RO 96

CLEARWATER
GROUP
Environmental Services

2118

Mr. Barney Chan
Alameda County Environmental Health Services
Environmental Protection Division
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577

November 15, 2001

NOV 19 2001

1/23/03

Re: Groundwater Monitoring Report, Third Quarter 2001
Eagle Gas Station
4301 San Leandro Street
Oakland, California 94601
StID # 2118

Dear Mr. Chan,

Clearwater Group (Clearwater), on behalf of Ms. Farah Naz, is pleased to present this letter report of findings for groundwater monitoring activities at the above site for your review, comments and direction. The activities reported here correspond with those proposed in the monitoring portion of the September 10, 1999, Artesian Environmental *Soil Remediation Pilot Study and Well Installation Workplan*, and those requested by Alameda county in correspondence dated May 10, 2001.

Site Description

The subject site is located in the southern portion of Oakland, California at the south corner of San Leandro Street and High Street, approximately 1,000 feet east of Interstate Highway 880. The site is bounded by commercial property to the southeast, southwest, and northwest, and by the BART tracks to the northeast (Figure 1). Based on observations made in previous investigations, it is known that the site is predominantly underlain by clays with some clayey gravel and clayey sand in shallower depths to approximately 10 feet below ground surface (bgs), and silty sand below 20 feet in some areas.

229 Tewksbury Avenue ◆ Point Richmond, California 94801 ◆ Telephone: 510-307-9943 ◆ Fax: 510-232-2823

Background

On April 21 and April 22, 1999, Artesian Environmental (now Clearwater) oversaw the removal of five underground storage tanks (USTs) at the subject site. The USTs included two 6,000 gallon gasoline USTs, two 4,000 gallon diesel USTs, and one 300 gallon used oil UST (Figure A). Field observations included strong petroleum odors from soils near the former USTs. A total of five confirmation soil samples and three groundwater samples were collected from the UST excavations. Laboratory analytical results confirmed an unauthorized release of petroleum (Table 2).

In a letter dated May 10, 1999, the Alameda County Department of Environmental Health (ACDEH) recommended that soil be remediated by over-excavation / land disposal and that "as much groundwater as possible" be pumped from the excavation. Subsequently, approximately 800 tons of petroleum impacted soil were excavated and disposed of as Class II non-hazardous waste. Less than 1,000 gallons of petroleum impacted groundwater were pumped from the excavation. Groundwater did not recharge after pumping. Existing structures limited the amount of soil that could be safely excavated. Soil samples collected from the excavation walls and product piping trenches indicated some remaining petroleum and MTBE contamination.

On August 4 and August 5, 1999, approximately 100 linear feet of product piping was removed. Vent piping from between the former USTs and the south corner of the onsite building was also removed. All piping was cut and disposed of as scrap metal. On August 5, 1999, confirmation soil samples were collected along the piping trench. Six samples were collected from approximately three feet bgs. An additional four samples were collected, one for each of four former fuel dispensers. Laboratory analytical results indicated the presence of hydrocarbon related contamination along the piping trenches (Table 2).

On September 26, 2000, West Hazmat of Rancho Cordova, California, used a CME 75 drill rig to advance three borings to approximately 25 feet bgs (Figure 2), and collect soil samples (Table 2). Each of the three borings was converted to a groundwater monitoring well using clean, flush-threaded, two-inch diameter PVC well materials. On October 3rd and 10th, 2000, Clearwater surveyed the top of casings elevations for each well relative to an arbitrary benchmark, and developed the wells for monitoring. Initial ground samples collected from these wells contained 83,000 µg/L to 250,000 µg/L total petroleum hydrocarbons as gasoline (TPHg), and 33,000 µg/L to 400,000 µg/L methyl-tert butyl ether (MTBE).

CLEARWATER
GROUP
Environmental Services

Groundwater Monitoring Field Activities

Date of field activities:	August 3, 2001
Wells gauged/sampled:	MW-1, MW-2 and MW-3
Analytes tested:	Total Petroleum Hydrocarbons as diesel (TPHd) and gasoline (TPHg), benzene, toluene, ethyl benzene and xylenes (BTEX), five fuel oxygenates, (MTBE, ETBE, DIPE, TAME, TBA)
Analytical methods:	EPA Methods 8015 (modified), 8020, and 8260
Laboratory:	Entech Analytical Labs, Inc., of Sunnyvale, CA
Remarks:	Lead scavengers (EDB and 1-2, DCA), were not analyzed this quarter, but will be included in future sampling events.

Groundwater Monitoring Results

Depth to water:	7.09 feet (MW-1) to 13.44 feet (MW-3) below ground surface (bgs)
Flow direction/gradient:	East-northeast, at 0.078 ft/ft
SPH - wells/thicknesses:	Not detected for any well
TPHd concentration range:	290 µg/L (MW-3) to 2,600 µg/L (MW-2)
TPHg concentration range:	19,000 µg/L (MW-1) to 42,000 µg/L (MW-2)
Benzene concentration range:	<50 µg/L (MW-1 & MW-3) to 1,100 µg/L (MW-2)
MTBE concentration range:	96,000 µg/L (MW-1) to 880,000 µg/L (MW-2)
Remarks:	Laboratory indicated that the diesel and gas detected in all three wells was "within quantification range but atypical for fuel." Groundwater direction and gradient are similar to previous quarters. Groundwater gradient does not follow site topography, but appears to flow toward the former Adams Creek channel to the east of the site (see below).

Summary And Conclusions

Laboratory analytical results confirm petroleum related soil and groundwater contamination remain at this site. Soil contamination is greatest near the former UST excavation. Previous data indicate that some contaminated soil may remain underneath existing structures or near the former dispensers. The extent of the groundwater contaminant plume has not yet been delineated, and requires further investigation.

Field observations during drilling activities indicated that first observed groundwater ~~was~~ is similar for all wells (17 feet bgs to 19 feet bgs). Static groundwater levels, however, varied considerably between the three wells. If measured static water levels are accurate, groundwater appears to flow towards the northeast, at a steep gradient (i = 0.050 ft/ft). This groundwater flow directions is approximately opposite to the direction of San Francisco Bay. However, it does trend toward the channel of the former Adams Creek.

Three operating USTs buried in artificial fill material currently occupy the former UST cavity, potentially acting as a groundwater sink interfering with normal groundwater flow patterns. Soil or other subsurface conditions may be influencing well recharge or groundwater gradient, producing anomalous groundwater elevation and gradient data.

Following last quarter's groundwater monitoring, Clearwater Group presented a *Workplan for Continuing Investigation* which has not yet been approved by the ACDEH. The proposed scope of this *Workplan* involves the installation of eight groundwater monitoring wells around the project site to delineate the MTBE plume, and clarify the groundwater flow gradient and direction of the area.

In response to Clearwater's workplan, the ACDEH, in correspondence dated October 18, 2001, recommended that off-site monitoring wells not be installed for the time being. Instead, the ACDEH requested that further characterization of subsurface soils and groundwater on-site be completed prior with on-site wells to the installation of any off-site wells. Additionally, the ACDEH requested that the UST pit be assessed for its usefulness in collecting contaminated groundwater from the site for treatment.

The site is currently within the UST Clean-Up Fund Program. This monitoring event represents the last in a year of pre-approved quarterly monitoring. Clearwater shall be preparing a cost pre-approval to continue quarterly monitoring at the site, and to complete a new workplan which conforms to the requests of the ACDEH in its October 18, 2001 letter. Clearwater recommends that continued quarterly groundwater monitoring of wells on the site include analyses for Total Petroleum Hydrocarbons as gas and diesel, BTEX, five fuel oxygenates including MTBE, and the lead scavengers 1,2-DCA and EDB as in previous quarters.

Attachments

Figure 1	Vicinity Map, Eagle Gas
Figure 2	Site Map, Eagle Gas
Figure 3	Groundwater Elevation Map - 8/03/01, Eagle Gas
Figure 4	Hydrocarbon Concentration in Groundwater, Eagle Gas - August 3, 2001
Figure 5	Site Vicinity Map, Eagle Gas
Figure A	Historical Sample Locations, Eagle Gas
Table 1	Groundwater Elevations and Sample Analytical Results, Eagle Gas
Table 2	Soil Sample Analytical Results

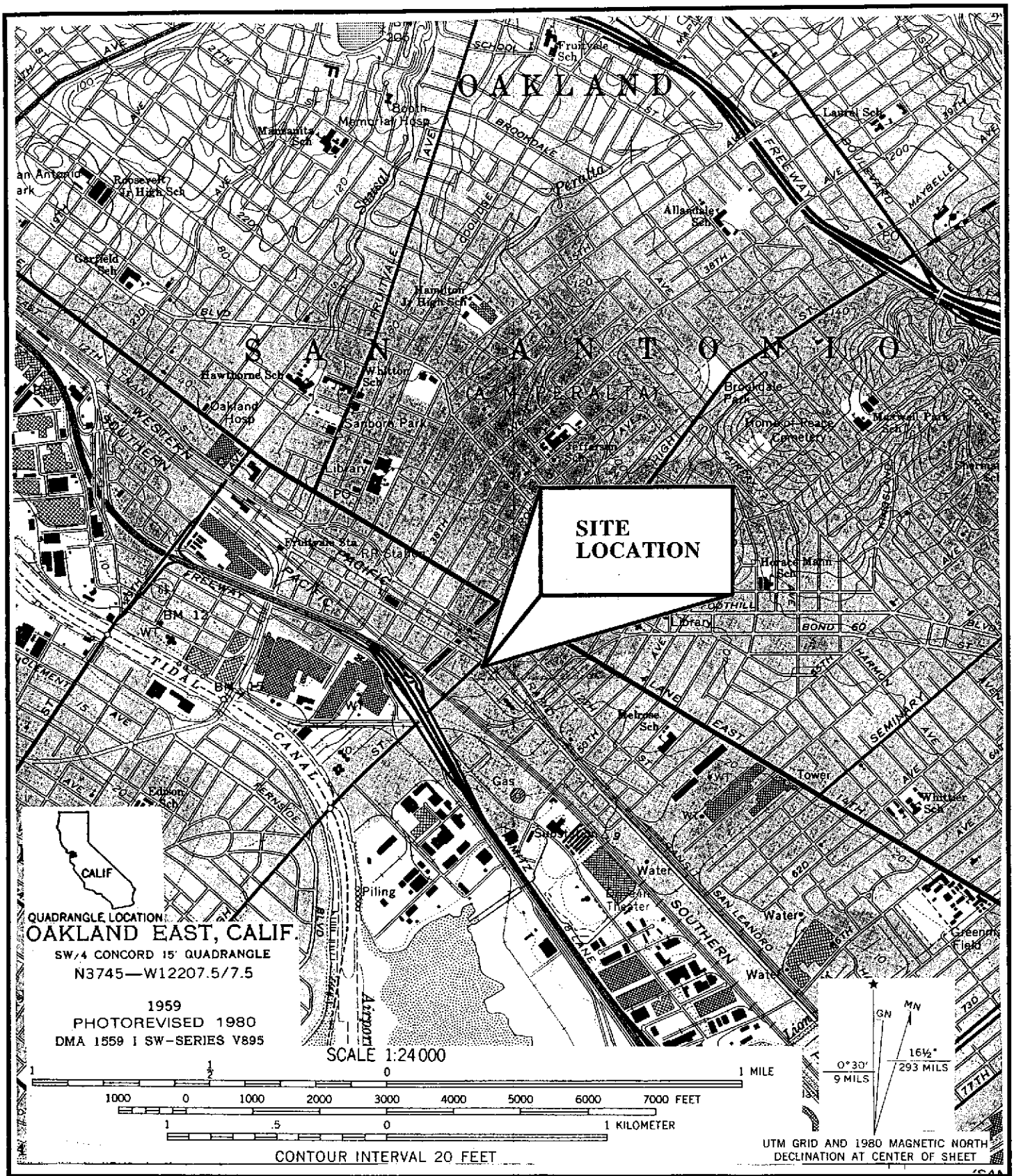
Clearwater Field Procedures

Well Gauging Data / Purge Calculations and Well Purging Data

Laboratory Reports and Chain-of-Custody Forms

CC: Inspector Hernan Gomez, Oakland Fire Department Emergency Services, 1605 Martin Luther King Jr. Way, Oakland, CA 94612

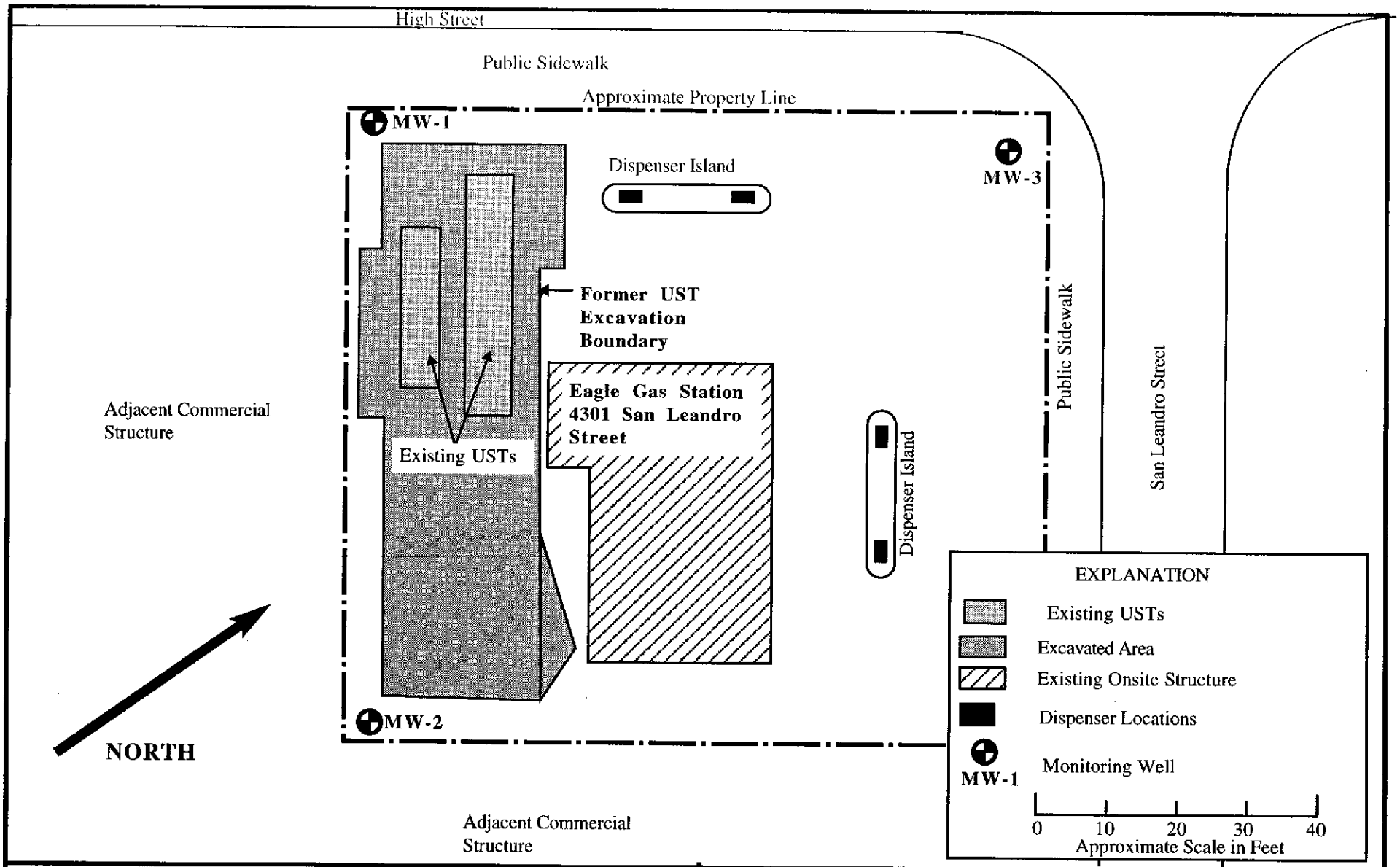
Mr. Muhammad Jamil and Ms. Farah Naz, 40092 Davis Street, Fremont, CA 94538



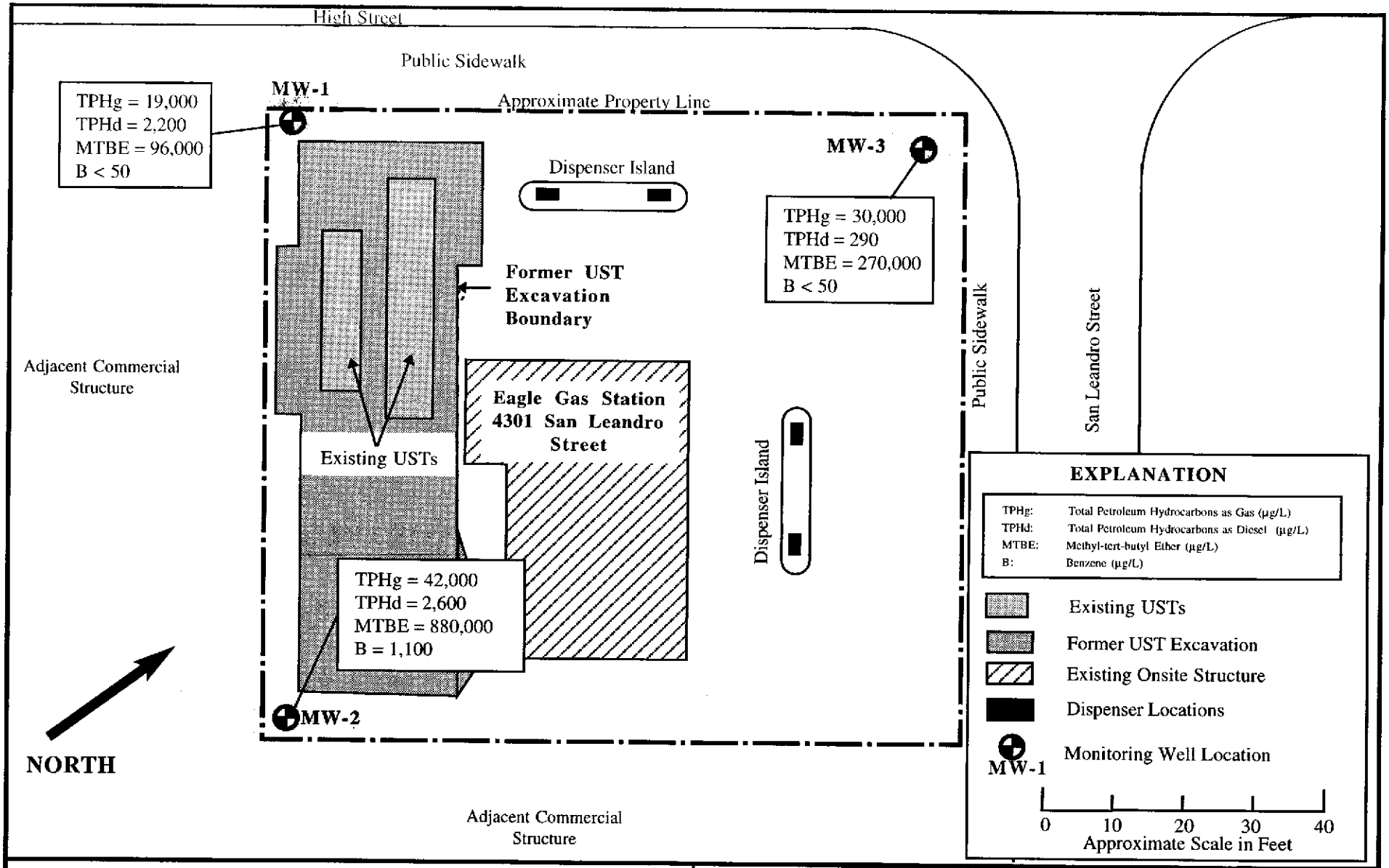
Clearwater Group, Inc.
520 3rd. St. Suite 104
Oakland, California 94607
Phone (510) 307-9943 Fax (510) 232-2823

Vicinity Map
Eagle Gas
4301 San Leandro
Oakland, California

Project No. ZP 046A	Date Prepared: 10/00	Prepared by: Judi Fox	Figure 1

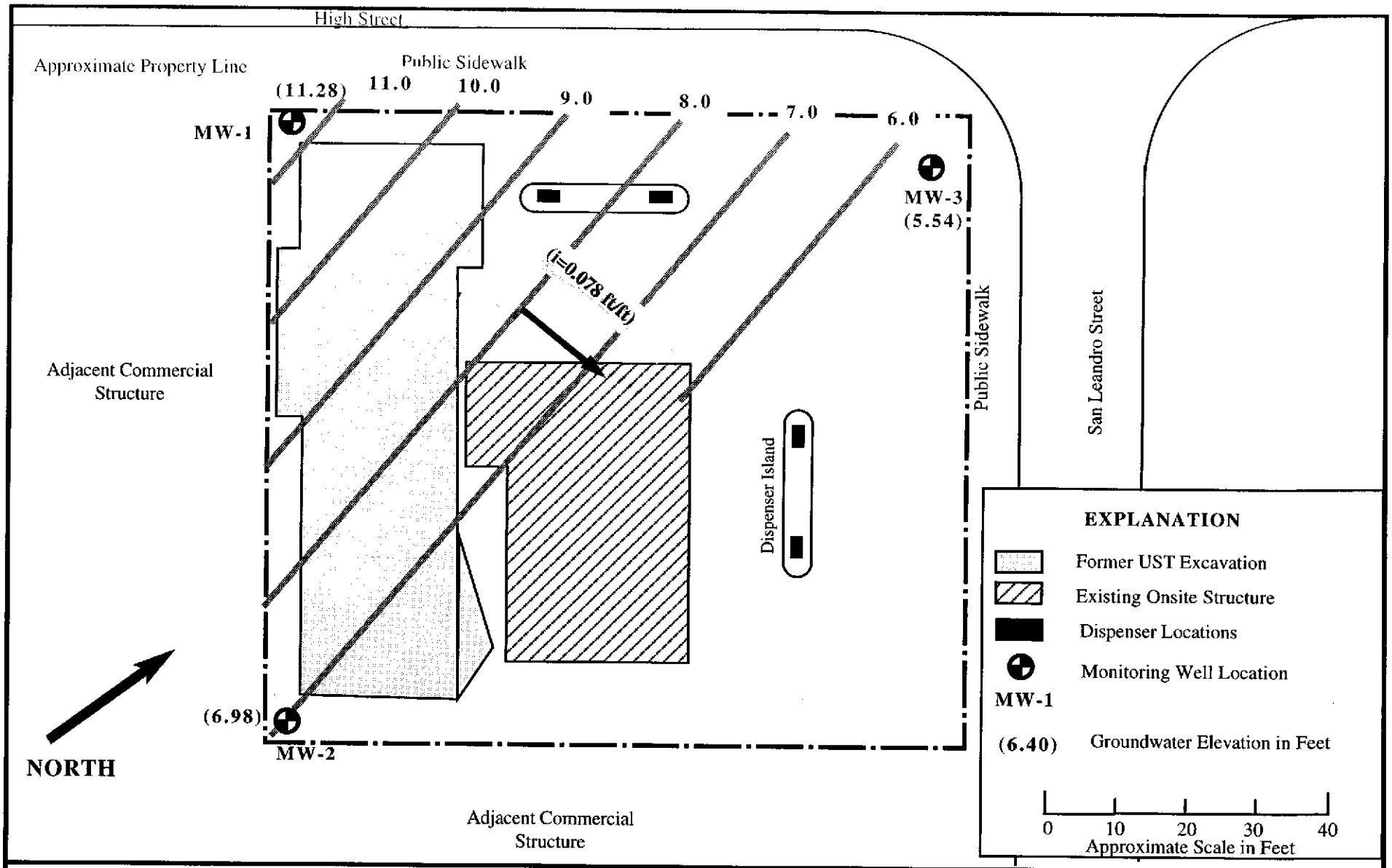


CLEARWATER GROUP **520 Third Street, Suite 104** **Oakland California**		**Site Map - Eagle Gas** **4301 San Leandro Street** **Oakland California**	
Project No. ZP046A	**Date: 10/01**	**Prepared by:** **A.M. Galleni**	**Figure 2**

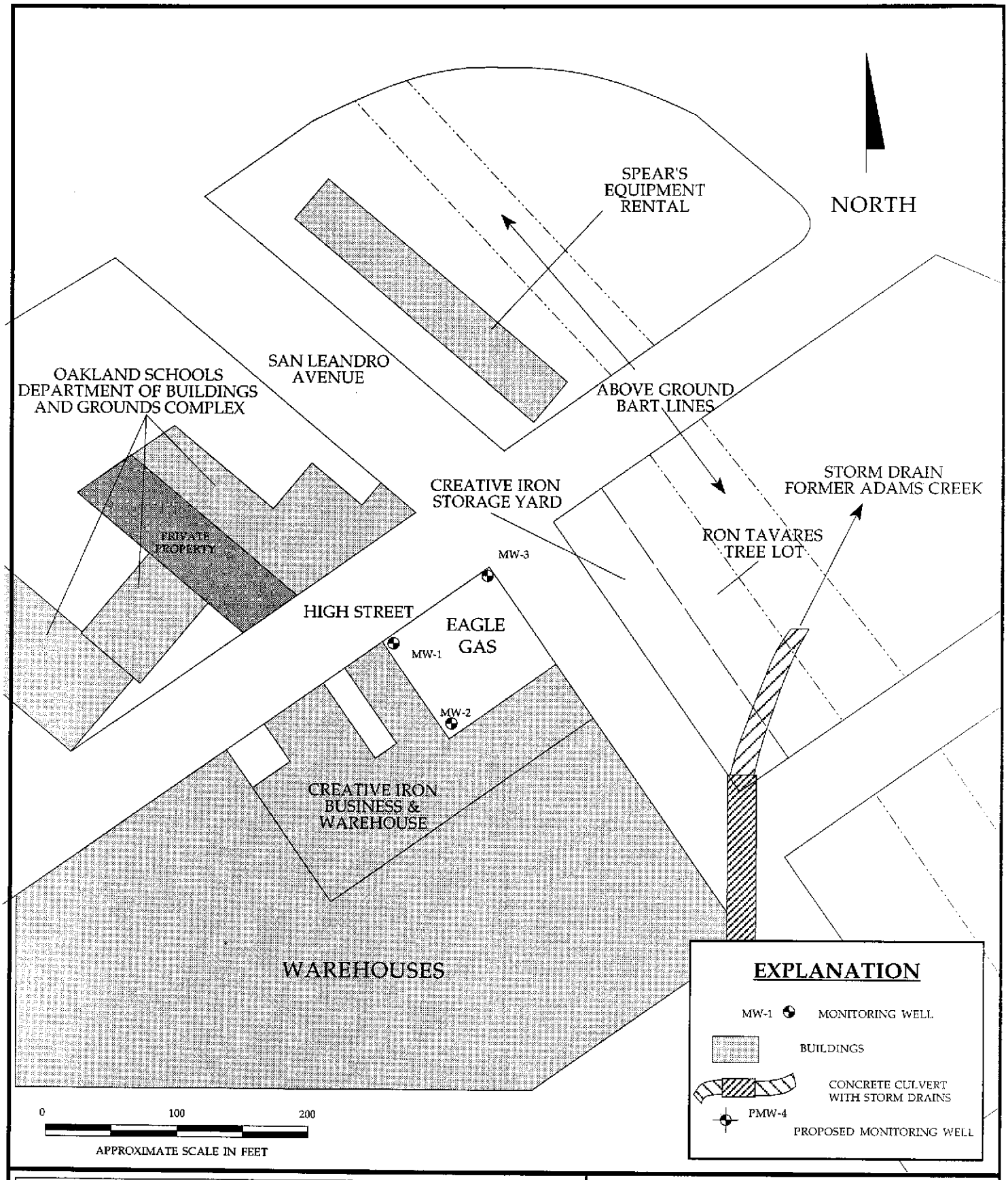


CLEARWATER GROUP **520 Third Street, Suite 104** **Oakland, California**	**Hydrocarbon Concentration in Goundwater** **Eagle Gas - August 3, 2001** **4301 San Leandro Street** **Oakland, California**

Project No. ZP046A	**Date: 10/01**	**Prepared by:** **A.M. Galleni**	**Figure 4**



CLEARWATER GROUP **520 Third Street, Suite 104** **Oakland, California**		**Groundwater Elevation Map - 8/03/01** **Eagle Gas, 4301 San Leandro Street** **Oakland, California**	
Project No. ZP046A	**Date:10/01**	**Prepared by:** **Andrew M. Galleni**	**Figure 3**

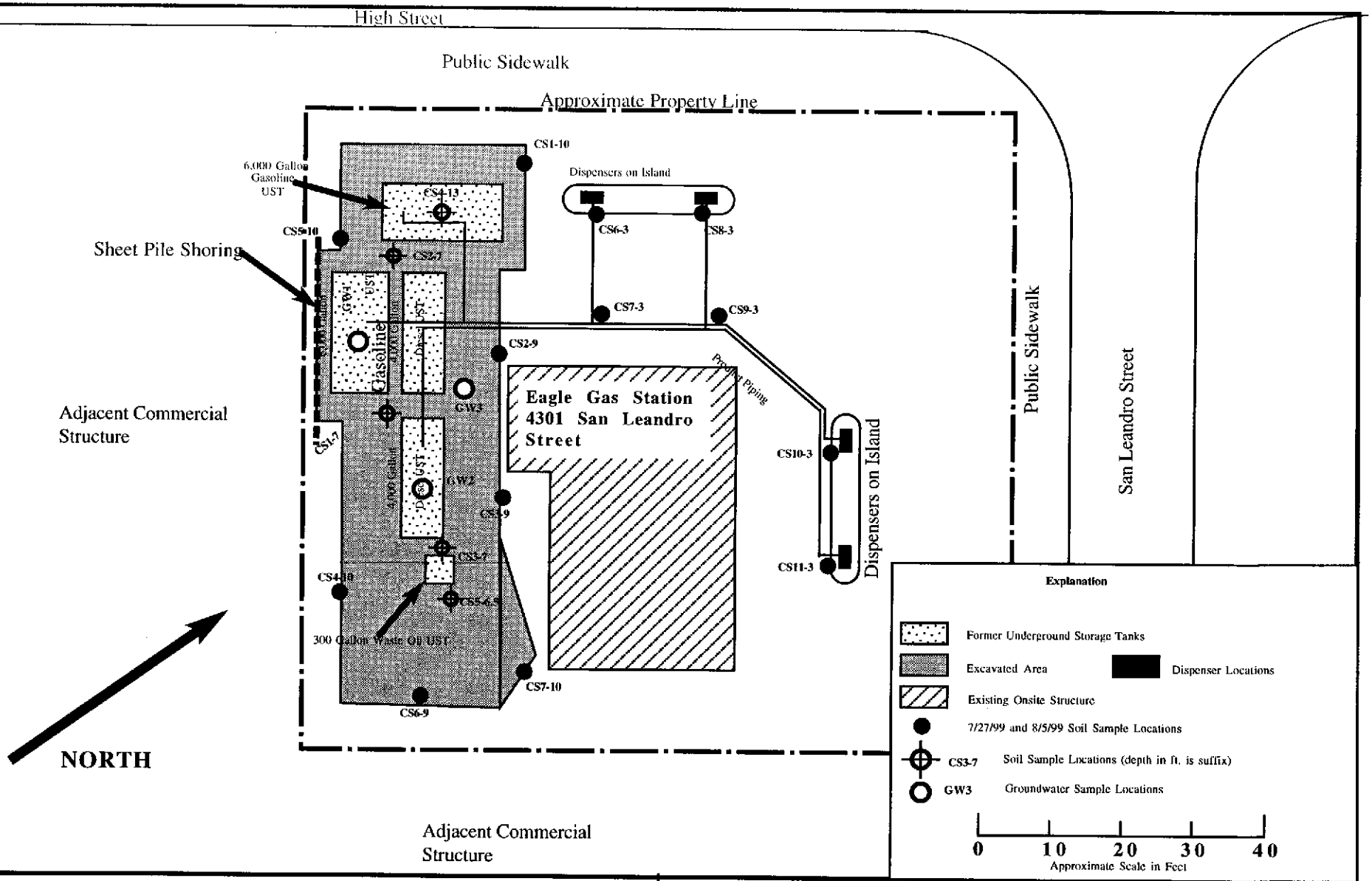


SITE VICINITY MAP

Eagle Gas
4301 San Leandro
Oakland, California

CLEARWATER GROUP

Project No.	Date	Figure
ZP046A	**8/01**	**5**



CLEARWATER GROUP **520 Third Street, Suite 104** **Oakland, California**	**Historical Sample Locations** **Eagle Gas** **4301 San Leandro** **Oakland, California**
Project No. ZP046A	**Date Revised: 10/30/00**
Drawn by: P.Jones **Revised By: J.Fox**	**Figure A**

TABLE 1
GROUNDWATER ELEVATIONS AND SAMPLE ANALYTICAL RESULTS
Eagle Gas
4301 San Leandro Street
Oakland, California

Sample ID	Sampling Date	TOC (feet)	DTW (feet)	GWE (feet)	SPH (feet)	TPHd (µg/L)	TPHg (µg/L)	B (µg/L)	T (µg/L)	E (µg/L)	X (µg/L)	MTBE (µg/L)	EDB (µg/L)	1,2-DCA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	TBA (µg/L)
MW-1	3-Oct-00	18.37	8.96	9.41	0	**460**	**93,000**	<500	<500	<500	<500	**130,000**	<10,000	<10,000	<10,000	<10,000	<10,000	<2,000
	27-Oct-00	18.37	7.27	11.10	0	---	---	---	---	---	---	---	---	---	---	---	---	---
	26-Jan-01	18.37	7.60	10.77	0	**1,600***	**51,000**	**270**	<100	<100	<100	**77,000**	<5,000	<5,000	<5,000	<5,000	<5,000	<20,000
	8-May-01	18.37	7.50	10.87	0	**470***	**36,000***	<100	<100	<100	<100	**15,000**	<5,000	<5,000	<5,000	<5,000	<5,000	<20,000
	3-Aug-01	18.37	7.09	11.28	0	**2,200***	**19,000***	<50	**59**	<50	<50	**96,000**	---	---	<5,000	<5,000	<5,000	<20,000
MW-2	3-Oct-00	20.28	20.26	0.02	0	**210**	**250,000**	<1,250	<1,250	<1,250	<1,250	**400,000**	<25,000	<25,000	<25,000	<25,000	<25,000	<100,000
	27-Oct-00	20.28	13.88	6.40	0	---	---	---	---	---	---	---	---	---	---	---	---	---
	26-Jan-01	20.28	12.10	8.18	0	**6,000***	**740,000**	**3,800**	<500	**940**	**1,600**	**1,000,000**	<50,000	<50,000	<50,000	<50,000	<50,000	<200,000
	8-May-01	20.28	12.05	8.23	0	**2,100***	**140,000**	**2,800**	<250	**780**	**640**	**840,000**	<50,000	<50,000	<50,000	<50,000	<50,000	<200,000
	3-Aug-01	20.28	13.30	6.98	0	**2,600***	**42,000***	**1,100**	**63**	**230**	**130**	**880,000**	---	---	<25,000	<25,000	<25,000	<100,000
MW-3	10-Oct-00	18.98	---	—	0	**120**	**83,000**	<500	<500	<500	<500	**33,000**	<2,500	<2,500	<2,500	<2,500	<2,500	<10,000
	27-Oct-00	18.98	18.75	0.23	0	---	---	---	---	---	---	---	---	---	---	---	---	---
	26-Jan-01	18.98	13.38	5.60	0	**900***	**230,000**	**930**	<500	<500	<500	**330,000**	<25,000	<25,000	<25,000	<25,000	<25,000	<100,000
	8-May-01	18.98	11.82	7.16	0	**1,100***	**95,000**	**840**	<250	<250	<250	**390,000**	<12,500	<12,500	<12,500	<12,500	<12,500	<50,000
	3-Aug-01	18.98	13.44	5.54	0	**290***	**30,000***	<50	**51**	<50	<50	**270,000**	---	---	<12,500	<12,500	<12,500	<50,000

NOTES:

TOC	Top of well casing referenced to mean sea level
DTW	Depth to water
GWE	Groundwater elevation
SPH	Separate phase hydrocarbons (floating product); no samples taken
TPHd	Total petroleum hydrocarbons as gasoline by EPA Method 8015 (modified)
TPHg	Total petroleum hydrocarbons as gasoline by EPA Method 8015 (modified)
BTEX	Benzene, toluene, ethylbenzene and total xylenes by EPA Method 8020 (modified)
MTBE	Methyl tert-Butyl Ether by EPA Method 8260B
EDB	1,2-Dibromoethane by EPA Method 8260B
1,2-DCA	1,2-Dichloroethane by EPA Method 8260B
DIPE	Diisopropyl Ether by EPA Method 8260B
ETBE	Ethyl-t-butyl Ether by EPA Method 8260B
TAME	tert-Amyl Methyl Ether by EPA Method 8260B
TBA	tert-Butanol by EPA Method 8260B
(µg/L)	Micrograms per liter: approximately wqual to parts per billion
<#	Not detected in quantities greater than indicated method detection limit
---	not tested / no data available
*	Laboratory note: "Results within quantitation range; chromatogrpahic pattern not typical of fuel."

TABLE 2
SOIL SAMPLE ANALYTICAL RESULTS
Eagle Gas
4301 San Leandro Street
Oakland, California

Sample ID	Sampling Date	TPHg (mg/Kg)	TPHd (mg/Kg)	B (mg/Kg)	T (mg/Kg)	E (mg/Kg)	X (mg/Kg)	MTBE (mg/Kg)	DIPE (mg/Kg)	ETBE (mg/Kg)	TAME (mg/Kg)	TBA (mg/Kg)	Methanol (mg/Kg)	Ethanol (mg/Kg)	1,2-DCA (mg/Kg)	EDB (mg/Kg)
CS1-7	21-Apr-99	770	840	8.9	4.8	5.8	16	86	---	---	---	---	---	---	---	---
CS2-7	21-Apr-99	880	1,900	3.3	5.7	15	45	16	---	---	---	---	---	---	---	---
CS3-7	22-Apr-99	1,600	780	4.3	110	42	220	92	---	---	---	---	---	---	---	---
CS5-6.5	22-Apr-99	20	33	0.22	1.8	0.54	3	52	---	---	---	---	---	---	---	---
Stockpile 1	22-Apr-99	610	770	0.28	4.7	6.9	36	ND	---	---	---	---	---	---	---	---
Stockpile 2	22-Apr-99	480	670	0.23	2.3	3.9	18	ND	---	---	---	---	---	---	---	---
CS4-13	22-Apr-00	ND	ND	ND	ND	ND	ND	0.08	---	---	---	---	---	---	---	---
CS6-3	5-Aug-99	4,300	1,300	11	130	82	420	70	---	---	---	---	---	---	---	---
CS7-3	5-Aug-99	50	200	nd	2.4	0.85	4	14	---	---	---	---	---	---	---	---
CS8-3	5-Aug-99	250	3,400	0.32	0.72	0.81	1	3.8	---	---	---	---	---	---	---	---
CS9-3	5-Aug-99	380	1,900	ND	ND	ND	ND	9.5	---	---	---	---	---	---	---	---
CS10-3	5-Aug-99	930	350	ND	78	17	99	310	---	---	---	---	---	---	---	---
CS11-3	5-Aug-99	1,400	5,200	3.2	13	25	90	62	---	---	---	---	---	---	---	---
MW1-10' bgs	26-Sep-00	310	87	0.062	0.022	1.3	3.4	6.9	<0.0050	<0.0050	0.019	2.9	<5.0	<0.050	<0.0050	<0.0050
MW2-10' bgs	26-Sep-00	630	210	0.053	0.052	2.0	14	1.0	<0.050	<0.050	<0.050	3.5	<10	<1.0	<0.050	<0.050
MW3-10' bgs	26-Sep-00	32	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	4.5	<0.0050	<0.0050	0.043	0.58	<1.0	<0.050	<0.0050	<0.0050

NOTES:

TPHd	Total petroleum hydrocarbons as diesel by EPA Method 8015 (modified)
TPHg	Total petroleum hydrocarbons as gasoline by EPA Method 8015 (modified)
BTEX	Benzene, toluene, ethylbenzene and total xylenes by EPA Method 8260 (modified)
MTBE	Methyl tert-Butyl Ether by EPA Method 8260B
ETBE	Ethyl-tert-Butyl Ether by EPA 8260B
TAME	tert-Amyl Methyl Ether by EPA 8260B
TBA	tert-Butanol by EPA 8260B
DIPE	Diisopropyl Ether by EPA 8260B
---	Not Tested / No Data Available
ND	not detected above laboratory detection limits

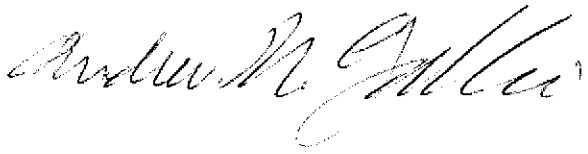
CLEARWATER
GROUP
Environmental Services

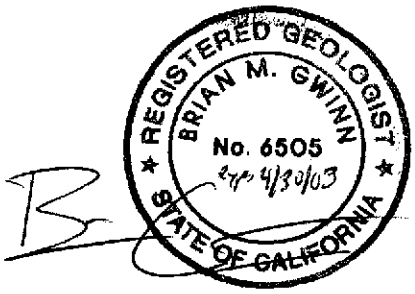
Certification

This report was prepared under the supervision of a professional Registered Geologist in the state of California. All statements, conclusions and recommendations are based solely upon published results from previous consultants, field observations by Clearwater Group and laboratory analysis performed by a California DOHS-certified laboratory related to the work performed by Clearwater Group. Information and interpretation presented herein are for the sole use of the client and regulating agency. The information and interpretation contained in this document should not be relied upon by a third party. The service provided by Clearwater Group has been conducted in a manner consistent with the level of care and skill ordinarily exercised by members of our profession currently practicing under similar conditions in the area of the site. No other warranty, expressed or implied, is made.

Clearwater Group,

Prepared by:





Andrew M. Galleni
Project Geologist

Brian Gwinn, R.G.
Senior Geologist

CLEARWATER GROUP, INC.

Constant Discharge Aquifer Test Field Procedures

Purpose and Scope

Aquifer testing is generally required in order to accurately calculate aquifer hydraulic parameters such as hydraulic conductivity (K), transmissivity (T), and coefficient of storage (S). The remedial system can then be designed cost-effectively based on these calculated parameters. In addition, the aquifer parameters are essential in evaluating contaminant transport. The scope of the aquifer test will depend on the purpose of the proposed remedial system and the configuration of the site and contaminant plume. In general, the constant-discharge aquifer test is the most accurate means for determining aquifer hydraulic parameters within the influence of a pumping well.

Equipment Set-up and Site Control

Prior to arriving on site, Clearwater Group, Inc. (CGI) will obtain the necessary permits to discharge all water extracted from the pumping well into the sewer, or a water holding tank to be delivered to the site for temporary storage.

CGI uses a submersible pump, either a 1/3 hp Grundfos or a mini Grundfos environmental pump. A discharge hose is attached to the pump, and extends into either the sewer (if permitted) or a holding tank. A flow meter is installed along the discharge hose to measure both flow rate and total gallons extracted. If a recharge test is also going to be performed, a one-way check valve will be placed at the bottom of the discharge hose (less than one foot from connection to pump), to prevent water from pouring back down the well once the pump is turned off. The pump is set approximately one to two feet from the bottom of the well to help keep the pump impellers from clogging with silt. The pump is attached to a control box to regulate the flow rate. A generator will be used to power the pump, as well as other equipment such as a light for night safety. The generator will be placed in an area which will minimize noise disturbance to the surrounding neighborhood. Pressure transducers will be used in both the pumping well and in the well closest to it. These will be connected to a data logger which displays the data as it is recorded. The pressure transducer within the pumping well will be attached to the discharge hose, approximately one foot above the pump intake.

Tall traffic cones and caution tape will be used to surround the pumping well and associated equipment. Traffic cones will also be set over each well that will be monitored during the test. The discharge hose and all power cords will be secured to the ground using duct tape. If work is to be performed in the street, an appropriate traffic control plan will be established prior to beginning work.

Field Procedures

At least 24 hours prior to the test, a pre-test (step test) will be performed to determine the appropriate flow rate to be used. The step test will be conducted in the same well to be used for the discharge test. Each step will consist of pumping groundwater from the well at a constant rate until the water level stabilizes or the well goes dry. The initial step will be conducted at the lowest flow rate. The flow rate will be increased in each subsequent step until the maximum flow rate that can be maintained by the well can be estimated.

Prior to the start of work, a decontamination area will be established. This will be in a secured area and consist of an Alconox solution wash, a first rinse and a second rinse. Any down hole equipment will be decontaminated prior to use. Prior to equipment set-up, all wells to be monitored during the test will be opened. Once the water level within each well has stabilized, the wells will be measured with an electronic water sounder to the nearest ±0.01 foot. After all equipment is set-up, as outlined in the previous section, the water level within each well will be measured again and the time will be noted. This will be used as the initial water level reading.

Prior to starting the pump, the total gallons displayed on the flow meter will be recorded. This will be used to determine the total number of gallons extracted from the pumping well. Once the pump is turned on, the exact time will be recorded. The control box will be immediately set to the flow rate established during the pre-test. The water level within each well will be measured continuously for the first 30 minutes of the test. For sites with more than ten monitoring wells, only those wells in the vicinity of the pumping well, up to 60 feet away, will be monitored for the first 30 minutes. The exact time will be recorded for each measurement taken. After the first 30 minutes, the water level within all wells to be monitored will be measured every 15 minutes until 90 minutes has elapsed since the test began. At this time the interval between measurements will be increased to every 30 minutes. This will

continue until six hours has elapsed since the test began. At this time the interval between measurements will be increased to once every hour until the test ends. In addition to recording water level measurements, the flow rate will also be recorded after each gauging round is completed.

Once the test is completed and the pump is shut off, the exact time and the total gallons displayed on the flow meter will be recorded. If performing a recharge test, the water level within each well within the vicinity of the pumping well will be measured continuously for the first 30 minutes of the test, and then every 15 minutes until the water levels stabilize. The exact time will be recorded for each measurement taken.

An effluent water sample shall be collected during the test to assist in the design of a water treatment system. Additional sampling will occur if required by conditions stated in the sewer discharge permit. If water is being stored in a holding tank, appropriate samples will be collected per disposal requirements. The water will be removed to an appropriate disposal facility by a licensed hauler.

Data Evaluation

Data obtained from groundwater pump/recovery tests can be evaluated using various graphical and numerical methods, depending on flow (steady or unsteady state) well construction (fully or partially penetrating) and aquifer type (confined, leaky, unconfined, semiconfined and fractured bedrock). Aquifer and well properties will be determined as accurately as possible prior to conducting the analyses, in order to select the appropriate method for evaluating the data. In some cases, it may be useful to evaluate the data using more than one method to confirm the aquifer and well characteristics. Some calculations and evaluations may be performed with the aid of the *"Aquifer Test Toolbox™"*, a collection of aquifer test worksheets developed by Creative Scientific Applications.

A majority of the pump tests will be conducted using partially penetrating wells in unconfined aquifers under steady state conditions. In general, the curve-fitting method presented by Neuman (1975) or by Boulton (1954) will be used to evaluate transmissivity, storativity and vertical hydraulic conductivity under these conditions (the Boulton method assumes nonsteady state conditions). The Stretltsova's curve-fitting method presented by Kruseman and de Ridder (1990) may also be used for unconfined conditions. In addition, the steady state well equation may be applied (Todd, 1980) to evaluate the hydraulic conductivity (away from the pumping well).

If it is determined that the test was performed under confined aquifer conditions and enough time has elapsed for steady-state conditions to have been met (as defined in the literature), the Jacob distance-drawdown and time-drawdown methods (Cooper & Jacob, 1946) will generally be applied to evaluate storativity and transmissivity. Alternatively, the Theis curve-fitting method (Theis, 1935) may be employed if steady-state conditions were not reached. In leaky aquifers, the Hantush method (Hantush, 1956) will generally be used.

The capture zone will also be determined using the transmissivity values obtained through the evaluation and following the method initially outlined by Janvandel and Tsang (1986). The data will then be used to determine the construction and design specifications of the proposed system, based on the requirements of the system conceptual design (migration control, dewatering, plume capture).

It must be recognized that even using theoretical models for the data evaluation, some judgment will be necessary in conducting the analyses and applying the calculated parameters to the system design. Different types of aquifers may have similar drawdown or response behaviors, and this must be accounted for. A complete explanation of the method used and the reasoning behind the choice of method and an analysis of the results will be presented with the data evaluation.

References

Boulton, N.S. (1954). The drawdown of the water table under nonsteady conditions near a pumped well in an unconfined formation. *Inst. Civil Engrs., Proc.*, Vol. 3, p. 564-579.

Cooper, H.H. & Jacob, C.E. (1946). A generalized graphical method for evaluating formation constants and summarizing well field history. *Am. Geophys. Union Trans.* Vol. 27, p. 526-534.

Creative Scientific Applications (1992-1994). The Aquifer Test Toolbox, Aquifer Test Worksheets for Hydrogeologists and Engineers. Ver. 1.0., Wellsville, Penn.

Hantush, M.S. (1956). Analysis of data from pumping tests in leaky aquifers. *J. Geophys. Res.* Vol. 64, p. 1043-1052.

Javandel, I. & Tsang, C., (1986). Capture-zone-type curves: a tool for aquifer cleanup. *Ground Water*, Vol. 24, No. 5, p. 616-625.

Kruseman, G.P., & de Ridder, N.A. (1991). Analysis and Evaluation of Pumping Test Data, 2nd edition, International Institute for Land Reclamation and Improvement, Wageningen, The Netherlands.

Neuman, S.P. (1975). Analysis of pumping test data from anisotropic unconfined aquifers considering delayed gravity response. *Water Resources Res.*, Vol. 10, p. 303-312.

Theis, C.V. (1935). The relation between the lowering of the piezometric surface and rate and duration of discharge of a well using groundwater storage. *Trans. Amer. Geophys. Union*, Vol. 2, p. 519-524.

Todd, D.K. (1980). Groundwater Hydrology. 2nd edition, John Wiley & Sons Pubs., 535 pp.

CLEARWATER GROUP, INC.

520 3rd Street, Suite 104 Oakland CA, 94607
Phone: (510)893-5160 Fax: (510) 893-5947

WELL GAUGING/PURGING CALCULATIONS DATA SHEET

Date: 9-3-01 | Job No.: 2P046A | Location: San Leandro street Oakland

Tech(s): SR

Drums on Site @TOA — Soil: 0 Water: 1

Drums on Site @ TOD — Soil: 0 Water: 1 (drum is now full!)

Well No	Diameter (in)	DTB (ft)	DTW (ft)	ST (ft)	CV (gal)	PV (gal)	SPL (ft)	Notes
MW-1	2	23	7.09	15.91	2.54	7.63		
MW-2	2	25	13.30	11.7	1.87	5.6		
MW-3	2	25	13.44	11.56	1.84	5.54		

Explanation:
DTB = Depth to Bottom
DTW = Depth to Water
ST = Saturated Thickness (DTB-DTW)
CV = Casing Volume (ST x cf)
PV = Purge Volume (standard 3 x CV, well development 10 x CV)
SPL = Thickness of Separate Phase Liquid

Conversion Factors (cf)
2-inch diameter well cf=0.16 gal/ft
4-inch diameter well cf=0.65 gal/ft
6-inch diameter well cf=1.44 gal/ft

WELL PURGING DATA

SHEET 1 OF 1

Job No.: ZP046A Location: Oakland Date: Aug 3, 2001 Tech: SR

WELL No.	TIME (24-hr)	VOLUME (gal)	TEMP. (deg. F.) x1000	COND. (mS/cm)	pH
MW-1	1150	2	71.4	.98	5.91
Calc. purge	1152	4	71.5	.86	5.52
volume	1154	6	71.5	.82	5.39
7.63	1156	7.63	71.2	.27	5.30

Sample time: 1200
Sample for: (circle)
TPHg TPHd TPHmo
BTEX MTBE 8010
Other:

Sampling Method:
Dedicated / Disposable bailer

Purging Method:
PVC bailer / Pump

sheen

COMMENTS: color, turbidity, recharge, etc.
black, high, good

WELL No.	TIME (24-hr)	VOLUME (gal)	TEMP. (deg. F.)	COND. (mS/cm)	pH
MW-3	122	2	73.9	.65	5.23
Calc. purge	1226	4	72.8	.63	5.3
volume	1228	5.6	72.6	.64	5.21
5.6					

Sample time: 1230
Sample for: (circle)
TPHg TPHd TPHmo
BTEX MTBE 8010
Other:

Sampling Method:
Dedicated / Disposable bailer

Purging Method:
PVC bailer / Pump

COMMENTS: color, turbidity, recharge, etc.
brown, moderate, poor

WELL No.	TIME (24-hr)	VOLUME (gal)	TEMP. (deg. F.)	COND. (mS/cm)	pH
MW-2	1251	2	75.4	.88	5.56
Calc. purge	1255	4	72.8	.90	7.51
volume	1257	5.54	70.1	.85	5.32
5.54					

Sample time: 1300
Sample for: (circle)
TPHg TPHd TPHmo
BTEX MTBE 8010
Other:

Sampling Method:
Dedicated / Disposable bailer

Purging Method:
PVC bailer / Pump

COMMENTS: color, turbidity, recharge, etc.
olive, moderate, poor

Entech Analytical Labs, Inc.

3334 Victor Court (408) 588-0200
Santa Clara, CA 95054 (408) 588-0201 - Fax

Chain of Custody / Analysis Request

Attention to: Drew Gallen	Phone No.: (510) 893-5160	Purchase Order No.:	Send Invoice to (If Different) / Phone
Company Name: Clearwater Group	Fax No.: (510) 893-5947	Project Number: ZP046A	Company
Mailing Address: 520 Third Street		Project Name: Eagle Gas	Billing Address (If Different)
City: Oakland 1150	State: Ca	Zip: 95607	Project Location: Oakland / City: / State / Zip
Sampler: Scott Robertson 1154		Turn Around Time: Same Day ☐ / 24 Hour ☐ / 48 Hour ☐ / 72 Hour ☐ / Standard ☑	
Date: 8/3/91 1156			

Order ID:

Client ID	Laboratory No.	Sampling: Date	Sampling: Time	Matrix	Composite	Grab	Containers	Preservative	Volatile Organics by GCMS: Freon 113 ☐ 624 ☐ 8240 ☐ 8260B ☑	Fuel Oxygenates by 8260B ☐ MTBE by 8260B ☐	Pesticides-8081 ☐	PCBs - 8082 ☐	Halogenated or Aromatic Volatiles: F113 ☐ 8021 ☐ 601/8010 ☐ 602/8020 ☑	TPH as Gas/BTEX ☑ 8015/8020	TPH as Gas/BTEX/MTBE ☐	Base/Neutral/Acid Organics 8270 ☐ 8270-SIMS ☐	Fuel Scan	Diesel ☑ 8015 w/ Si-gel	8015 w/ Si-gel Column Cleanup ☐	Standard Cleanup ☐	TRPH ☐	Oil & Grease ☐	THM (502.2)	Metals - Circle Below: Total ☐ Dissolved ☐	Remarks
MW-1	122	8-3-01	1200	H2O		X	7	HCl/non	X				X				X								
MW-2	1226	8-3-01	1300	↓		↓	↓	↓	X				X				X								
MW-3	1226	8-3-01	1230	↓		↓	↓	↓	X				X				X								
	1225																								

Relinquished by:	Received by:	Date:	Time:
Scott Robertson	Dean #370	8/3	1515
Relinquished by:	Received by:	Date:	Time:
Relinquished by:	Received by:	Date:	Time:
Relinquished by:	Received by:	Date:	Time:

Special Instructions or Comments

☐ NPDES Detection Limits

Metals: Al, As, Sb, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Mo, Ni, K, Si, Ag, Na, Se, Sr, Tl, Sn, Ti, V, Zn, W : CAM-17 ☐ Plating ☐ PPM-13 ☐ LUFT-5 ☐

Entech Analytical Labs, Inc.

3334 Victor Court • Santa Clara, CA 95054 • (408) 588-0200 • Fax (408) 588-0201

August 10, 2001

Drew Galleni
Clearwater Group, Inc.
520 Third Street, Suite 104
Oakland, CA 94607

Order: 26468
Project Name: Eagle Gas
Project Number: ZP046A
Project Notes:

Date Collected: 8/3/01
Date Received: 8/3/01
P.O. Number: ZP046A

On August 03, 2001, samples were received under documentented chain of custody. Results for the following analyses are attached:

Matrix	Test	Method
Liquid	Gas/BTEX	EPA 8015 MOD. (Purgeable)
		EPA 8020
	Oxygenates by EPA 8260B	EPA 8260B
	TPH as Diesel	EPA 8015 MOD. (Extractable)

Chemical analysis of these samples has been completed. Summaries of the data are contained on the following pages. USEPA protocols for sample storage and preservation were followed.

Entech Analytical Labs, Inc. is certified by the State of California (#2346). If you have any questions regarding procedures or results, please call me at 408-588-0200.

Sincerely,

Patti L. Sandrock
QA/QC Manager

Entech Analytical Labs, Inc.

3334 Victor Court • Santa Clara, CA 95054 • (408) 588-0200 • Fax (408) 588-0201

Clearwater Group, Inc.
520 Third Street, Suite 104
Oakland, CA 94607
Attn: Drew Galleni

Date: 8/10/01
Date Received: 8/3/01
Project Name: Eagle Gas
Project Number: ZP046A
P.O. Number: ZP046A
Sampled By: Scott Robertson

Certified Analytical Report

Order ID: 26468 **Lab Sample ID:** 26468-001 **Client Sample ID:** MW-1

Sample Time: 12:00 PM **Sample Date:** 8/3/01 **Matrix:** Liquid

Parameter	Result	Flag	DF	PQL	DLR	Units	Extraction Date	Analysis Date	QC Batch ID	Method
Benzene	ND		100	0.5	50	µg/L	N/A	8/6/01	WGC42115	EPA 8020
Toluene	59		100	0.5	50	µg/L	N/A	8/6/01	WGC42115	EPA 8020
Ethyl Benzene	ND		100	0.5	50	µg/L	N/A	8/6/01	WGC42115	EPA 8020
Xylenes, Total	ND		100	0.5	50	µg/L	N/A	8/6/01	WGC42115	EPA 8020

Surrogate	Surrogate Recovery	Control Limits (%)
aaa-Trifluorotoluene	94	65 - 135

Parameter	Result	Flag	DF	PQL	DLR	Units	Extraction Date	Analysis Date	QC Batch ID	Method
TPH as Diesel	2200	x	2	50	100	µg/L	8/7/01	8/9/01	DW4049A	EPA 8015 MOD. (Extractable)

Surrogate	Surrogate Recovery	Control Limits (%)
o-Terphenyl	119	38 - 133

Parameter	Result	Flag	DF	PQL	DLR	Units	Extraction Date	Analysis Date	QC Batch ID	Method
TPH as Gasoline	19000	x	100	50	5000	µg/L	N/A	8/6/01	WGC42115	EPA 8015 MOD. (Purgeable)

Surrogate	Surrogate Recovery	Control Limits (%)
aaa-Trifluorotoluene	101	65 - 135

DF = Dilution Factor ND = Not Detected DLR = Detection Limit Reported PQL = Practical Quantitation Limit

Analysis performed by Entech Analytical Labs, Inc. (CA ELAP #2346)

Michelle L. Anderson, Laboratory Director

Environmental Analysis Since 1983

Entech Analytical Labs, Inc.

3334 Victor Court • Santa Clara, CA 95054 • (408) 588-0200 • Fax (408) 588-0201

Clearwater Group, Inc.
520 Third Street, Suite 104
Oakland, CA 94607
Attn: Drew Galleni

Date: 8/10/01
Date Received: 8/3/01
Project Name: Eagle Gas
Project Number: ZP046A
P.O. Number: ZP046A
Sampled By: Scott Robertson

Certified Analytical Report

Order ID: 26468 **Lab Sample ID:** 26468-001 **Client Sample ID:** MW-1

Sample Time: 12:00 PM **Sample Date:** 8/3/01 **Matrix:** Liquid

Parameter	Result	Flag	DF	PQL	DLR	Units	Analysis Date	QC Batch ID	Method
Diisopropyl Ether	ND		1000	5	5000	µg/L	8/8/01	WMS11119	EPA 8260B
Ethyl-t-butyl Ether	ND		1000	5	5000	µg/L	8/8/01	WMS11119	EPA 8260B
Methyl-t-butyl Ether	96000		1000	5	5000	µg/L	8/8/01	WMS11119	EPA 8260B
tert-Amyl Methyl Ether	ND		1000	5	5000	µg/L	8/8/01	WMS11119	EPA 8260B
tert-Butanol	ND		1000	20	20000	µg/L	8/8/01	WMS11119	EPA 8260B

Surrogate	Surrogate Recovery	Control Limits (%)
4-Bromofluorobenzene	67	65 - 135
Dibromofluoromethane	93	57 - 139
Toluene-d8	96	65 - 135

DF = Dilution Factor ND = Not Detected DLR = Detection Limit Reported PQL = Practical Quantitation Limit

Analysis performed by Entech Analytical Labs, Inc. (CA ELAP #2346)

Michelle L. Anderson, Laboratory Director

Environmental Analysis Since 1983

Entech Analytical Labs, Inc.

3334 Victor Court • Santa Clara, CA 95054 • (408) 588-0200 • Fax (408) 588-0201

Clearwater Group, Inc.
520 Third Street, Suite 104
Oakland, CA 94607
Attn: Drew Galleni

Date: 8/10/01
Date Received: 8/3/01
Project Name: Eagle Gas
Project Number: ZP046A
P.O. Number: ZP046A
Sampled By: Scott Robertson

Certified Analytical Report

Order ID: 26468 **Lab Sample ID:** 26468-002 **Client Sample ID:** MW-2

Sample Time: 1:00 PM **Sample Date:** 8/3/01 **Matrix:** Liquid

Parameter	Result	Flag	DF	PQL	DLR	Units	Extraction Date	Analysis Date	QC Batch ID	Method
Benzene	1100		100	0.5	50	µg/L	N/A	8/6/01	WGC42115	EPA 8020
Toluene	63		100	0.5	50	µg/L	N/A	8/6/01	WGC42115	EPA 8020
Ethyl Benzene	230		100	0.5	50	µg/L	N/A	8/6/01	WGC42115	EPA 8020
Xylenes, Total	130		100	0.5	50	µg/L	N/A	8/6/01	WGC42115	EPA 8020

Surrogate	Surrogate Recovery	Control Limits (%)
aaa-Trifluorotoluene	95	65 - 135

Parameter	Result	Flag	DF	PQL	DLR	Units	Extraction Date	Analysis Date	QC Batch ID	Method
TPH as Diesel	2600	x	2	50	100	µg/L	8/7/01	8/9/01	DW4049A	EPA 8015 MOD. (Extractable)

Surrogate	Surrogate Recovery	Control Limits (%)
o-Terphenyl	122	38 - 133

Parameter	Result	Flag	DF	PQL	DLR	Units	Extraction Date	Analysis Date	QC Batch ID	Method
TPH as Gasoline	42000	x	100	50	5000	µg/L	N/A	8/6/01	WGC42115	EPA 8015 MOD. (Purgeable)

Surrogate	Surrogate Recovery	Control Limits (%)
aaa-Trifluorotoluene	103	65 - 135

DF = Dilution Factor ND = Not Detected DLR = Detection Limit Reported PQL = Practical Quantitation Limit

Analysis performed by Entech Analytical Labs, Inc. (CA ELAP #2346)

Michelle L. Anderson, Laboratory Director

Environmental Analysis Since 1983

Entech Analytical Labs, Inc.

3334 Victor Court • Santa Clara, CA 95054 • (408) 588-0200 • Fax (408) 588-0201

Clearwater Group, Inc.
520 Third Street, Suite 104
Oakland, CA 94607
Attn: Drew Galleni

Date: 8/10/01
Date Received: 8/3/01
Project Name: Eagle Gas
Project Number: ZP046A
P.O. Number: ZP046A
Sampled By: Scott Robertson

Certified Analytical Report

Order ID: 26468 **Lab Sample ID:** 26468-002 **Client Sample ID:** MW-2

Sample Time: 1:00 PM **Sample Date:** 8/3/01 **Matrix:** Liquid

Parameter	Result	Flag	DF	PQL	DLR	Units	Analysis Date	QC Batch ID	Method
Diisopropyl Ether	ND		5000	5	25000	µg/L	8/8/01	WMS11119	EPA 8260B
Ethyl-t-butyl Ether	ND		5000	5	25000	µg/L	8/8/01	WMS11119	EPA 8260B
Methyl-t-butyl Ether	880000		5000	5	25000	µg/L	8/8/01	WMS11119	EPA 8260B
tert-Amyl Methyl Ether	ND		5000	5	25000	µg/L	8/8/01	WMS11119	EPA 8260B
tert-Butanol	ND		5000	20	100000	µg/L	8/8/01	WMS11119	EPA 8260B

Surrogate	Surrogate Recovery	Control Limits (%)
4-Bromofluorobenzene	68	65 - 135
Dibromofluoromethane	94	57 - 139
Toluene-d8	97	65 - 135

DF = Dilution Factor ND = Not Detected DLR = Detection Limit Reported PQL = Practical Quantitation Limit

Analysis performed by Entech Analytical Labs, Inc. (CA ELAP #2346)

Michelle L. Anderson, Laboratory Director

Environmental Analysis Since 1983

Entech Analytical Labs, Inc.

3334 Victor Court • Santa Clara, CA 95054 • (408) 588-0200 • Fax (408) 588-0201

Clearwater Group, Inc.
520 Third Street, Suite 104
Oakland, CA 94607
Attn: Drew Galleni

Date: 8/10/01
Date Received: 8/3/01
Project Name: Eagle Gas
Project Number: ZP046A
P.O. Number: ZP046A
Sampled By: Scott Robertson

Certified Analytical Report

Order ID: 26468 **Lab Sample ID:** 26468-003 **Client Sample ID:** MW-3

Sample Time: 12:30 PM **Sample Date:** 8/3/01 **Matrix:** Liquid

Parameter	Result	Flag	DF	PQL	DLR	Units	Extraction Date	Analysis Date	QC Batch ID	Method
Benzene	ND		100	0.5	50	µg/L	N/A	8/6/01	WGC42115	EPA 8020
Toluene	51		100	0.5	50	µg/L	N/A	8/6/01	WGC42115	EPA 8020
Ethyl Benzene	ND		100	0.5	50	µg/L	N/A	8/6/01	WGC42115	EPA 8020
Xylenes, Total	ND		100	0.5	50	µg/L	N/A	8/6/01	WGC42115	EPA 8020

Surrogate	Surrogate Recovery	Control Limits (%)
aaa-Trifluorotoluene	93	65 - 135

Parameter	Result	Flag	DF	PQL	DLR	Units	Extraction Date	Analysis Date	QC Batch ID	Method
TPH as Diesel	290	x	1	50	50	µg/L	8/7/01	8/8/01	DW4049A	EPA 8015 MOD. (Extractable)

Surrogate	Surrogate Recovery	Control Limits (%)
o-Terphenyl	112	38 - 133

Parameter	Result	Flag	DF	PQL	DLR	Units	Extraction Date	Analysis Date	QC Batch ID	Method
TPH as Gasoline	30000	x	100	50	5000	µg/L	N/A	8/6/01	WGC42115	EPA 8015 MOD. (Purgeable)

Surrogate	Surrogate Recovery	Control Limits (%)
aaa-Trifluorotoluene	101	65 - 135

DF = Dilution Factor ND = Not Detected DLR = Detection Limit Reported PQL = Practical Quantitation Limit

Analysis performed by Entech Analytical Labs, Inc. (CA ELAP #2346)

Michelle L. Anderson, Laboratory Director

Environmental Analysis Since 1983

Entech Analytical Labs, Inc.

3334 Victor Court • Santa Clara, CA 95054 • (408) 588-0200 • Fax (408) 588-0201

Clearwater Group, Inc.
520 Third Street, Suite 104
Oakland, CA 94607
Attn: Drew Galleni

Date: 8/10/01
Date Received: 8/3/01
Project Name: Eagle Gas
Project Number: ZP046A
P.O. Number: ZP046A
Sampled By: Scott Robertson

Certified Analytical Report

Order ID: 26468 **Lab Sample ID:** 26468-003 **Client Sample ID:** MW-3

Sample Time: 12:30 PM **Sample Date:** 8/3/01 **Matrix:** Liquid

Parameter	Result	Flag	DF	PQL	DLR	Units	Analysis Date	QC Batch ID	Method
Diisopropyl Ether	ND		2500	5	12500	µg/L	8/8/01	WMS11119	EPA 8260B
Ethyl-t-butyl Ether	ND		2500	5	12500	µg/L	8/8/01	WMS11119	EPA 8260B
Methyl-t-butyl Ether	270000		2500	5	12500	µg/L	8/8/01	WMS11119	EPA 8260B
tert-Amyl Methyl Ether	ND		2500	5	12500	µg/L	8/8/01	WMS11119	EPA 8260B
tert-Butanol	ND		2500	20	50000	µg/L	8/8/01	WMS11119	EPA 8260B

Surrogate	Surrogate Recovery	Control Limits (%)
4-Bromofluorobenzene	67	65 - 135
Dibromofluoromethane	93	57 - 139
Toluene-d8	97	65 - 135

DF = Dilution Factor ND = Not Detected DLR = Detection Limit Reported PQL = Practical Quantitation Limit

Analysis performed by Entech Analytical Labs, Inc. (CA ELAP #2346)

Michelle L. Anderson, Laboratory Director

Environmental Analysis Since 1983

Entech Analytical Labs, Inc.

3334 Victor Court • Santa Clara, CA 95054 • (408) 588-0200 • Fax (408) 588-0201

Quality Control Results Summary

QC Batch #: WGC42115 **Units:** µg/L
Matrix: Liquid **Date Analyzed:** 8/6/01

Parameter	Method	Blank Result	Spike Sample ID	Spike Amount	Sample Result	Spike Result	QC Type	% Recovery	RPD	RPD Limits	Recovery Limits
Test: TPH as Gasoline											
TPH as Gasoline	EPA 8015 M	ND		561		458.0	LCS	81.6			59.2 - 111.9
	Surrogate		**Surrogate Recovery**			**Control Limits (%)**					
	aaa-Trifluorotoluene		98			65 - 135					
Test: BTEX											
Benzene	EPA 8020	ND		6.2		6.13	LCS	98.9			65.0 - 135.0
Ethyl Benzene	EPA 8020	ND		7.8		7.41	LCS	95.0			65.0 - 135.0
Toluene	EPA 8020	ND		35.8		35.5	LCS	99.2			65.0 - 135.0
Xylenes, total	EPA 8020	ND		43		39.4	LCS	91.6			65.0 - 135.0
	Surrogate		**Surrogate Recovery**			**Control Limits (%)**					
	aaa-Trifluorotoluene		101			65 - 135					
Test: MTBE by EPA 8020											
Methyl-t-butyl Ether	EPA 8020	ND		52.8		38.8	LCS	73.5			65.0 - 135.0
	Surrogate		**Surrogate Recovery**			**Control Limits (%)**					
	aaa-Trifluorotoluene		101			65 - 135					
Test: TPH as Gasoline											
TPH as Gasoline	EPA 8015 M	ND		561		477.9	LCSD	85.2	4.25	25.00	59.2 - 111.9
	Surrogate		**Surrogate Recovery**			**Control Limits (%)**					
	aaa-Trifluorotoluene		101			65 - 135					
Test: BTEX											
Benzene	EPA 8020	ND		6.2		6.04	LCSD	97.4	1.48	25.00	65.0 - 135.0
Ethyl Benzene	EPA 8020	ND		7.8		7.44	LCSD	95.4	0.40	25.00	65.0 - 135.0
Toluene	EPA 8020	ND		35.8		35.1	LCSD	98.0	1.13	25.00	65.0 - 135.0
Xylenes, total	EPA 8020	ND		43		39.4	LCSD	91.6	0.00	25.00	65.0 - 135.0
	Surrogate		**Surrogate Recovery**			**Control Limits (%)**					
	aaa-Trifluorotoluene		101			65 - 135					
Test: MTBE by EPA 8020											
Methyl-t-butyl Ether	EPA 8020	ND		52.8		38.7	LCSD	73.3	0.26	25.00	65.0 - 135.0
	Surrogate		**Surrogate Recovery**			**Control Limits (%)**					
	aaa-Trifluorotoluene		101			65 - 135					

Entech Analytical Labs, Inc.

3334 Victor Court • Santa Clara, CA 95054 • (408) 588-0200 • Fax (408) 588-0201

Quality Control Results Summary

QC Batch #: WMS11119 **Units:** µg/L
Matrix: Liquid **Date Analyzed:** 8/8/01

Parameter	Method	Blank Result	Spike Sample ID	Spike Amount	Sample Result	Spike Result	QC Type	% Recovery	RPD	RPD Limits	Recovery Limits
Test: EPA 8260B											
1,1-Dichloroethene	EPA 8260B	ND		20		17.6	LCS	88.0			65.0 - 135.0
Benzene	EPA 8260B	ND		20		16.3	LCS	81.5			65.0 - 135.0
Chlorobenzene	EPA 8260B	ND		20		18.9	LCS	94.5			65.0 - 135.0
Methyl-t-butyl Ether	EPA 8260B	ND		20		18.2	LCS	91.0			56.0 - 135.0
Toluene	EPA 8260B	ND		20		18.4	LCS	92.0			65.0 - 135.0
Trichloroethene	EPA 8260B	ND		20		18.1	LCS	90.5			65.0 - 135.0

Surrogate	Surrogate Recovery	Control Limits (%)
4-Bromofluorobenzene	79	65 - 135
Dibromofluoromethane	93	57 - 139
Toluene-d8	102	65 - 135

Parameter	Method	Blank Result	Spike Sample ID	Spike Amount	Sample Result	Spike Result	QC Type	% Recovery	RPD	RPD Limits	Recovery Limits
Test: EPA 8260B											
1,1-Dichloroethene	EPA 8260B	ND		20		17.7	LCSD	88.5	0.57	25.00	65.0 - 135.0
Benzene	EPA 8260B	ND		20		16.3	LCSD	81.5	0.00	25.00	65.0 - 135.0
Chlorobenzene	EPA 8260B	ND		20		18.9	LCSD	94.5	0.00	25.00	65.0 - 135.0
Methyl-t-butyl Ether	EPA 8260B	ND		20		19.4	LCSD	97.0	6.38	25.00	56.0 - 135.0
Toluene	EPA 8260B	ND		20		18.5	LCSD	92.5	0.54	25.00	65.0 - 135.0
Trichloroethene	EPA 8260B	ND		20		17.9	LCSD	89.5	1.11	25.00	65.0 - 135.0

Surrogate	Surrogate Recovery	Control Limits (%)
4-Bromofluorobenzene	80	65 - 135
Dibromofluoromethane	93	57 - 139
Toluene-d8	103	65 - 135

Entech Analytical Labs, Inc.

3334 Victor Court • Santa Clara, CA 95054 • (408) 588-0200 • Fax (408) 588-0201

Quality Control Results Summary

QC Batch #: DW4049A
Matrix: Liquid
Units: µg/L
Date Analyzed: 8/7/01

Parameter	Method	Blank Result	Spike Sample ID	Spike Amount	Sample Result	Spike Result	QC Type	% Recovery	RPD	RPD Limits	Recovery Limits
Test: TPH as Diesel											
TPH as Diesel	EPA 8015 M	ND		1000		1005.95	LCS	100.6			37.6 - 129.8
	Surrogate			**Surrogate Recovery**			**Control Limits (%)**				
	o-Terphenyl			113			38 - 133				
Test: TPH as Diesel											
TPH as Diesel	EPA 8015 M	ND		1000		1089.63	LCSD	109.0	7.99	25.00	37.6 - 129.8
	Surrogate			**Surrogate Recovery**			**Control Limits (%)**				
	o-Terphenyl			123			38 - 133				

Entech Analytical Labs, Inc.

3334 Victor Court (408) 588-0200
Santa Clara, CA 95054 (408) 588-0201 - Fax

Chain of Custody / Analysis Request

Attention to: Drew Gallen	Phone No.: (510) 893-5160	Purchase Order No.:	Send Invoice to (If Different)	Phone
Company Name: Clearwater Group	Fax No.: (510) 893-5947	Project Number: ZP046A	Company	
Mailing Address: 520 Third Street		Project Name: Eagle Gas	Billing Address (if Different)	
City: Oakland	State: Ca Zip: 95607	Project Location: Oakland	City:	State Zip

Sampler: Scott Robertson

Date: 8/3/91

Turn Around Time: Same Day ☐ 24 Hour ☐ 48 Hour ☐ 72 Hour ☐ Standard ☒

Order ID:

Client ID	Laboratory No.	Sampling Date	Sampling Time	Matrix	Composite	Grab	Containers	Preservative	Volatile Organics by GC/MS: 624 ☐	Fuel Oxygenates by MTBE by 8260B ☐	Pesticides-8081 ☐	Halogenated or Aromatic Volatiles: 601/8010 ☐	TPH as Gas/BTEX 602/8020 ☐	TPH as Gas/BTEX/MTBE 8021 ☐	Base/Neutral/Acid Organics 8270 ☐	Fuel Scan Diesel ☐	Remarks
MW-1		8-3-01	1200	H2O		X	7	HCl/ice	X			X				X	26468-001
MW-2		8-3-01	1300	"		"	"	"	X			X				X	002
MW-3		8-3-01	1230	V		V	V	V	X			X				X	003

Relinquished by:	Received by:	Date:	Time:
Scott Robertson	Drew #775	8/3	1515
Drew #775	[illegible]	8/3/01	1610
Relinquished by:	Received by:	Date:	Time:
Relinquished by:	Received by:	Date:	Time:

Special Instructions or Comments

☐ NPDES Detection Limits

Metals: Al, As, Sb, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Mo, Ni, K, Si, Ag, Na, Se, Sr, Tl, Sn, Ti, V, Zn, W : CAM-17 ☐ Plating ☐ PPM-13 ☐ LUFT-5 ☐