA	< 0.005	0.004	1.2	< 0.002	< 0.005	< 0.005	< 0.01	< 0.01
	13-Dec-96	7.1	9,000	0.006	0.008	1.0	< 0.002	< 0.005	< 0.005	< 0.01	< 0.01

All measurements are with reference to top of PVC casing of each well.
Results from Jun-95 and Dec-95 are from the Geomatrix "Site Characterization Report, 5051 Coliseum Way, Oakland, California", June 1996.
= results above detection limits
(D) = Duplicate sample

TABLE 2
Groundwater Analytical Results
5051 Coliseum Way, Oakland, California

Monitoring Well	Sample Date	Hg (mg/L)	Mo (mg/L)	Ni (mg/L)	Pb (mg/L)	Sb (mg/L)	Se (mg/L)	Tl (mg/L)	V (mg/L)	Zn (mg/L)
MWA-1	2-Jun-95	< 0.002	< 0.1	0.9	< 0.4	< 0.2	< 0.04	< 0.05	< 0.05	990
	12-Dec-95	0.0003	< 0.1	1.2	0.6	< 0.2	0.013	< 500	< 0.05	1000
	13-Dec-96	< 0.0002	0.03	0.97	1	< 0.02	< 0.004	< 0.05	< 0.005	990
	13-Dec-96 (D)	< 0.0002	0.03	1.1	1.1	< 0.02	< 0.004	< 0.05	< 0.005	970
MWA-2	2-Jun-95	< 0.0002	0.07	0.21	< 0.04	0.04	< 4	< 0.05	0.012	5.5
	12-Dec-95	< 0.0002	0.06	0.19	< 0.04	0.06	< 4	< 0.05	0.032	4.6
	13-Dec-96	< 0.0002	0.040	0.11	< 0.04	0.04	< 0.004	< 0.05	0.005	4.1
MWA-3	2-Jun-95	< 0.0002	< 0.01	< 0.01	< 0.04	< 0.02	< 4	< 0.05	< 0.005	2
	12-Dec-95	< 0.0002	< 0.01	0.04	< 0.04	< 0.02	< 4	0.05	0.007	26
	13-Dec-96	< 0.0002	< 0.01	0.01	< 0.04	< 0.02	< 0.004	< 0.05	< 0.005	1.5
MW-4	11-Dec-95	< 0.0002	< 0.1	3.0	< 0.4	< 0.2	< 0.02	< 500	< 0.05	430
	13-Dec-96	< 0.0002	< 0.01	1.0	< 0.4	< 0.2	< 0.004	< 0.5	< 0.05	660
MW-5	11-Dec-95	< 0.0002	< 0.01	< 0.01	< 0.04	< 0.02	< 4	< 0.05	< 0.005	0.02
	13-Dec-96	< 0.0002	< 0.01	< 0.01	< 0.04	< 0.02	< 0.004	< 0.05	< 0.005	0.17
MW-6	11-Dec-95	< 0.0002	0.03	0.03	< 0.04	< 0.02	< 4	< 0.05	0.022	0.02
	13-Dec-96	< 0.0002	0.02	0.01	< 0.04	< 0.02	< 0.004	< 0.05	0.034	0.08
MW-7	11-Dec-95	< 0.0002	< 0.01	0.02	< 0.04	<0.02	< 4	< 0.05	< 0.005	0.04
	13-Dec-96	< 0.0002	< 0.01	0.02	< 0.04	< 0.02	< 0.004	< 0.05	< 0.005	0.02
MW-8	11-Dec-95	< 0.0002	< 0.01	< 0.01	< 0.04	< 0.02	< 4	0.05	0.011	0.01
	13-Dec-96	< 0.0002	< 0.01	< 0.01	< 0.04	< 0.02	< 0.004	< 0.05	0.011	0.01

All measurements are with reference to top of PVC casing of each well.
Results from Jun-95 and Dec-95 are from the Geomatrix "Site Characterization Report, 5051 Coliseum Way, Oakland, California", June 1996.
= results above detection limits
(D) = Duplicate sample

APPENDIX A

FIELD SAMPLING SURVEY FORMS

GEOMATRIX

WELL SAMPLING AND/OR DEVELOPMENT RECORD

Well ID: MWA-1
Sample ID: MWA-1 Duplicate ID: MWA-10
Sample Depth: 15
Project and Task No.: 2906
Project Name: PGE -
Date: 12/13
Sampled By: MAT
Method of Purging: Diaphragm Pump
Method of Sampling: Disposable Bailer

Initial Depth to Water: 9.25
Depth to Water after Sampling:
Total Depth of Well: 18
Well Diameter: 4"
1 Casing/Borehole Volume = 6 (Circle one)
4 Casing/Borehole Volumes = 24 (Circle one)
Total Casing/Borehole Volumes Removed: 12.

Time	Intake Depth	Rate (gpm)	Cum. Vol. (gal.)	Temp. (°C)	pH (units)	Specific Electrical Conductance (µS/cm)	Remarks (color, turbidity, and sediment)
1140	18		3	20.0	4.9	6400	clear.
1145	18		6	21.0	5.2	6300	clear.
1150	14		12	20.9	5.3	6600	clear; dry
1455	18		18	20.0	*	6500	clear
1500	15	sample.		20.5	*	6500	clear

pH CALIBRATION (choose two)

Buffer Solution	pH 4.0	pH 7.0	pH 10.0	
Temperature °C				
Instrument Reading				

Model or Unit No.: 5

SPECIFIC ELECTRICAL CONDUCTANCE – CALIBRATION

KCL Solution (µS/cm = µmhos/cm)			
Temperature °C			
Instrument Reading			

Model or Unit No.: 5

Notes: * pH meter broke.

Forms(PF).003 (Revised 12/95)

GEOMATRIX

WELL SAMPLING AND/OR DEVELOPMENT RECORD

Well ID: MWA-2
Sample ID: MWA-2 Duplicate ID: _____
Sample Depth: 15
Project and Task No.: 2906
Project Name: PGE
Date: 12/13/96
Sampled By: NAT
Method of Purging: Diaphragm Pump
Method of Sampling: Disposable Bailer

Initial Depth to Water: 6'
Depth to Water after Sampling: _____
Total Depth of Well: 17.5
Well Diameter: 4"
1 Casing/Borehole Volume = 7 (Circle one)
4 Casing/Borehole Volumes = 28 (Circle one)
Total Casing/Borehole Volumes Removed: 30

Time	Intake Depth	Rate (gpm)	Cum. Vol. (gal.)	Temp. (°C)	pH (units)	Specific Electrical Conductance (µS/cm)	Remarks (color, turbidity, and sediment)
1400	15		5	19.6	6.8	2900	clear
1405	15		10	19.7	6.9	2800	clear
1410	15		20	19.8	7.0	2800	clear
1420	15		30	19.9	7.0	2800	clear
1425	sample			19.6	6.9	2800	clear

pH CALIBRATION (choose two)				
Buffer Solution	pH 4.0	pH 7.0	pH 10.0	
Temperature °C				
Instrument Reading				

Model or Unit No.:

SPECIFIC ELECTRICAL CONDUCTANCE – CALIBRATION			
KCL Solution (µS/cm = µmhos/cm)			
Temperature °C			
Instrument Reading			

Model or Unit No.:

Notes: _____

Forms(PF).003 (Revised 12/95)

GEOMATRIX

WELL SAMPLING AND/OR DEVELOPMENT RECORD

Well ID: MW-3
Sample ID: MW-3 Duplicate ID: -
Sample Depth: 15
Project and Task No.: 2906
Project Name: PG&E -
Date: 12/13/96
Sampled By: MAS
Method of Purging: Diaphragm Pump
Method of Sampling: Disposable Bailer

Initial Depth to Water: 7.94
Depth to Water after Sampling:
Total Depth of Well:
Well Diameter: 4"
1 Casing/Borehole Volume = 4.5
(Circle one)
4 Casing/Borehole Volumes = 18
(Circle one)
Total Casing/Borehole Volumes Removed: 12

Time	Intake Depth	Rate (gpm)	Cum. Vol. (gal.)	Temp. (°C)	pH (units)	Specific Electrical Conductance (µS/cm)	Remarks (color, turbidity, and sediment)
1155	17		2	19.8	6.2	4000	clear.
1157	17		6	19.5	6.7	3800	"
1200	17		12	19.4	6.7	3800	" ; dry
1445	Sample.			19.5	*	3600	clear

pH CALIBRATION (choose two)				
Buffer Solution	pH 4.0	pH 7.0	pH 10.0	
Temperature °C				
Instrument Reading				

Model or Unit No.:

SPECIFIC ELECTRICAL CONDUCTANCE – CALIBRATION			
KCL Solution (µS/cm = µmhos/cm)			
Temperature °C			
Instrument Reading			

Model or Unit No.:

Notes: pH meter broken.

GEOMATRIX

WELL SAMPLING AND/OR DEVELOPMENT RECORD

Well ID: MW-4
Sample ID: MW-4 Duplicate ID: _____
Sample Depth: 15
Project and Task No.: 2906
Project Name: PGE Oakland
Date: 12/13/96
Sampled By: NMT
Method of Purging: Diaphragm Pump
Method of Sampling: Disposable Bailer

Initial Depth to Water: 1000
Depth to Water after Sampling: _____
Total Depth of Well: 19
Well Diameter: 2"
1 Casing/Borehole Volume = 1.5 (Circle one)
4 Casing/Borehole Volumes = 6.0 (Circle one)
Total Casing/Borehole Volumes Removed: 6

Time	Intake Depth	Rate (gpm)	Cum. Vol. (gal.)	Temp. (°C)	pH (units)	Specific Electrical Conductance (µS/cm)	Remarks (color, turbidity, and sediment)
1330	18.		2	19.1	6.4	6500	clear.
1335	18		4	19.5	6.1	6300	Clear
1340	18		6	19.4	6.0	6400	Clear
1345	Sample			19.5	5.8	6700	Clear

pH CALIBRATION (choose two)				
Buffer Solution	pH 4.0	pH 7.0	pH 10.0	
Temperature °C				
Instrument Reading				

Model or Unit No.:

SPECIFIC ELECTRICAL CONDUCTANCE – CALIBRATION			
KCL Solution (µS/cm = µmhos/cm)			
Temperature °C			
Instrument Reading			

Model or Unit No.:

Notes: _____

GEOMATRIX

WELL SAMPLING AND/OR DEVELOPMENT RECORD

Well ID: MW-5
Sample ID: MW-5 Duplicate ID: _____
Sample Depth: 15
Project and Task No.: 2906
Project Name: PGE
Date: 12/13
Sampled By: NAT
Method of Purging: Diaphragm Pump
Method of Sampling: Disposable Bailer

Initial Depth to Water: 6.50
Depth to Water after Sampling: _____
Total Depth of Well: 19
Well Diameter: 2"
1 Casing/Borehole Volume = 1.5 (Circle one)
4 Casing/Borehole Volumes = 6.0 (Circle one)
Total Casing/Borehole Volumes Removed: 6

Time	Intake Depth	Rate (gpm)	Cum. Vol. (gal.)	Temp. (°C)	pH (units)	Specific Electrical Conductance (µS/cm)	Remarks (color, turbidity, and sediment)
1316	17		2.0	18.3	7.3	6100	clear
1315	17		4.0	18.2	7.1	6000	clear
1320	17		6.0	18.4	7.2	6000	clear
1325		Sample.		18.8	7.1	5800	clear.

pH CALIBRATION (choose two)				
Buffer Solution	pH 4.0	pH 7.0	pH 10.0	
Temperature °C				
Instrument Reading				

Model or Unit No.:

SPECIFIC ELECTRICAL CONDUCTANCE – CALIBRATION			
KCL Solution (µS/cm = µmhos/cm)			
Temperature °C			
Instrument Reading			

Model or Unit No.:

Notes: _____

Forms(PF).003 (Revised 12/95)

GEOMATRIX

WELL SAMPLING AND/OR DEVELOPMENT RECORD

Well ID: MW-6
Sample ID: MW Duplicate ID:
Sample Depth: 15
Project and Task No.: 2906
Project Name: PGE
Date: 12/13
Sampled By: Nat
Method of Purging: Diaphragm Pump
Method of Sampling: Disposable Bailer

Initial Depth to Water: 6.85
Depth to Water after Sampling:
Total Depth of Well: 18.5
Well Diameter: 2"
1 Casing/Borehole Volume = 2 (Circle one)
4 Casing/Borehole Volumes = 8 (Circle one)
Total Casing/Borehole Volumes Removed: 8

Time	Intake Depth	Rate (gpm)	Cum. Vol. (gal.)	Temp. (°C)	pH (units)	Specific Electrical Conductance (µS/cm)	Remarks (color, turbidity, and sediment)
1250			2.0	19.5	8.0	7200	clear
1255			4.0	19.7	7.7	7100	clear
1300			6.0	19.8	7.6	7800	clear
1303			6.0	19.7	7.7	7600	clear
1305	Sample			19.7	7.6	7500	clear

pH CALIBRATION (choose two)				
Buffer Solution	pH 4.0	pH 7.0	pH 10.0	
Temperature °C				
Instrument Reading				

Model or Unit No.:

SPECIFIC ELECTRICAL CONDUCTANCE – CALIBRATION			
KCL Solution (µS/cm = µmhos/cm)			
Temperature °C			
Instrument Reading			

Model or Unit No.:

Notes:

GEOMATRIX

WELL SAMPLING AND/OR DEVELOPMENT RECORD

Well ID: mw-7
Sample ID: mw-7 Duplicate ID: —
Sample Depth: 18'
Project and Task No.: 2906
Project Name: PG+E - Oakland
Date: 12/12/96
Sampled By: NAT
Method of Purging: Bailer - Disposable
Method of Sampling: bailer - Disposable.

Initial Depth to Water: 17.97.
Depth to Water after Sampling:
Total Depth of Well: 19.0
Well Diameter: 2"
(1 Casing)/Borehole Volume = 0.17
(Circle one)
4 Casing/Borehole Volumes =
(Circle one)
Total Casing/Borehole Volumes Removed: 0.3

Time	Intake Depth	Rate (gpm)	Cum. Vol. (gal.)	Temp. (°C)	pH (units)	Specific Electrical Conductance (µS/cm)	Remarks (color, turbidity, and sediment)
0945			0.25	21.1	6.5	28000	Clear
0955			0.30	20.6	6.7	24000	Clear.
1551		Sample		21.0	6.7	24000	Clear

pH CALIBRATION (choose two)

Buffer Solution	pH 4.0	pH 7.0	pH 10.0	
Temperature °C	19.5	19.6		
Instrument Reading	4.0	7.0		

Model or Unit No.: 5

SPECIFIC ELECTRICAL CONDUCTANCE – CALIBRATION

KCL Solution (µS/cm = µmhos/cm)		12880	
Temperature °C		19.1	
Instrument Reading		12800	

Model or Unit No.: 5

Notes: TDS, pH, Metals

GEOMATRIX

WELL SAMPLING AND/OR DEVELOPMENT RECORD

Well ID: MW-8
Sample ID: MW-8 Duplicate ID: _____
Sample Depth: 15
Project and Task No.: 2906
Project Name: PLE - 004 Amd
Date: 12/13/91
Sampled By: MAS
Method of Purging: Diaphragm Pump
Method of Sampling: Disposable Bailer

Initial Depth to Water: 6.44
Depth to Water after Sampling: _____
Total Depth of Well: 19
Well Diameter: 2"
1 Casing/Borehole Volume = 2.5 (Circle one)
4 Casing/Borehole Volumes = 10 (Circle one)
Total Casing/Borehole Volumes Removed: 10

Time	Intake Depth	Rate (gpm)	Cum. Vol. (gal.)	Temp. (°C)	pH (units)	Specific Electrical Conductance (µS/cm)	Remarks (color, turbidity, and sediment)
1225	17		2.5	19.4	6.9	15000	Clear.
1230			5.0	19.5	6.9	14800	Clear
1235			7.5	19.5	6.9	14700	Clear.
1240			10.0	19.6	6.9	13500	Clear
1240		Sample		20.0	7.0	13300	Clear

pH CALIBRATION (choose two)

Model or Unit No.:

Buffer Solution	pH 4.0	pH 7.0	pH 10.0	
Temperature °C				
Instrument Reading				

SPECIFIC ELECTRICAL CONDUCTANCE – CALIBRATION

Model or Unit No.:

KCL Solution (µS/cm = µmhos/cm)			
Temperature °C			
Instrument Reading			

Notes: _____

APPENDIX B

ANALYTICAL REPORTS

American Environmental Network

Certificate of Analysis

DOHS Certification: 1172 AIHA Accreditation: 11134

GEOMATRIX CONSULTANTS
100 PINE ST., SUITE 1000
SAN FRANCISCO, CA 94111

ATTN: MIKE KEIM
CLIENT PROJ. ID: 2906

C.O.C. NUMBER: 7796

REPORT DATE: 12/26/96

DATE(S) SAMPLED: 12/13/96

DATE RECEIVED: 12/13/96

AEN WORK ORDER: 9612225

PROJECT SUMMARY:

On December 13, 1996, this laboratory received 10 water sample(s).

Client requested 9 sample(s) be analyzed for chemical parameters; one sample was placed on hold. Results of analysis are summarized on the following page(s). Please see quality control report for a summary of QC data pertaining to this project.

Samples will be stored for 30 days after completion of analysis, then disposed of in accordance with State and Federal regulations. Samples may be archived by prior arrangement.

If you have any questions, please contact Client Services at (510) 930-9090.

Larry Klein
Laboratory Director

GEOMATRIX CONSULTANTS

SAMPLE ID: MWA-1
AEN LAB NO: 9612225-01
AEN WORK ORDER: 9612225
CLIENT PROJ. ID: 2906

DATE SAMPLED: 12/13/96
DATE RECEIVED: 12/13/96
REPORT DATE: 12/26/96

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
#Sample Filtration	0.45 um	-		Filtr Date	12/13/96
pH	EPA 150.1	5.6		S.U.	12/13/96
Total Dissolved Solids	EPA 160.1	7,400 *	10	mg/L	12/19/96
#Digestion, Metals by GFAA	EPA 3020	-		Prep Date	12/19/96
#Digestion, Metals by ICP	EPA 3010	-		Prep Date	12/19/96
CCR 17 Metals					
Ag Silver	EPA 6010	0.008 *	0.005	mg/L	12/19/96
As Arsenic	EPA 7060	0.010 *	0.002	mg/L	12/19/96
Ba Barium	EPA 6010	0.01 *	0.01	mg/L	12/19/96
Be Beryllium	EPA 6010	ND	0.002	mg/L	12/19/96
Cd Cadmium	EPA 6010	3.1 *	0.005	mg/L	12/19/96
Co Cobalt	EPA 6010	0.14 *	0.005	mg/L	12/19/96
Cr Chromium	EPA 6010	ND	0.01	mg/L	12/19/96
Cu Copper	EPA 6010	1.4 *	0.01	mg/L	12/19/96
Hg Mercury	EPA 7470	ND	0.0002	mg/L	12/21/96
Mo Molybdenum	EPA 6010	0.03 *	0.01	mg/L	12/19/96
Ni Nickel	EPA 6010	0.97 *	0.01	mg/L	12/19/96
Pb Lead	EPA 6010	1.0 *	0.04	mg/L	12/19/96
Sb Antimony	EPA 6010	ND	0.02	mg/L	12/19/96
Se Selenium	EPA 7740	ND	0.004	mg/L	12/19/96
Tl Thallium	EPA 6010	ND	0.05	mg/L	12/19/96
V Vanadium	EPA 6010	ND	0.005	mg/L	12/19/96
Zn Zinc	EPA 6010	990 *	0.01	mg/L	12/19/96

ND = Not detected at or above the reporting limit
* = Value at or above reporting limit

GEOMATRIX CONSULTANTS

SAMPLE ID: MWA-2
AEN LAB NO: 9612225-02
AEN WORK ORDER: 9612225
CLIENT PROJ. ID: 2906

DATE SAMPLED: 12/13/96
DATE RECEIVED: 12/13/96
REPORT DATE: 12/26/96

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
#Sample Filtration	0.45 um	-		Filtr Date	12/13/96
pH	EPA 150.1	7.0		S.U.	12/13/96
Total Dissolved Solids	EPA 160.1	1,600 *	10	mg/L	12/19/96
#Digestion, Metals by GFAA	EPA 3020	-		Prep Date	12/19/96
#Digestion, Metals by ICP	EPA 3010	-		Prep Date	12/19/96
CCR 17 Metals					
Ag Silver	EPA 6010	0.006 *	0.005	mg/L	12/19/96
As Arsenic	EPA 7060	1.1 *	0.002	mg/L	12/21/96
Ba Barium	EPA 6010	1.6 *	0.01	mg/L	12/19/96
Be Beryllium	EPA 6010	ND	0.002	mg/L	12/19/96
Cd Cadmium	EPA 6010	0.040 *	0.005	mg/L	12/19/96
Co Cobalt	EPA 6010	0.006 *	0.005	mg/L	12/19/96
Cr Chromium	EPA 6010	ND	0.01	mg/L	12/19/96
Cu Copper	EPA 6010	ND	0.01	mg/L	12/19/96
Hg Mercury	EPA 7470	ND	0.0002	mg/L	12/21/96
Mo Molybdenum	EPA 6010	0.040 *	0.01	mg/L	12/19/96
Ni Nickel	EPA 6010	0.11 *	0.01	mg/L	12/19/96
Pb Lead	EPA 6010	ND	0.04	mg/L	12/19/96
Sb Antimony	EPA 6010	0.04 *	0.02	mg/L	12/19/96
Se Selenium	EPA 7740	ND	0.004	mg/L	12/19/96
Tl Thallium	EPA 6010	ND	0.05	mg/L	12/19/96
V Vanadium	EPA 6010	0.005 *	0.005	mg/L	12/19/96
Zn Zinc	EPA 6010	4.1 *	0.01	mg/L	12/22/96

ND = Not detected at or above the reporting limit
* = Value at or above reporting limit

GEOMATRIX CONSULTANTS

SAMPLE ID: MWA-3
AEN LAB NO: 9612225-03
AEN WORK ORDER: 9612225
CLIENT PROJ. ID: 2906

DATE SAMPLED: 12/13/96
DATE RECEIVED: 12/13/96
REPORT DATE: 12/26/96

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
#Sample Filtration	0.45 um	-		Filtr Date	12/13/96
pH	EPA 150.1	7.0		S.U.	12/13/96
Total Dissolved Solids	EPA 160.1	2,400 *	10	mg/L	12/19/96
#Digestion, Metals by GFAA	EPA 3020	-		Prep Date	12/19/96
#Digestion, Metals by ICP	EPA 3010	-		Prep Date	12/19/96
CCR 17 Metals					
Ag Silver	EPA 6010	ND	0.005	mg/L	12/19/96
As Arsenic	EPA 7060	0.030 *	0.002	mg/L	12/21/96
Ba Barium	EPA 6010	0.12 *	0.01	mg/L	12/19/96
Be Beryllium	EPA 6010	ND	0.002	mg/L	12/19/96
Cd Cadmium	EPA 6010	0.016 *	0.005	mg/L	12/19/96
Co Cobalt	EPA 6010	0.009 *	0.005	mg/L	12/19/96
Cr Chromium	EPA 6010	ND	0.01	mg/L	12/19/96
Cu Copper	EPA 6010	ND	0.01	mg/L	12/19/96
Hg Mercury	EPA 7470	ND	0.0002	mg/L	12/21/96
Mo Molybdenum	EPA 6010	ND	0.01	mg/L	12/19/96
Ni Nickel	EPA 6010	0.01 *	0.01	mg/L	12/19/96
Pb Lead	EPA 6010	ND	0.04	mg/L	12/19/96
Sb Antimony	EPA 6010	ND	0.02	mg/L	12/19/96
Se Selenium	EPA 7740	ND	0.004	mg/L	12/19/96
Tl Thallium	EPA 6010	ND	0.05	mg/L	12/19/96
V Vanadium	EPA 6010	ND	0.005	mg/L	12/19/96
Zn Zinc	EPA 6010	1.5 *	0.01	mg/L	12/22/96

ND = Not detected at or above the reporting limit
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GEOMATRIX CONSULTANTS

SAMPLE ID: MW-4
AEN LAB NO: 9612225-04
AEN WORK ORDER: 9612225
CLIENT PROJ. ID: 2906

DATE SAMPLED: 12/13/96
DATE RECEIVED: 12/13/96
REPORT DATE: 12/26/96

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
#Sample Filtration	0.45 um	-		Filtr Date	12/13/96
pH	EPA 150.1	5.5		S.U.	12/13/96
Total Dissolved Solids	EPA 160.1	7,100 *	10	mg/L	12/19/96
#Digestion, Metals by GFAA	EPA 3020	-		Prep Date	12/19/96
#Digestion, Metals by ICP	EPA 3010	-		Prep Date	12/19/96
CCR 17 Metals					
Ag Silver	EPA 6010	ND	0.05	mg/L	12/19/96
As Arsenic	EPA 7060	0.013 *	0.002	mg/L	12/21/96
Ba Barium	EPA 6010	0.10 *	0.01	mg/L	12/19/96
Be Beryllium	EPA 6010	ND	0.02	mg/L	12/19/96
Cd Cadmium	EPA 6010	0.38 *	0.05	mg/L	12/19/96
Co Cobalt	EPA 6010	ND	0.05	mg/L	12/19/96
Cr Chromium	EPA 6010	ND	0.1	mg/L	12/19/96
Cu Copper	EPA 6010	ND	0.1	mg/L	12/19/96
Hg Mercury	EPA 7470	ND	0.0002	mg/L	12/21/96
Mo Molybdenum	EPA 6010	ND	0.1	mg/L	12/19/96
Ni Nickel	EPA 6010	1.0 *	0.1	mg/L	12/19/96
Pb Lead	EPA 6010	ND	0.4	mg/L	12/19/96
Sb Antimony	EPA 6010	ND	0.2	mg/L	12/19/96
Se Selenium	EPA 7740	ND	0.004	mg/L	12/19/96
Tl Thallium	EPA 6010	ND	0.5	mg/L	12/19/96
V Vanadium	EPA 6010	ND	0.05	mg/L	12/19/96
Zn Zinc	EPA 6010	660 *	0.1	mg/L	12/19/96

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GEOMATRIX CONSULTANTS

SAMPLE ID: MW-5
AEN LAB NO: 9612225-05
AEN WORK ORDER: 9612225
CLIENT PROJ. ID: 2906

DATE SAMPLED: 12/13/96
DATE RECEIVED: 12/13/96
REPORT DATE: 12/26/96

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
#Sample Filtration	0.45 um	-		Filtr Date	12/13/96
pH	EPA 150.1	7.2		S.U.	12/13/96
Total Dissolved Solids	EPA 160.1	3,600 *	10	mg/L	12/19/96
#Digestion, Metals by GFAA	EPA 3020	-		Prep Date	12/19/96
#Digestion, Metals by ICP	EPA 3010	-		Prep Date	12/19/96
CCR 17 Metals					
Ag Silver	EPA 6010	ND	0.005	mg/L	12/19/96
As Arsenic	EPA 7060	0.005 *	0.002	mg/L	12/19/96
Ba Barium	EPA 6010	0.73 *	0.01	mg/L	12/19/96
Be Beryllium	EPA 6010	ND	0.002	mg/L	12/19/96
Cd Cadmium	EPA 6010	ND	0.005	mg/L	12/19/96
Co Cobalt	EPA 6010	ND	0.005	mg/L	12/19/96
Cr Chromium	EPA 6010	ND	0.01	mg/L	12/19/96
Cu Copper	EPA 6010	ND	0.01	mg/L	12/19/96
Hg Mercury	EPA 7470	ND	0.0002	mg/L	12/21/96
Mo Molybdenum	EPA 6010	ND	0.01	mg/L	12/19/96
Ni Nickel	EPA 6010	ND	0.01	mg/L	12/19/96
Pb Lead	EPA 6010	ND	0.04	mg/L	12/19/96
Sb Antimony	EPA 6010	ND	0.02	mg/L	12/19/96
Se Selenium	EPA 7740	ND	0.004	mg/L	12/19/96
Tl Thallium	EPA 6010	ND	0.05	mg/L	12/19/96
V Vanadium	EPA 6010	ND	0.005	mg/L	12/19/96
Zn Zinc	EPA 6010	0.17 *	0.01	mg/L	12/22/96

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GEOMATRIX CONSULTANTS

SAMPLE ID: MW-6
AEN LAB NO: 9612225-06
AEN WORK ORDER: 9612225
CLIENT PROJ. ID: 2906

DATE SAMPLED: 12/13/96
DATE RECEIVED: 12/13/96
REPORT DATE: 12/26/96

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
#Sample Filtration	0.45 um	-		Filtr Date	12/13/96
pH	EPA 150.1	7.5		S.U.	12/13/96
Total Dissolved Solids	EPA 160.1	4,300 *	10	mg/L	12/19/96
#Digestion, Metals by GFAA	EPA 3020	-		Prep Date	12/19/96
#Digestion, Metals by ICP	EPA 3010	-		Prep Date	12/19/96
CCR 17 Metals					
Ag Silver	EPA 6010	ND	0.005	mg/L	12/19/96
As Arsenic	EPA 7060	0.008 *	0.002	mg/L	12/19/96
Ba Barium	EPA 6010	0.35 *	0.01	mg/L	12/19/96
Be Beryllium	EPA 6010	ND	0.002	mg/L	12/19/96
Cd Cadmium	EPA 6010	ND	0.005	mg/L	12/19/96
Co Cobalt	EPA 6010	ND	0.005	mg/L	12/19/96
Cr Chromium	EPA 6010	ND	0.01	mg/L	12/19/96
Cu Copper	EPA 6010	ND	0.01	mg/L	12/19/96
Hg Mercury	EPA 7470	ND	0.0002	mg/L	12/21/96
Mo Molybdenum	EPA 6010	0.02 *	0.01	mg/L	12/19/96
Ni Nickel	EPA 6010	0.01 *	0.01	mg/L	12/19/96
Pb Lead	EPA 6010	ND	0.04	mg/L	12/19/96
Sb Antimony	EPA 6010	ND	0.02	mg/L	12/19/96
Se Selenium	EPA 7740	ND	0.004	mg/L	12/19/96
Tl Thallium	EPA 6010	ND	0.05	mg/L	12/19/96
V Vanadium	EPA 6010	0.034 *	0.005	mg/L	12/19/96
Zn Zinc	EPA 6010	0.08 *	0.01	mg/L	12/22/96

ND = Not detected at or above the reporting limit
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GEOMATRIX CONSULTANTS

SAMPLE ID: MW-7
AEN LAB NO: 9612225-07
AEN WORK ORDER: 9612225
CLIENT PROJ. ID: 2906

DATE SAMPLED: 12/13/96
DATE RECEIVED: 12/13/96
REPORT DATE: 12/26/96

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
#Sample Filtration	0.45 um	-		Filtr Date	12/13/96
pH	EPA 150.1	6.8		S.U.	12/13/96
Total Dissolved Solids	EPA 160.1	18,100 *	10	mg/L	12/19/96
#Digestion, Metals by GFAA	EPA 3020	-		Prep Date	12/19/96
#Digestion, Metals by ICP	EPA 3010	-		Prep Date	12/19/96
CCR 17 Metals					
Ag Silver	EPA 6010	0.006 *	0.005	mg/L	12/19/96
As Arsenic	EPA 7060	0.007 *	0.002	mg/L	12/19/96
Ba Barium	EPA 6010	0.22 *	0.01	mg/L	12/19/96
Be Beryllium	EPA 6010	ND	0.002	mg/L	12/19/96
Cd Cadmium	EPA 6010	ND	0.005	mg/L	12/19/96
Co Cobalt	EPA 6010	0.019 *	0.005	mg/L	12/19/96
Cr Chromium	EPA 6010	ND	0.01	mg/L	12/19/96
Cu Copper	EPA 6010	ND	0.01	mg/L	12/19/96
Hg Mercury	EPA 7470	ND	0.0002	mg/L	12/21/96
Mo Molybdenum	EPA 6010	ND	0.01	mg/L	12/19/96
Ni Nickel	EPA 6010	0.02 *	0.01	mg/L	12/19/96
Pb Lead	EPA 6010	ND	0.04	mg/L	12/19/96
Sb Antimony	EPA 6010	ND	0.02	mg/L	12/19/96
Se Selenium	EPA 7740	ND	0.004	mg/L	12/19/96
Tl Thallium	EPA 6010	ND	0.05	mg/L	12/19/96
V Vanadium	EPA 6010	ND	0.005	mg/L	12/19/96
Zn Zinc	EPA 6010	0.02 *	0.01	mg/L	12/22/96

ND = Not detected at or above the reporting limit
* = Value at or above reporting limit

GEOMATRIX CONSULTANTS

SAMPLE ID: MW-8
AEN LAB NO: 9612225-08
AEN WORK ORDER: 9612225
CLIENT PROJ. ID: 2906

DATE SAMPLED: 12/13/96
DATE RECEIVED: 12/13/96
REPORT DATE: 12/26/96

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
#Sample Filtration	0.45 um	-		Filtr Date	12/13/96
pH	EPA 150.1	7.1		S.U.	12/13/96
Total Dissolved Solids	EPA 160.1	9,000 *	10	mg/L	12/19/96
#Digestion, Metals by GFAA	EPA 3020	-		Prep Date	12/19/96
#Digestion, Metals by ICP	EPA 3010	-		Prep Date	12/19/96
CCR 17 Metals					
Ag Silver	EPA 6010	0.006 *	0.005	mg/L	12/19/96
As Arsenic	EPA 7060	0.008 *	0.002	mg/L	12/19/96
Ba Barium	EPA 6010	1.0 *	0.01	mg/L	12/19/96
Be Beryllium	EPA 6010	ND	0.002	mg/L	12/19/96
Cd Cadmium	EPA 6010	ND	0.005	mg/L	12/19/96
Co Cobalt	EPA 6010	ND	0.005	mg/L	12/19/96
Cr Chromium	EPA 6010	ND	0.01	mg/L	12/19/96
Cu Copper	EPA 6010	ND	0.01	mg/L	12/19/96
Hg Mercury	EPA 7470	ND	0.0002	mg/L	12/21/96
Mo Molybdenum	EPA 6010	ND	0.01	mg/L	12/19/96
Ni Nickel	EPA 6010	ND	0.01	mg/L	12/19/96
Pb Lead	EPA 6010	ND	0.04	mg/L	12/19/96
Sb Antimony	EPA 6010	ND	0.02	mg/L	12/19/96
Se Selenium	EPA 7740	ND	0.004	mg/L	12/19/96
Tl Thallium	EPA 6010	ND	0.05	mg/L	12/19/96
V Vanadium	EPA 6010	0.011 *	0.005	mg/L	12/19/96
Zn Zinc	EPA 6010	0.01 *	0.01	mg/L	12/22/96

ND = Not detected at or above the reporting limit
* = Value at or above reporting limit

GEOMATRIX CONSULTANTS

SAMPLE ID: MWA-10
AEN LAB NO: 9612225-09
AEN WORK ORDER: 9612225
CLIENT PROJ. ID: 2906

DATE SAMPLED: 12/13/96
DATE RECEIVED: 12/13/96
REPORT DATE: 12/26/96

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
#Sample Filtration	0.45 um	-		Filtr Date	12/13/96
pH	EPA 150.1	5.6		S.U.	12/13/96
Total Dissolved Solids	EPA 160.1	7,500 *	10	mg/L	12/19/96
#Digestion, Metals by GFAA	EPA 3020	-		Prep Date	12/19/96
#Digestion, Metals by ICP	EPA 3010	-		Prep Date	12/19/96
CCR 17 Metals					
Ag Silver	EPA 6010	0.010 *	0.005	mg/L	12/19/96
As Arsenic	EPA 7060	0.011 *	0.002	mg/L	12/19/96
Ba Barium	EPA 6010	0.02 *	0.01	mg/L	12/19/96
Be Beryllium	EPA 6010	ND	0.002	mg/L	12/19/96
Cd Cadmium	EPA 6010	3.1 *	0.005	mg/L	12/19/96
Co Cobalt	EPA 6010	0.17 *	0.005	mg/L	12/19/96
Cr Chromium	EPA 6010	ND	0.01	mg/L	12/19/96
Cu Copper	EPA 6010	1.5 *	0.01	mg/L	12/19/96
Hg Mercury	EPA 7470	ND	0.0002	mg/L	12/21/96
Mo Molybdenum	EPA 6010	0.03 *	0.01	mg/L	12/19/96
Ni Nickel	EPA 6010	1.1 *	0.01	mg/L	12/19/96
Pb Lead	EPA 6010	1.1 *	0.04	mg/L	12/19/96
Sb Antimony	EPA 6010	ND	0.02	mg/L	12/19/96
Se Selenium	EPA 7740	ND	0.004	mg/L	12/19/96
Tl Thallium	EPA 6010	ND	0.05	mg/L	12/19/96
V Vanadium	EPA 6010	ND	0.005	mg/L	12/19/96
Zn Zinc	EPA 6010	970 *	0.01	mg/L	12/19/96

ND = Not detected at or above the reporting limit
* = Value at or above reporting limit

AEN (CALIFORNIA)
QUALITY CONTROL REPORT

AEN JOB NUMBER: 9612225
CLIENT PROJECT ID: 2906

Quality Control and Project Summary

All laboratory quality control parameters were found to be within established limits.

Definitions

Laboratory Control Sample (LCS)/Method Spikes(s): Control samples of known composition. LCS and Method Spike data are used to validate batch analytical results.

Matrix Spike(s): Aliquot of a sample (aqueous or solid) with added quantities of specific compounds and subjected to the entire analytical procedure. Matrix spike and matrix spike duplicate QC data are advisory.

Method Blank: An analytical control consisting of all reagents, internal standards, and surrogate standards carried through the entire analytical process. Used to monitor laboratory background and reagent contamination.

Not Detected (ND): Not detected at or above the reporting limit.

Relative Percent Difference (RPD): An indication of method precision based on duplicate analyses.

Reporting Limit (RL): The lowest concentration routinely determined during laboratory operations. The RL is generally 1 to 10 times the Method Detection Limit (MDL). Reporting limits are matrix, method, and analyte dependent and take into account any dilutions performed as part of the analysis.

Surrogates: Organic compounds which are similar to analytes of interest in chemical behaviour, but are not found in environmental samples. Surrogates are added to all blanks, calibration and check standards, samples, and spiked samples. Surrogate recovery is monitored as an indication of acceptable sample preparation and instrument performance.

D: Surrogates diluted out.

I: Interference.

!: Indicates result outside of established laboratory QC limits.

ANALYSIS: Arsenic

MATRIX: Water

METHOD BLANK SAMPLES

SAMPLE TYPE: Blank-Method/Media blank
INSTRUMENT: TJA 4000, GFAA
UNITS: mg/L
METHOD:

LAB ID: GFW_BLNK_J
PREPARED:
ANALYZED: 12/19/96

INSTR RUN: 4000\961219212800/1/
BATCH ID: GFW121896-J
DILUTION: 1.000000

ANALYTE	RESULT	REF RESULT	REPORTING LIMIT	SPIKE VALUE	RECOVERY (%)	REC LIMITS (%) LOW	REC LIMITS (%) HIGH	RPD (%)	RPD LIMIT (%)
Arsenic in water by GFAA	ND		0.002						

METHOD SPIKE SAMPLES

SAMPLE TYPE: Spike-Method/Media blank
INSTRUMENT: TJA 4000, GFAA
UNITS: mg/L
METHOD:

LAB ID: GFW_MD_J
PREPARED:
ANALYZED: 12/19/96

INSTR RUN: 4000\961219212800/3/1
BATCH ID: GFW121896-J
DILUTION: 1.000000

ANALYTE	RESULT	REF RESULT	REPORTING LIMIT	SPIKE VALUE	RECOVERY (%)	REC LIMITS (%) LOW	REC LIMITS (%) HIGH	RPD (%)	RPD LIMIT (%)
Arsenic in water by GFAA	0.0403	ND	0.002	0.0400	101	82	140		

SAMPLE TYPE: Spike-Method/Media blank
INSTRUMENT: TJA 4000, GFAA
UNITS: mg/L
METHOD:

LAB ID: GFW_MS_J
PREPARED:
ANALYZED: 12/19/96

INSTR RUN: 4000\961219212800/2/1
BATCH ID: GFW121896-J
DILUTION: 1.000000

ANALYTE	RESULT	REF RESULT	REPORTING LIMIT	SPIKE VALUE	RECOVERY (%)	REC LIMITS (%) LOW	REC LIMITS (%) HIGH	RPD (%)	RPD LIMIT (%)
Arsenic in water by GFAA	0.0396	ND	0.002	0.0400	99.0	82	140		

METHOD SPIKE DUPLICATES

SAMPLE TYPE: Method Spike Sample Duplicate
INSTRUMENT: TJA 4000, GFAA
UNITS: mg/L
METHOD:

LAB ID: GFW_MR_J
PREPARED:
ANALYZED: 12/19/96

INSTR RUN: 4000\961219212800/4/2
BATCH ID: GFW121896-J
DILUTION: 1.000000

ANALYTE	RESULT	REF RESULT	REPORTING LIMIT	SPIKE VALUE	RECOVERY (%)	REC LIMITS (%) LOW	REC LIMITS (%) HIGH	RPD (%)	RPD LIMIT (%)
Arsenic in water by GFAA	0.0403	0.0396	0.002					1.75	12.5

ANALYSIS: CCR 17 Metals

MATRIX: Water

METHOD BLANK SAMPLES

SAMPLE TYPE: Blank-Method/Media blank
INSTRUMENT: TJA Enviro 36
UNITS: mg/L
METHOD:

LAB ID: IFW_BLNK_I
PREPARED:
ANALYZED: 12/19/96

INSTR RUN: ICP\961219152100/1/
BATCH ID: IFW121896-I
DILUTION: 1.000000

ANALYTE	RESULT	REF RESULT	REPORTING LIMIT	SPIKE VALUE	RECOVERY (%)	REC LIMITS (%) LOW	REC LIMITS (%) HIGH	RPD (%)	RPD LIMIT (%)
Silver	ND		0.005						
Barium	ND		0.01						
Beryllium	ND		0.002						
Cadmium	ND		0.005						
Cobalt	ND		0.005						
Chromium	ND		0.01						
Copper	ND		0.01						
Molybdenum	ND		0.01						
Nickel	ND		0.01						
Lead	ND		0.04						
Antimony	ND		0.02						
Thallium	ND		0.05						
Vanadium	ND		0.005						
Zinc	ND		0.01						

METHOD SPIKE SAMPLES

SAMPLE TYPE: Spike-Method/Media blank
INSTRUMENT: TJA Enviro 36
UNITS: mg/L
METHOD:

LAB ID: IFW_MD_I
PREPARED:
ANALYZED: 12/19/96

INSTR RUN: ICP\961219152100/3/1
BATCH ID: IFW121896-I
DILUTION: 1.000000

ANALYTE	RESULT	REF RESULT	REPORTING LIMIT	SPIKE VALUE	RECOVERY (%)	REC LIMITS (%) LOW	REC LIMITS (%) HIGH	RPD (%)	RPD LIMIT (%)
Silver	0.0271	ND	0.005	0.0250	108	72	127		
Barium	1.02	ND	0.01	1.00	102	91	120		
Beryllium	0.0233	ND	0.002	0.0250	93.2	82	119		
Cadmium	0.0514	ND	0.005	0.0500	103	84	120		
Cobalt	0.254	ND	0.005	0.250	102	96	120		
Chromium	0.0924	ND	0.01	0.100	92.4	85	128		
Copper	0.126	ND	0.01	0.125	101	86	123		
Molybdenum	0.194	ND	0.01	0.200	97.0	89	117		
Nickel	0.243	ND	0.01	0.250	97.2	92	121		
Lead	0.488	ND	0.04	0.500	97.6	90	122		
Antimony	0.512	ND	0.02	0.500	102	82	113		
Thallium	0.448	ND	0.05	0.500	89.6	85	115		
Vanadium	0.247	ND	0.005	0.250	98.8	91	118		
Zinc	0.245	ND	0.01	0.250	98.0	90	121		

SAMPLE TYPE: Spike-Method/Media blank
INSTRUMENT: TJA Enviro 36
UNITS: mg/L
METHOD:

LAB ID: IFW_MS_I
PREPARED:
ANALYZED: 12/19/96

INSTR RUN: ICP\961219152100/2/1
BATCH ID: IFW121896-I
DILUTION: 1.000000

ANALYTE	RESULT	REF RESULT	REPORTING LIMIT	SPIKE VALUE	RECOVERY (%)	REC LIMITS (%) LOW	REC LIMITS (%) HIGH	RPD (%)	RPD LIMIT (%)
Silver	0.0265	ND	0.005	0.0250	106	72	127		
Barium	1.05	ND	0.01	1.00	105	91	120		
Beryllium	0.0240	ND	0.002	0.0250	96.0	82	119		
Cadmium	0.0492	ND	0.005	0.0500	98.4	84	120		
Cobalt	0.256	ND	0.005	0.250	102	96	120		
Chromium	0.0900	ND	0.01	0.100	90.0	85	128		
Copper	0.123	ND	0.01	0.125	98.4	86	123		
Molybdenum	0.196	ND	0.01	0.200	98.0	89	117		
Nickel	0.247	ND	0.01	0.250	98.8	92	121		
Lead	0.483	ND	0.04	0.500	96.6	90	122		
Antimony	0.516	ND	0.02	0.500	103	82	113		
Thallium	0.456	ND	0.05	0.500	91.2	85	115		
Vanadium	0.251	ND	0.005	0.250	100	91	118		
Zinc	0.249	ND	0.01	0.250	99.6	90	121		

ANALYSIS: CCR 17 Metals

MATRIX: Water

METHOD SPIKE DUPLICATES

SAMPLE TYPE: Method Spike Sample Duplicate
INSTRUMENT: TJA Enviro 36
UNITS: mg/L
METHOD:

LAB ID: IFW_MR_I
PREPARED:
ANALYZED: 12/19/96

INSTR RUN: ICP\961219152100/4/2
BATCH ID: IFW121896-I
DILUTION: 1.000000

ANALYTE	RESULT	REF RESULT	REPORTING LIMIT	SPIKE VALUE	RECOVERY (%)	REC LIMITS (%) LOW	REC LIMITS (%) HIGH	RPD (%)	RPD LIMIT (%)
Silver	0.0271	0.0265	0.005					2.24	10
Barium	1.02	1.05	0.01					2.90	10
Beryllium	0.0233	0.0240	0.002					2.96	10
Cadmium	0.0514	0.0492	0.005					4.37	10
Cobalt	0.254	0.256	0.005					0.784	10
Chromium	0.0924	0.0900	0.01					2.63	10
Copper	0.126	0.123	0.01					2.41	10
Molybdenum	0.194	0.196	0.01					1.03	10
Nickel	0.243	0.247	0.01					1.63	10
Lead	0.488	0.483	0.04					1.03	10
Antimony	0.512	0.516	0.02					0.778	10
Thallium	0.448	0.456	0.05					1.77	10
Vanadium	0.247	0.251	0.005					1.61	10
Zinc	0.245	0.249	0.01					1.62	10

ANALYSIS: Mercury

MATRIX: Water

METHOD BLANK SAMPLES

SAMPLE TYPE: Blank-Method/Media blank
INSTRUMENT: Coleman Hg Analyzer 50D
UNITS: ug/L
METHOD:

LAB ID: HGW_BLNK
PREPARED:
ANALYZED: 12/21/96

INSTR RUN: HG\961221180000/1/
BATCH ID: HGW122196-2
DILUTION: 1.000000

ANALYTE	RESULT	REF RESULT	REPORTING LIMIT	SPIKE VALUE	RECOVERY (%)	REC LIMITS (%) LOW	REC LIMITS (%) HIGH	RPD (%)	RPD LIMIT (%)
Mercury	ND		0.2						

METHOD SPIKE SAMPLES

SAMPLE TYPE: Spike-Method/Media blank
INSTRUMENT: Coleman Hg Analyzer 50D
UNITS: ug/L
METHOD:

LAB ID: HGW_MS
PREPARED:
ANALYZED: 12/21/96

INSTR RUN: HG\961221180000/2/1
BATCH ID: HGW122196-2
DILUTION: 1.000000

ANALYTE	RESULT	REF RESULT	REPORTING LIMIT	SPIKE VALUE	RECOVERY (%)	REC LIMITS (%) LOW	REC LIMITS (%) HIGH	RPD (%)	RPD LIMIT (%)
Mercury	2.13	ND	0.2	2.00	107	89	121		

METHOD SPIKE DUPLICATES

SAMPLE TYPE: Method Spike Sample Duplicate
INSTRUMENT: Coleman Hg Analyzer 50D
UNITS: ug/L
METHOD:

LAB ID: HGW_MR
PREPARED:
ANALYZED: 12/21/96

INSTR RUN: HG\961221180000/4/2
BATCH ID: HGW122196-2
DILUTION: 1.000000

ANALYTE	RESULT	REF RESULT	REPORTING LIMIT	SPIKE VALUE	RECOVERY (%)	REC LIMITS (%) LOW	REC LIMITS (%) HIGH	RPD (%)	RPD LIMIT (%)
Mercury	2.07	2.13	0.2					2.86	10

MATRIX SPIKE SAMPLES

SAMPLE TYPE: Spike-Sample/Matrix
INSTRUMENT: Coleman Hg Analyzer 50D
UNITS: ug/L
METHOD:

LAB ID: MD12225-02A
PREPARED:
ANALYZED: 12/21/96

INSTR RUN: HG\961221180000/18/16
BATCH ID: HGW122196-2
DILUTION: 1.000000

ANALYTE	RESULT	REF RESULT	REPORTING LIMIT	SPIKE VALUE	RECOVERY (%)	REC LIMITS (%) LOW	REC LIMITS (%) HIGH	RPD (%)	RPD LIMIT (%)
Mercury	1.85	ND	0.2	2.00	92.5	69	128		

SAMPLE TYPE: Spike-Sample/Matrix
INSTRUMENT: Coleman Hg Analyzer 50D
UNITS: ug/L
METHOD:

LAB ID: MS12225-02A
PREPARED:
ANALYZED: 12/21/96

INSTR RUN: HG\961221180000/17/16
BATCH ID: HGW122196-2
DILUTION: 1.000000

ANALYTE	RESULT	REF RESULT	REPORTING LIMIT	SPIKE VALUE	RECOVERY (%)	REC LIMITS (%) LOW	REC LIMITS (%) HIGH	RPD (%)	RPD LIMIT (%)
Mercury	1.88	ND	0.2	2.00	94.0	69	128		

MATRIX SPIKE DUPLICATES

SAMPLE TYPE: Spiked Sample Duplicate
INSTRUMENT: Coleman Hg Analyzer 50D
UNITS: ug/L
METHOD:

LAB ID: MR12225-02A
PREPARED:
ANALYZED: 12/21/96

INSTR RUN: HG\961221180000/19/17
BATCH ID: HGW122196-2
DILUTION: 1.000000

ANALYTE	RESULT	REF RESULT	REPORTING LIMIT	SPIKE VALUE	RECOVERY (%)	REC LIMITS (%) LOW	REC LIMITS (%) HIGH	RPD (%)	RPD LIMIT (%)
Mercury	1.85	1.88	0.2					1.61	10

ANALYSIS: Selenium

MATRIX: Water

METHOD BLANK SAMPLES

SAMPLE TYPE: Blank-Method/Media blank
INSTRUMENT: TJA 4000, GFAA
UNITS: mg/L
METHOD:

LAB ID: GFW_BLNK_J
PREPARED:
ANALYZED: 12/19/96

INSTR RUN: 4000\961219212900/1/
BATCH ID: GFW121896-J
DILUTION: 1.000000

ANALYTE	RESULT	REF RESULT	REPORTING LIMIT	SPIKE VALUE	RECOVERY (%)	REC LIMITS (%) LOW	REC LIMITS (%) HIGH	RPD (%)	RPD LIMIT (%)
Selenium in water by GFAA	ND		0.004						

METHOD SPIKE SAMPLES

SAMPLE TYPE: Spike-Method/Media blank
INSTRUMENT: TJA 4000, GFAA
UNITS: mg/L
METHOD:

LAB ID: GFW_MD_J
PREPARED:
ANALYZED: 12/19/96

INSTR RUN: 4000\961219212900/3/1
BATCH ID: GFW121896-J
DILUTION: 1.000000

ANALYTE	RESULT	REF RESULT	REPORTING LIMIT	SPIKE VALUE	RECOVERY (%)	REC LIMITS (%) LOW	REC LIMITS (%) HIGH	RPD (%)	RPD LIMIT (%)
Selenium in water by GFAA	0.0800	ND	0.004	0.0800	100	79	115		

SAMPLE TYPE: Spike-Method/Media blank
INSTRUMENT: TJA 4000, GFAA
UNITS: mg/L
METHOD:

LAB ID: GFW_MS_J
PREPARED:
ANALYZED: 12/19/96

INSTR RUN: 4000\961219212900/2/1
BATCH ID: GFW121896-J
DILUTION: 1.000000

ANALYTE	RESULT	REF RESULT	REPORTING LIMIT	SPIKE VALUE	RECOVERY (%)	REC LIMITS (%) LOW	REC LIMITS (%) HIGH	RPD (%)	RPD LIMIT (%)
Selenium in water by GFAA	0.0770	ND	0.004	0.0800	96.3	79	115		

METHOD SPIKE DUPLICATES

SAMPLE TYPE: Method Spike Sample Duplicate
INSTRUMENT: TJA 4000, GFAA
UNITS: mg/L
METHOD:

LAB ID: GFW_MR_J
PREPARED:
ANALYZED: 12/19/96

INSTR RUN: 4000\961219212900/4/2
BATCH ID: GFW121896-J
DILUTION: 1.000000

ANALYTE	RESULT	REF RESULT	REPORTING LIMIT	SPIKE VALUE	RECOVERY (%)	REC LIMITS (%) LOW	REC LIMITS (%) HIGH	RPD (%)	RPD LIMIT (%)
Selenium in water by GFAA	0.0800	0.0770	0.004					3.82	13

---------- End of Quality Control Report ----------

10A R-7,5-G

9612225

Chain-of-Custody Record

№ 7796

Date: 12 | 13 | 96

Page 1 of 1

Project No.: 2906

Samplers (Signatures): Nathaniel A. Taylor

	Date	Time	Sample Number
01A	12/13	1500	MW1-1
02A		1425	MW1-2
03A		1445	MW1-3
04A		1345	MW-4
05A		1325	MW-5
06A		1305	MW-6
07A		1220	MW-7
08A		1240	MW-8
09A		1530	MW1-10
10A	↓	1615	EB-1A

ANALYSES

Sample	EPA Method 8010	EPA Method 8020	EPA Method 8240	EPA Method 8270	TPH as gasoline	TPH as diesel	TPH as BTEX	TDS	pH	Metals	HOLD
01A								X	X	X	
02A								X	X	X	
03A								X	X	X	
04A								X	X	X	
05A								X	X	X	
06A								X	X	X	
07A								X	X	X	
08A								X	X	X	
09A								X	X	X	
10A								X	X	X	X

REMARKS

Sample	Cooled	Soil (S) or water (W)	Acidified	Number of containers
01A	Y	W	N	1
02A	↓	↓	↓	1
03A				1
04A				1
05A				1
06A				1
07A				1
08A				1
09A				1
10A	↓	↓	↓	1

Additional comments

(1) Analyze for TDS and pH.

(2) Analyze for Title 22 metals and filter before analysis.

(3) Fax results to: Mike Keim @ 415-434-1365

Turnaround time: Standard

Results to: Mike Keim

Total No. of containers: 10

	Date	Time
Relinquished by: Nathaniel A. Taylor	12/13	1520
Signature: NATHANIEL A. TAYLOR		
Printed name: GEOMATRIX		
Company:		
Received by: Ed Stroeber		
Signature:		
Printed name: Ed Stroeber		
Company: AEN		

	Date	Time
Relinquished by: Ed Stroeber	12/13	1520
Signature:		
Printed name: Ed Stroeber		
Company: AEN		
Received by: Ronald C. Jensen		
Signature: RON JENSEN		
Printed name: AEN		
Company:		

	Date	Time
Relinquished by:		
Signature:		
Printed name:		
Company:		
Received by:		
Signature:		
Printed name:		
Company:		

Method of shipment: Pick-Up

Laboratory comments and Log No.:

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San Francisco, CA. 94111
(415) 434-9400