RECEIVED

2:31 pm, Nov 06, 2007

Alameda County
Environmental Health

Mr. Jerry Wickham
Hazardous Materials Specialist
Alameda County Health Care Services Agency
Environmental Health Services
Environmental Protection
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502

RE: Eagle Gas Station
4301 San Leandro Street
Oakland, California 94601
LOP StID# 2118
Fuel Leak Case No. RO0000096
USTCF Claim No. 014551
Clearwater Group Project # ZP046I

Dear Mr. Wickham,

As the legally authorized representative of the above-referenced project location, I have reviewed the *Quarterly Groundwater Monitoring Report – Third Quarter 2007* prepared by my consultant of record, Clearwater Group. I declare, under penalty of perjury, that the information and/or recommendations contained in this report are true and correct to the best of my knowledge.

Sincerely,

Muhammad Jamil

Mr. Muhammad Jamil
Date: 10-24-07

CLEARWATER
GROUP
Environmental Services

October 12, 2007

Mr. Jerry Wickham, P.G.
Hazardous Materials Specialist
Alameda County Environmental Health Services
Environmental Protection Division
1131 Harbor Bay Parkway, Suite 250
Alameda, California 94502-6577

Re: ***Quarterly Groundwater Monitoring Report – Third Quarter 2007***
Eagle Gas Station, 4301 San Leandro Street
Oakland, California 94601
LOP Site ID# 2118
USTCF Claim No. 014551
Clearwater Project No. ZP046I

Dear Mr. Wickham:

Clearwater Group (Clearwater) has prepared this Third Quarter 2007 Groundwater Monitoring Report for the Eagle Gas Station site. This report presents the groundwater monitoring activities and associated results. The groundwater monitoring was performed on August 15 and 16, 2007.

SITE DESCRIPTION

The site is located in the southern portion of the City of Oakland, Alameda County, California, at the southern corner of the intersection of San Leandro Street and High Street. The site is located approximately 1,100 feet east of Interstate Highway 880 (**Figure 1**). The site is bounded by commercial property to the southeast and southwest, by High Street to the northwest, and by San Leandro Street to the northeast (**Figure 2**). The site is operated as a gas station and convenience store.

BACKGROUND

On April 21 and 22, 1999, Clearwater (formerly Artesian Environmental) oversaw the removal of five underground storage tanks (USTs) consisting of two 6,000-gallon gasoline tanks, two 4,000-gallon diesel tanks, and one 300-gallon used-oil tank from the site. Strong petroleum hydrocarbon odors were reportedly observed emanating from the excavation pit of the USTs. Five soil samples and three groundwater samples were collected from the UST excavation for confirmation sampling after completion of the UST excavation. Field observations and laboratory analysis indicated that an unauthorized release of petroleum hydrocarbons had occurred. The former UST excavation is shown in **Figure 2** and was defined by driven steel shoring installed to protect the on-site and off-site buildings prior to the field activities.

In a letter dated May 10, 1999, Alameda County Environmental Health Services (ACEH) staff recommended that the soil at the site be remediated by over-excavation and that "as much groundwater as possible" be pumped from the excavation. Approximately 800 tons of petroleum hydrocarbon-impacted soil were excavated and disposed of as Class II non-hazardous waste, and approximately 1,000 gallons of petroleum hydrocarbon-impacted groundwater was pumped and removed from the site. Groundwater did not recharge quickly after the initial pumping. Existing on- and off-site structures and associated shoring limited the amount of soil that could be safely excavated. Soil samples collected from the excavation walls and product-piping trenches indicated that residual concentrations of petroleum hydrocarbons and methyl-tert-butyl-ether (MTBE) remained.

On August 4 and 5, 1999, approximately 100 linear feet of product piping was removed. Vent piping from between the former USTs and the southern corner of the on-site building was also removed. All piping was cut up and disposed of as scrap metal. On August 5, 1999, six confirmation soil samples were collected along the piping trench approximately 3 feet below ground surface (bgs). In addition, one soil sample was collected from each of the four former fuel dispensers. Laboratory analytical results indicated that petroleum hydrocarbon impacts remained along the piping trenches.

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 and collect soil samples. The three borings were completed as groundwater-monitoring wells (**Figure 2**) using clean, flush-threaded, 2-inch diameter polyvinyl chloride (PVC) for the well casing. The construction data for these three wells are presented in **Table 1**.

On October 3 and 10, 2000, Clearwater surveyed the top-of-the-casing (TOC) elevation of each of the wells relative to an arbitrary datum and developed the wells for monitoring purposes. Initial groundwater samples collected from these wells contained 83,000 micrograms per liter (μg/L) to 250,000 μg/L total petroleum hydrocarbon as gasoline (TPH-g) and 33,000 μg/L to 400,000 μg/L MTBE.

On August 3, 2001, Clearwater submitted its *Groundwater Monitoring Report—Second Quarter 2001* and *Sensitive Receptor Survey and Workplan for Continuing Investigation.* It was determined, at that time, that there were no major ecological receptors, permanent surface waters, or domestic-use wells within a 2,000-foot radius of the site. The proposed scope of the workplan included the installation of eight groundwater-monitoring wells around the site to delineate the MTBE plume in groundwater. In response to Clearwater's workplan, ACEH staff, in correspondence dated October 18, 2001, recommended postponing the installation of the additional off-site wells. Instead, ACEH staff requested that further characterization of subsurface soils and groundwater on the subject site be completed prior to the installation of any off-site wells.

Quarterly monitoring was suspended after the Third Quarter 2001 event on August 3, 2001. Quarterly monitoring resumed in July 2003 and has since continued. The historical groundwater elevation and analytical results are listed in **Table 2**.

On January 9, 2004, after completing the review of the *Third Quarter 2003 Groundwater Monitoring Report*, ACEH staff requested a workplan that included additional on-site and off-site subsurface investigations to address the extent of groundwater impacts on the site. Clearwater submitted its *Interim Remedial Action Plan* (IRAP), as requested by ACEH staff, on January 14, 2004.

ACEH staff provided review comments for the IRAP and the *First Quarter 2005 Groundwater Monitoring Report* in a letter dated May 26, 2005. Pursuant to the ACEH request described in this letter, Clearwater submitted a *Soil and Groundwater Investigation Workplan* on August 10, 2005. In review letters dated September 21, 2005, and November 1, 2005, ACEH approved the implementation of a modified IRAP proposed in Clearwater's June 13, 2005, letter entitled *Recommendations for Interim Remedial Actions* and the August 10, 2005, *Soil and Groundwater Investigation Workplan*. On the basis of the above-mentioned documents and correspondences, Clearwater installed 15 additional on-site wells between December 15 and December 20, 2005, and conducted Geoprobe soil sampling from December 6 to December 9, 2005, and from March 29 to April 2, 2006. In order to monitor the level of groundwater impacts and the magnitude of vertical migration of contaminants in deeper groundwater, two deep monitoring wells (MW-4D and MW-5D) were installed. These wells were screened between 35 and 45 feet bgs. The construction data for the new wells are presented in **Table 1**. All the wells were surveyed by Clearwater using a global positioning system (GPS) and laser level on March 16 and 28, 2006.

On the basis of apparent on-site groundwater mounding and unusually steep on-site groundwater gradients, ACEH staff requested a check of the groundwater elevation data. Each well's horizontal position was originally determined using a GPS survey in 2005. Clearwater field-checked the well locations of all the groundwater monitoring wells on August 18, 2006, using a 100-foot-long cloth tape. The horizontal distances between wells were measured, and the well positions were triangulated from these measurements. Several well locations were adjusted slightly on the base map; the revised base map with the resurveyed well locations is shown on **Figure 2** and has been used throughout reports generated since that time.

The TOC elevations of all the wells were remeasured on September 12, 2006, using a survey level and survey staff, accurate to within 1/100th of a foot. The TOC elevation for well MW-1 (northwest corner of site) was the starting datum, and the TOC elevation for all the other wells was calculated as the relative difference from MW-1's TOC elevation. The surveyed TOC elevations were compared with the previously used TOC elevations, which were determined using a laser level. The relative difference in TOC elevation for each well was determined. The maximum vertical difference was found to be 0.12 foot for well IS-3. **Table 2** presents the original elevations values up to May 9, 2005 followed by the resurveyed TOC elevations after that date. The overall groundwater gradient pattern did not significantly change after completion of the monitoring well resurvey.

Sampling analysis for Escherichia coli (E. coli), total coliform, and water treatment byproducts as residual chlorine was performed November 2006 on groundwater samples obtained from wells IS-5, MW-8, and MW-7 in an attempt to identify whether on-site groundwater mounding could be caused by water and/or sewer line leaks; both E. coli and total coliform were present in IS-5 and MW-8, and water treatment byproducts were present in IS-5, MW-8, and MW-7. Leak testing was performed, and both a crack and an off-set in the sewer line were identified to exist near well IS-1. The sampling results for the *E. coli*, total coliform, and water treatment byproducts were reported in the *Quarterly Groundwater Monitoring Report - Fourth Quarter 2006*, and the sewer line leak test results were reported in the *Quarterly Groundwater Monitoring Report - First Quarter 2007.*

On May 30, 2006, Clearwater submitted its *Soil and Groundwater Investigation Report* to the ACEH, which included an updated Site Conceptual Model for the site. In response to the report, ACEH requested a Workplan to present proposed additional on- and off-site investigations. ACEH staff also provided Technical Comments to be addressed in the Workplan. Clearwater's *Response to Comments* was sent to ACEH on July 7, 2006. ACEH responded with an August 11, 2006, letter with revised Technical Comments to be incorporated into the Workplan. Clearwater submitted its *Revised Workplan* to the ACEH on December 19, 2006. ACEH responded in a letter dated January 4, 2007, with Technical Comments, which were to be addressed and incorporated during the field investigation; submittal of an additional revised Workplan was not necessary per ACEH staff. Clearwater is in the process of implementing the *Revised Workplan* including recent Technical Comments.

During the week of June 11–15, 2007, nine off-site direct-push soil borings and three borings logged using the cone penetrometer test (CPT) system were completed. Prior to the drilling event, a traffic plan was obtained from the City of Oakland to perform soil borings in the sidewalk and in the parking and traffic lanes of both High and San Leandro Streets; results of the June 2007 drilling event will be presented in an upcoming Site Investigation Report which will also include an updated Site Conceptual Model.

On August 2, 2007, Clearwater submitted the *Quarterly Groundwater Monitoring Report - Second Quarter 2007.* The *Bioremediation Feasibility Study Report* was submitted July 9, 2007. In early August 2007, Clearwater acquired access agreements from the owners of the two adjacent properties to perform soil borings on their properties. An ironwork shop, a sheet metal shop, and a smog-check business are located on one property; live-work lofts are located on the other property. During September 2007 five soil borings were completed on adjacent properties and in October 2007 two deep on-site wells as well as 6 on-site vapor-wells were installed. All of these will be reported on in the upcoming Site Investigation Report.

GROUNDWATER MONITORING ACTIVITIES

The third quarter 2007 groundwater monitoring event was performed on August 15 and 16, 2007. The monitoring event included gauging the depths to groundwater, well purging and sampling, and laboratory analysis of groundwater samples.

Groundwater Gauging, Purging, and Sampling

On August 15, 2007, the depth to static groundwater in all 18 wells was measured (**Table 2**). An electronic water-level indicator accurate to within ±0.01 foot was used to measure the depth to groundwater from the top of the well casing. All the wells were visually checked for the presence of light non-aqueous phase liquid (LNAPL) during well purging.

Prior to groundwater sampling, all wells were purged of approximately three well volumes using a disposable polyethylene bailer until temperature, conductivity, and pH measurements of the purge water stabilized according to Clearwater's Groundwater Monitoring and Sampling Field Procedures (**Attachment A**). Depth to water and well purging data were recorded on Well Gauging/Purging Calculations and Purging Data Sheets (**Attachment B**). Following recovery of water levels to at least 80% of their static levels, groundwater samples were collected from the wells using a new disposable polyethylene bailer for each well. The samples were labeled, documented on a chain-of-custody form, and placed on ice in a chilled cooler for transport to the laboratory. The purge water and rinseate were pumped into an internal tank in the sampling van and removed from the site for disposal at InStrat, Rio Vista, California, a licensed treatment, storage, and disposal facility.

Laboratory Analysis

Groundwater samples were analyzed by Kiff Analytical LLC (Kiff), of Davis, California. Kiff is a California Department of Health Services-certified laboratory. The samples were analyzed by Environmental Protection Agency Method 8260B for TPH-g; benzene, toluene, ethylbenzene, and total xylenes (BTEX); and seven oxygenates including MTBE, di-isopropyl ether (DIPE), ethyl tertiary butyl ether (ETBE), tertiary amyl methyl ether (TAME), tert-butanol (TBA). The laboratory analytical reports (#58075 and #58076) including the chain-of-custody forms are included in **Attachment C**.

GROUNDWATER MONITORING RESULTS

Observations During Groundwater Sampling

During well purging, apparent petroleum odors were detected emanating from monitoring wells MW-1 through MW-6, MW-8, IS-1 through IS-6, and extraction wells EW-1 and EW-2. Slight sheens were observed in the groundwater samples collected from monitoring wells MW-1, MW-4D, IS-1, and IS-4. Sheens were observed in the groundwater samples collected from wells MW-2, MW-4, MW-6, MW-8, IS-2, IS-5, EW-1, and EW-2. Groundwater purged from wells MW-2, MW-3, MW-4, MW-5D, IS-5, and EW-1 had high turbidity; groundwater in the remaining wells had moderate to low turbidity. The water ranged in color from brown to gray to tan. The field-measured water quality data are included in **Table 3** and are described in Natural Attenuation Processes and Recommended Monitoring Guidelines (**Attachment D**).

It should be noted that neither sheen nor odor was identified in the groundwater samples collected from monitoring wells MW-7 and MW-5D.

Groundwater Elevation and Flow Direction

On August 15 and 16, 2007, the depths to groundwater in the shallow monitoring wells ranged from 7.91 feet (IS-6) to 13.48 feet (MW-2) bgs. The shallow groundwater elevations ranged from a low of 8.50 feet above mean sea level (msl) in MW-2 to a high of 12.70 feet above msl in IS-2. The groundwater elevations in the deep monitoring wells MW-4D and MW-5D were 5.02 feet above msl and 5.01 feet above msl, respectively. The groundwater elevations observed in the shallow wells adjacent to the deep wells were approximately 7.25 feet higher than those observed in the deep wells. Wells MW-4D and MW-5D are screened from 35 feet to 45 feet bgs, and the shallow wells are all screened from 10 feet to 25 feet bgs. The groundwater contour elevation map for this event is shown on **Figure 3.** The groundwater elevation data from deep wells MW-4D and MW-5D were not used in the groundwater gradient calculation and flow direction shown on **Figure 3**.

The groundwater contour elevation map, **Figure 3**, shows variable groundwater flow directions and gradients caused by an apparent groundwater mound. Three representative flow directions and gradients are shown on **Figure 3**; at the northern corner of the site, the center of the site, and the southeast corner of the site. Groundwater flow at the north corner of the site is predominantly to the north-northwest at a gradient of approximately 0.38 feet per foot (ft/ft). Groundwater flow across the central portion of the site is predominantly to the south-southwest at a gradient of approximately 0.07 ft/ft. Groundwater flow in the southeast corner of the site is predominantly to the southeast at a gradient of approximately 0.05 ft/ft.

Groundwater Sample Analytical Results

Consistent with historical data, the primary constituents of concern (COCs) at the site are TPH-g, TPH-d, benzene, MTBE, and TBA. The groundwater analytical results are summarized in **Table 2**, and a distribution of the primary COCs is depicted on **Figure 4**.

TPH-g concentrations were reported below the laboratory method-reporting limit (MRL) in samples collected from all the monitoring wells, except for well MW-6 (4,000 μg/L); however, the reporting limits ranged from a low of 50 μg/L (MW-4D and MW-5D) to a high of 150,000 μg/L (MW-4 and IS-3).

The elevated concentrations for diesel-range hydrocarbons (TPH-d) in the shallow wells ranged from a low of 390 μg/L (MW-7) to a high of 4,400 μg/L (MW-4 and MW-8). TPH-d was not reported above the laboratory MRLs in shallow monitoring wells MW-3, IS-2, IS-3, IS-5, and EW-2. The MRLs for TPH-d ranged from a low of 200 μg/L (MW-3) to a high of 10,000 μg/L (MW-5) in the shallow monitoring wells. TPH-d was reported at concentrations of 130 μg/L and 330 μg/L in deep monitoring wells MW-4D and MW-5D, respectively; however, the TPH-d hydrocarbon range did not exhibit a typical diesel chromatogram, which may indicate interference from other compounds.

Benzene concentrations reported above the laboratory MRLs ranged from a low of 42 μg/L (MW-3) to a high of 4,300 μg/L (IS-5). Benzene concentrations were not reported above the laboratory MRLs in samples collected from monitoring wells MW-1, MW-4D, MW-5, MW-5D, MW-7, IS-1, and IS-4. The highest benzene concentrations were observed around well IS-5, adjacent to the northeast fuel dispenser island.

MTBE concentrations were reported above the laboratory MRLs in all the shallow wells and ranged from a low of 230 μg/L (MW-1) to 960,000 μg/L (IS-3).

TBA concentrations were reported above the laboratory MRLs in all the shallow wells and ranged from 34,000 μg/L (MW-1) to 620,000 μg/L (MW-5). The highest TBA concentrations were observed on the northeast portion of the site in wells MW-5 and IS-4. Isolated high concentrations of TBA were also observed in wells MW-8 and EW-1 (**Figure 7**). The high TBA concentrations are likely due to the biodegradation of MTBE. TBA concentrations in wells MW-5 and IS-4 have been steadily increasing over time as MTBE concentrations in these wells have been steadily decreasing (**Figures 8** and **9**, respectively).

A slight sheen was observed in the groundwater sample collected from monitoring well MW-4D, although a minor concentration of TPH-d was the only analyte detected above the laboratory MRLs.

FINDINGS AND CONCLUSIONS

The mounded groundwater elevation contour pattern observed during this quarterly monitoring event is consistent with historical groundwater elevation contour patterns (**Figure 3**). A groundwater mound appears to be located between the site building and the two dispenser islands. A significant difference was measured in the hydraulic head between the shallow and deep monitoring wells.

The groundwater sample analytical results indicate that the site groundwater continues to be significantly impacted by TPH-g, TPH-d, benzene, MTBE, and TBA. TBA levels have generally increased over time as MTBE levels have decreased.

FUTURE ACTIVITIES

Clearwater is in the process of implementing the *Revised Workplan* including ACEH's Technical Comments dated January 2, 2007. The *Revised Workplan* activities will include reporting on the advancement of soil borings on the adjacent properties, logging of two additional on-site borings using the CPT system, installation of two additional deep groundwater monitoring wells and six permanent vapor wells, and scheduling a High-Vacuum Dual Phase Extraction Pilot Test and a Persulfate Bench Test on soil cuttings and groundwater obtained during the installation of the deep groundwater monitoring wells.

CLEARWATER
GROUP
Environmental Services

CERTIFICATION

This report was prepared under the supervision of a Professional Geologist registered in the State of California. All statements, conclusions, and recommendations are based solely upon published results from previous consultants, field observations by Clearwater staff, and laboratory analyses performed by a State-of-California-certified laboratory related to the work performed by Clearwater. Information and interpretation presented herein are for the sole use of the client and regulatory agency. A third party should not rely upon the information and interpretation contained in this document.

The service provided by Clearwater has been conducted in a manner consistent with the level of care and skill ordinarily exercised by members of this profession currently practicing under similar conditions in the area of the site. No other warranty, expressed or implied, is made.

LICENSED PROFESSIONALS

In-house licensed professionals direct all projects. These professionals, including geologists or engineers, shall be guided by the highest standards of ethics, honesty, integrity, fairness, personal honor, and professional conduct. To the fullest extent possible, the licensed professional shall protect the public health and welfare and property in carrying out their professional duties. In the course of normal business, recommendations by the in-house professional may include the use of equipment, services, or products in which the Company has an interest. Therefore, the Company is making full disclosure of potential or perceived conflicts of interest to all parties.

Sincerely,
CLEARWATER GROUP

REGISTERED GEOLOGIST
ROBERT L. NELSON
No. 2087
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

Robert L. Nelson, #P.G. 6270, #C.E.G. 2087
Senior Geologist

PROFESSIONAL GEOLOGIST
JAMES ALAN JACOBS
NO. 88
CERTIFIED HYDROGEOLOGIST
STATE OF CALIFORNIA

James A. Jacobs, P.G. #4815, C.H.G. #88
Chief Hydrogeologist

cc: Mr. Muhammad Jamil, 40092 Davis Street, Fremont, CA 94538

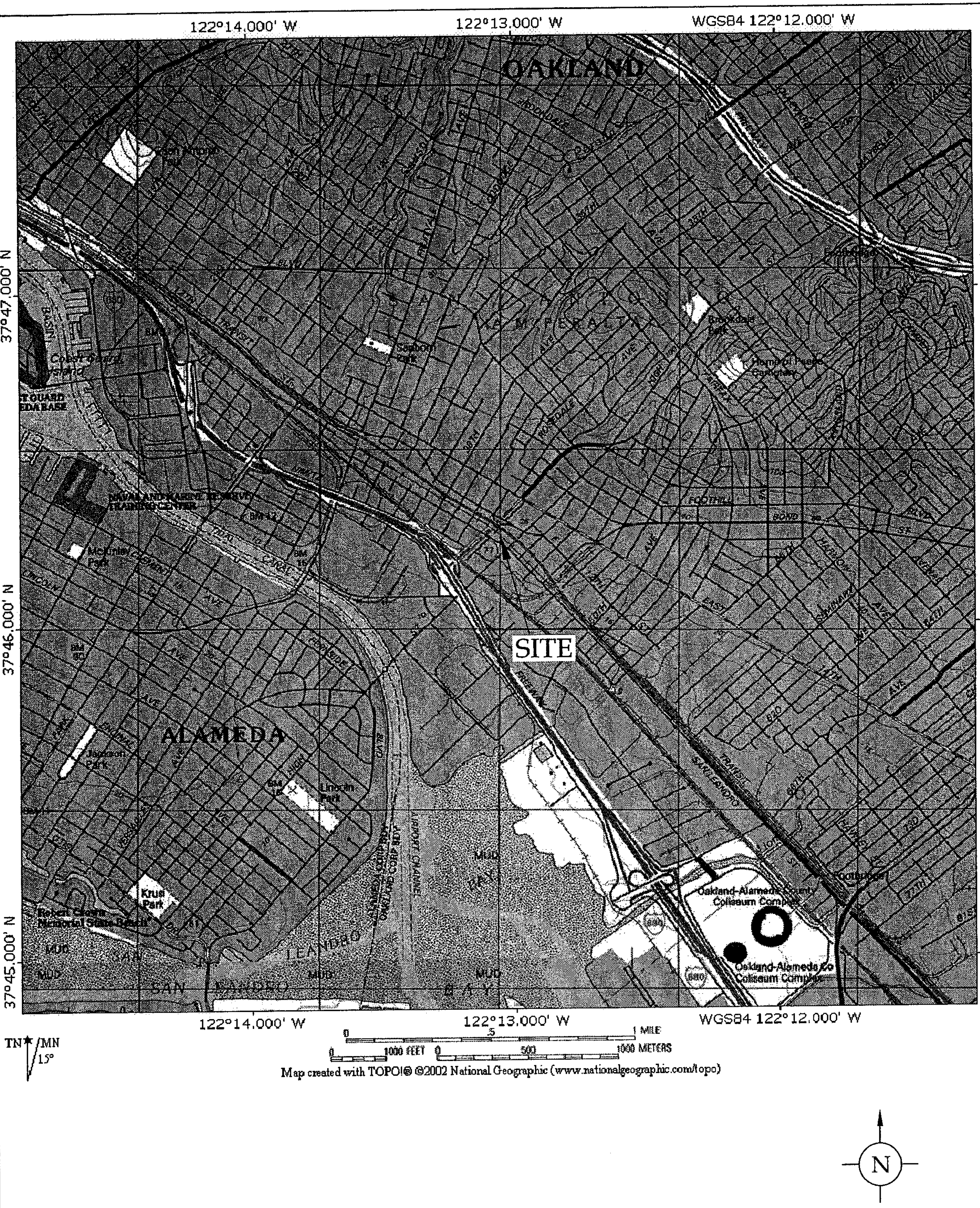
CLEARWATER GROUP
Environmental Services

FIGURES

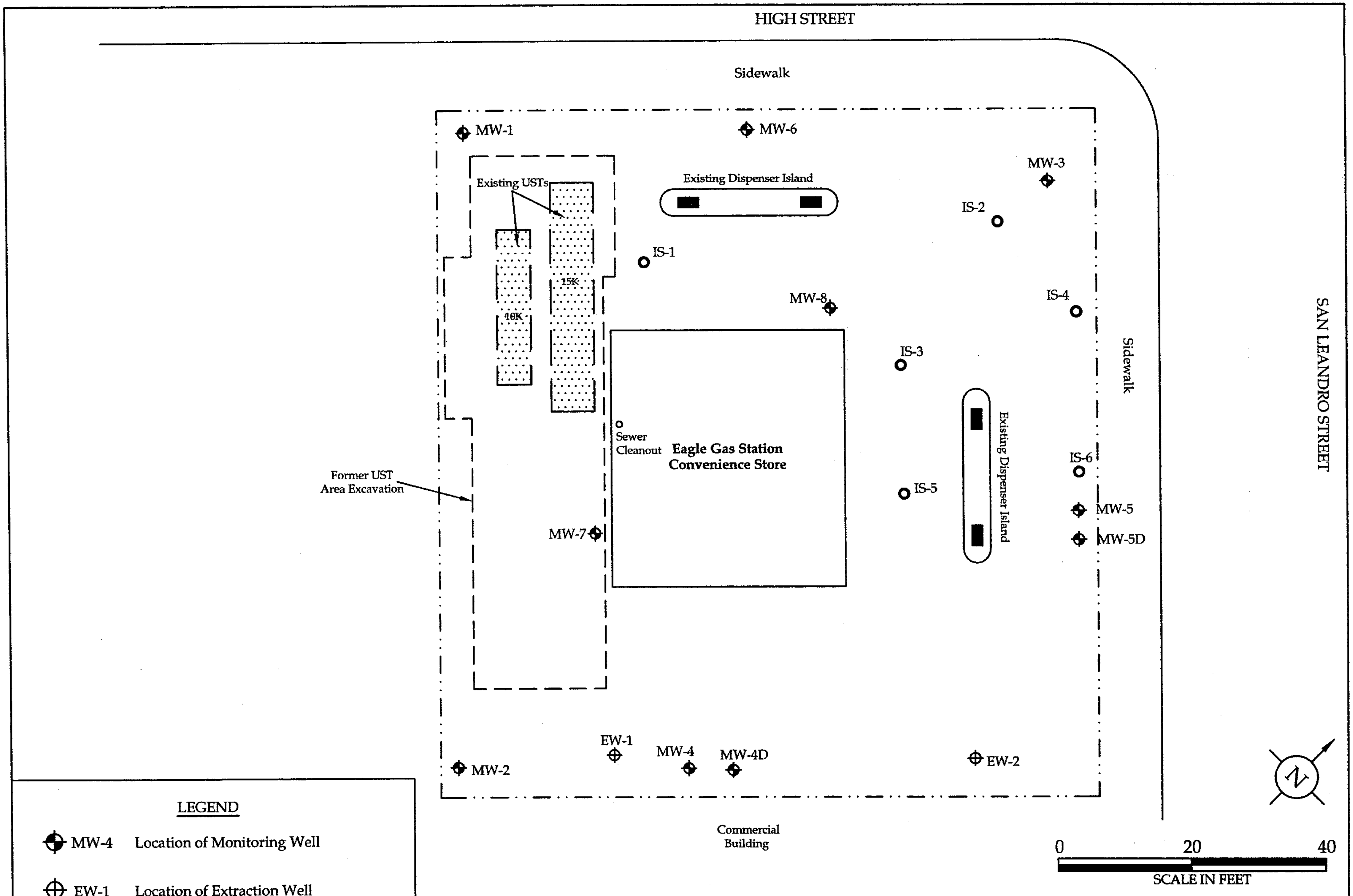
TABLES

ATTACHMENTS

FIGURES



SITE VICINITY MAP Eagle Gas 4301 San Leandro Street Oakland, California	CLEARWATER GROUP		
	Project No. ZP046	Figure Date 5/06	Figure 1

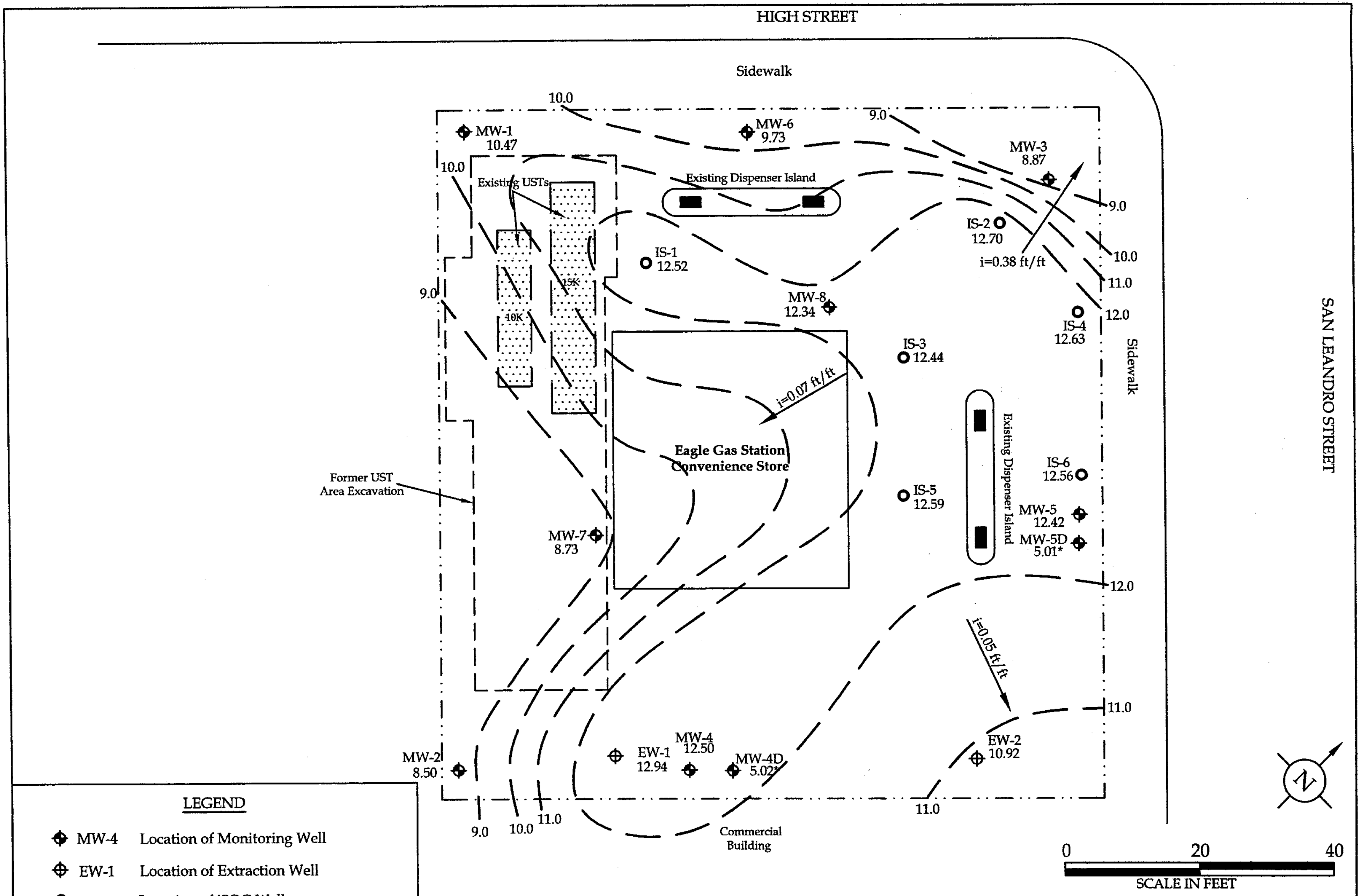


Site Plan

Eagle Gas
4301 San Leandro Street
Oakland, California

CLEARWATER GROUP

Project No.	Figure Date	Figure
ZP046	6/07	2



LEGEND

- MW-4 Location of Monitoring Well
- EW-1 Location of Extraction Well
- IS-1 Location of iSOC Well
- Property Line
- Groundwater Elevation Contour (feet above mean sea level)

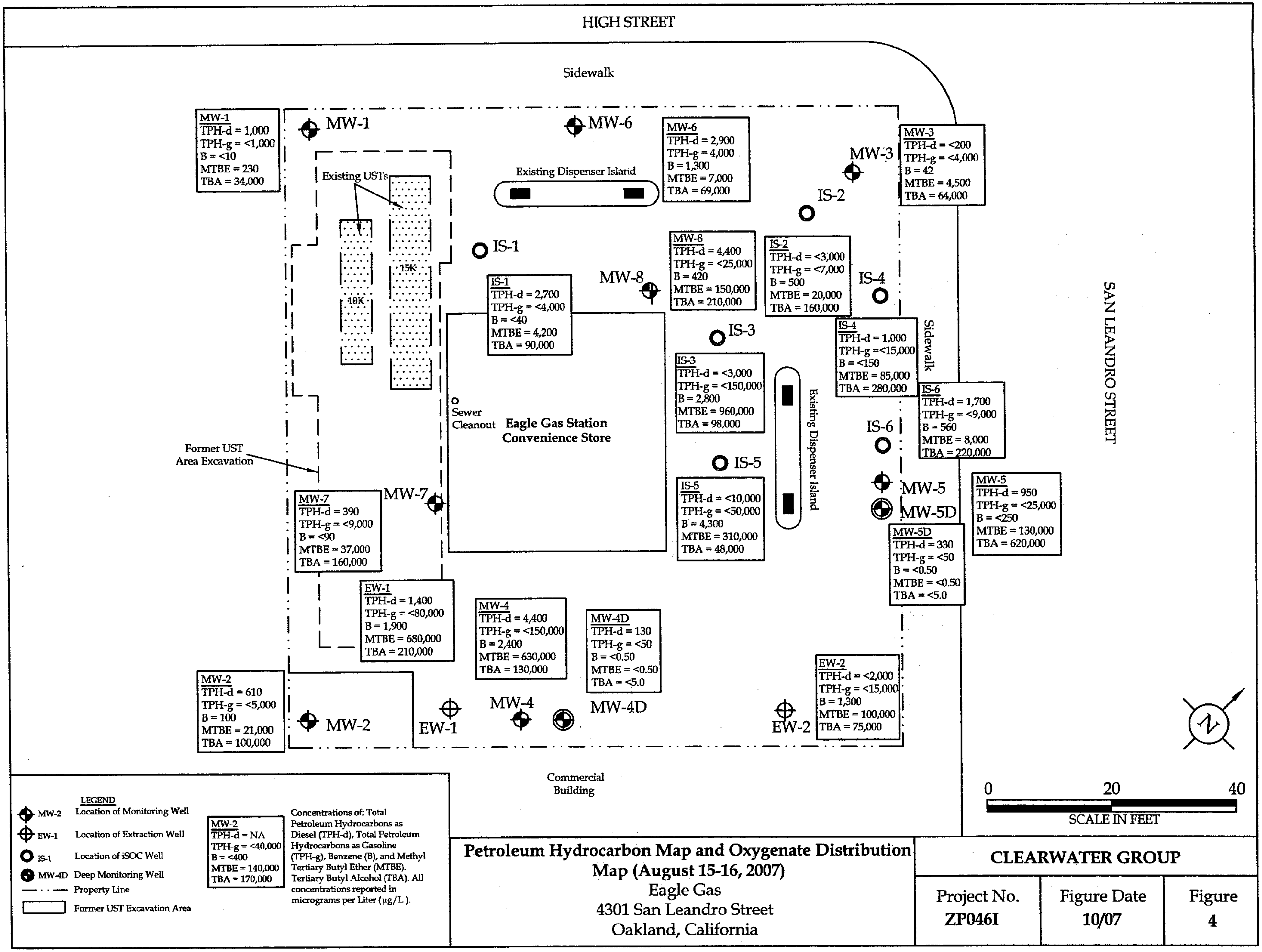
* not included in contouring

Groundwater Elevation Contour Map
August 15, 2007
Eagle Gas
4301 San Leandro Street
Oakland, California

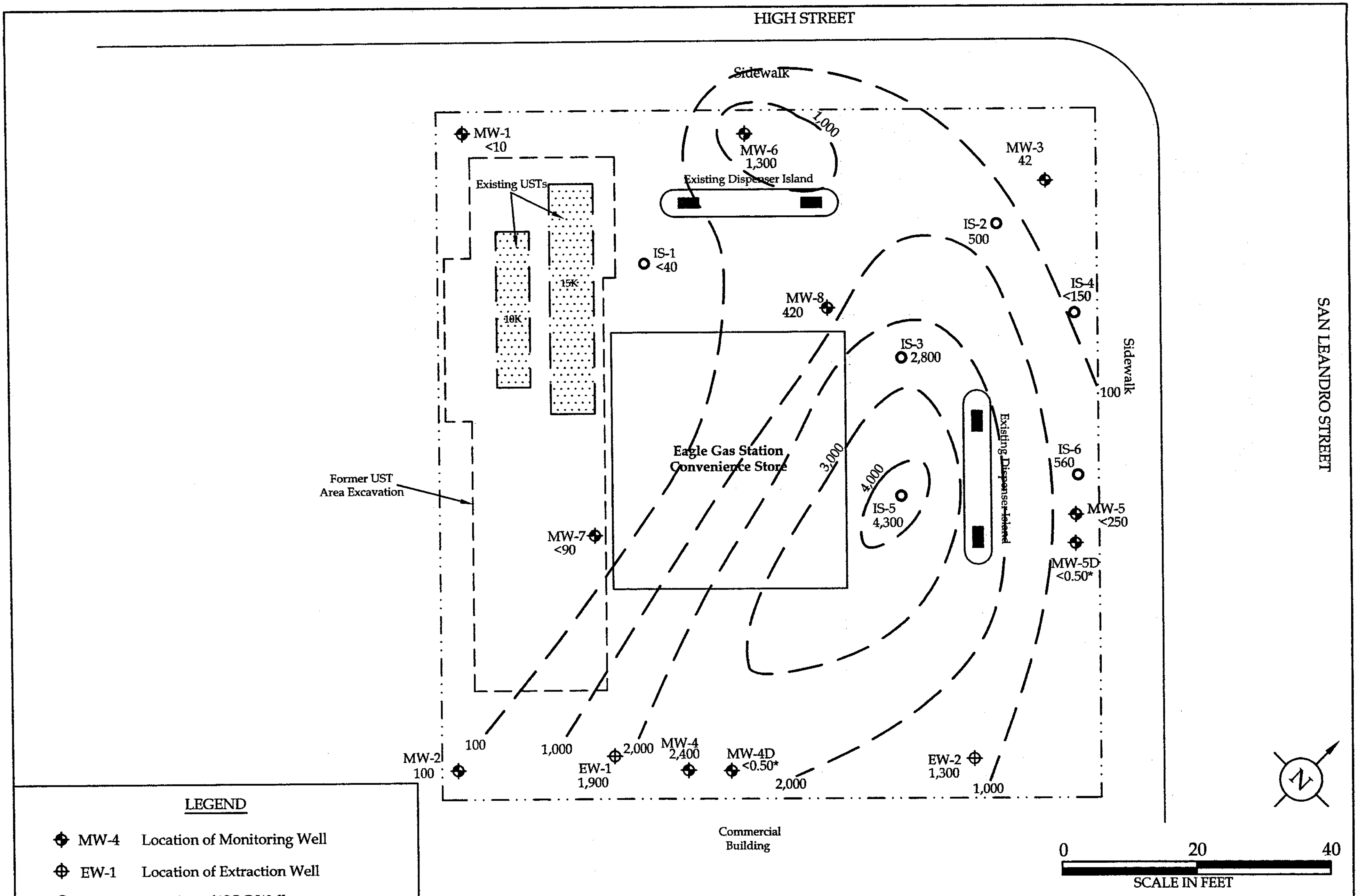
CLEARWATER GROUP

Project No.	Figure Date	Figure
ZP046I	**9/07**	**3**

\\Tagi\Shares\Department\Jobs\ZP046 Eagle Gas\Quaterly Reports\3Q07\Figures\ZP046D -Figure 3 Groundwater Contour Elevation Map



\\Tagi\Shares\Department\Jobs\ZP046 Eagle Gas\Quaterly Reports\3Q07\Figuress\Fig 4 Petroleum Hydrocarbon Map

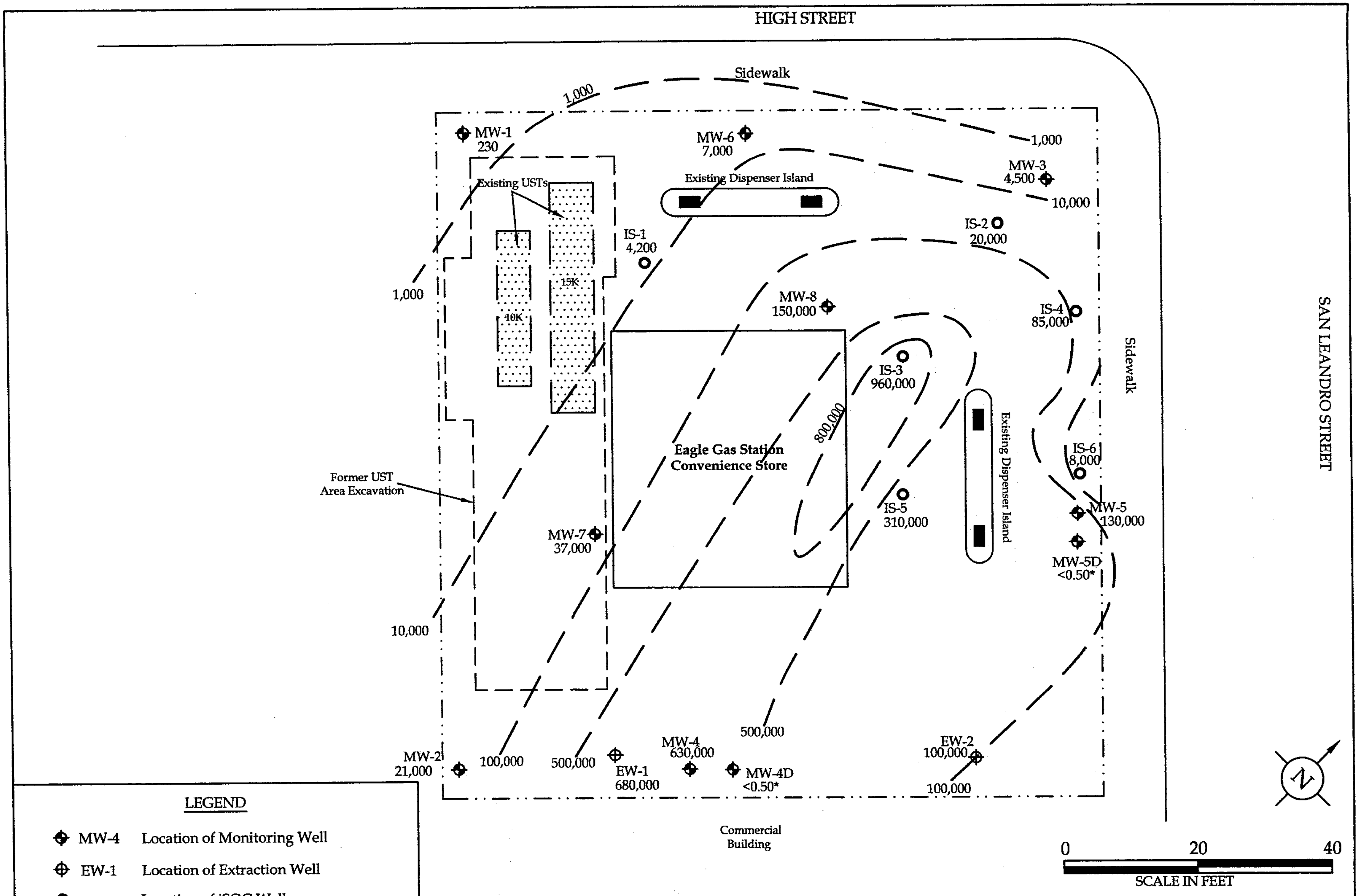


Benzene ISO-Contour Map
August 15-16, 2007
Eagle Gas
4301 San Leandro Street
Oakland, California

CLEARWATER GROUP

Project No.	Figure Date	Figure
ZP046I	10/07	5

\\Tagi\Shares\Department\Jobs\ZP046 Eagle Gas\Quaterly Reports\3Q07\Figures\ZP046D -Figure 5 Benzene ISO-Contour Map



LEGEND

MW-4	Location of Monitoring Well
EW-1	Location of Extraction Well
IS-1	Location of iSOC Well
— · · —	Property Line
— — —	MTBE ISO-Contour in micrograms per liter (µg/L)

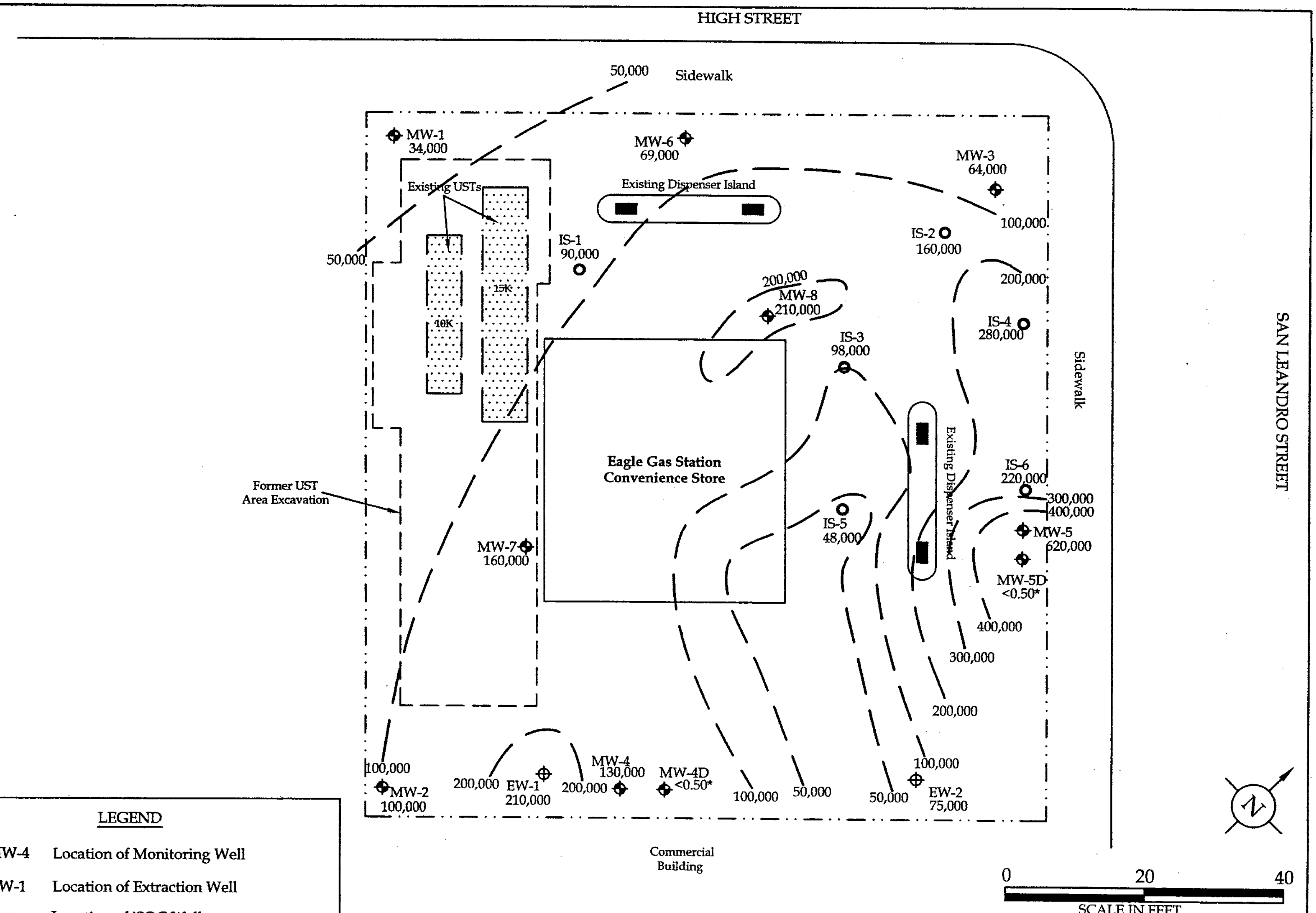
* not included in contouring

MTBE ISO-Contour Map
August 15-16, 2007
Eagle Gas
4301 San Leandro Street
Oakland, California

CLEARWATER GROUP

Project No.	Figure Date	Figure
ZP046I	**9/07**	**6**

\\Tagi\Shares\Department\Jobs\ZP046 Eagle Gas\Quaterly Reports\3Q07\Figures\ZP046D -Figure 6 MTBE ISO-Contour Map



LEGEND

- MW-4 Location of Monitoring Well
- EW-1 Location of Extraction Well
- IS-1 Location of iSOC Well
- —·· — Property Line
- — — — TBA ISO-Contour in micrograms per liter (µg/L)

* not included in contouring

TBA ISO-Contour Map
August 15-16, 2007
Eagle Gas
4301 San Leandro Street
Oakland, California

CLEARWATER GROUP

Project No.	Figure Date	Figure
ZP046I	**9/07**	7

\\Tagi\Shares\Department\Jobs\ZP046 Eagle Gas\Quaterly Reports\3Q07\Figures\ZP046D -Figure 7 TBA ISO-Contour Map

FIGURE 8
Concentrations of MTBE and TBA in Monitoring Well MW-5

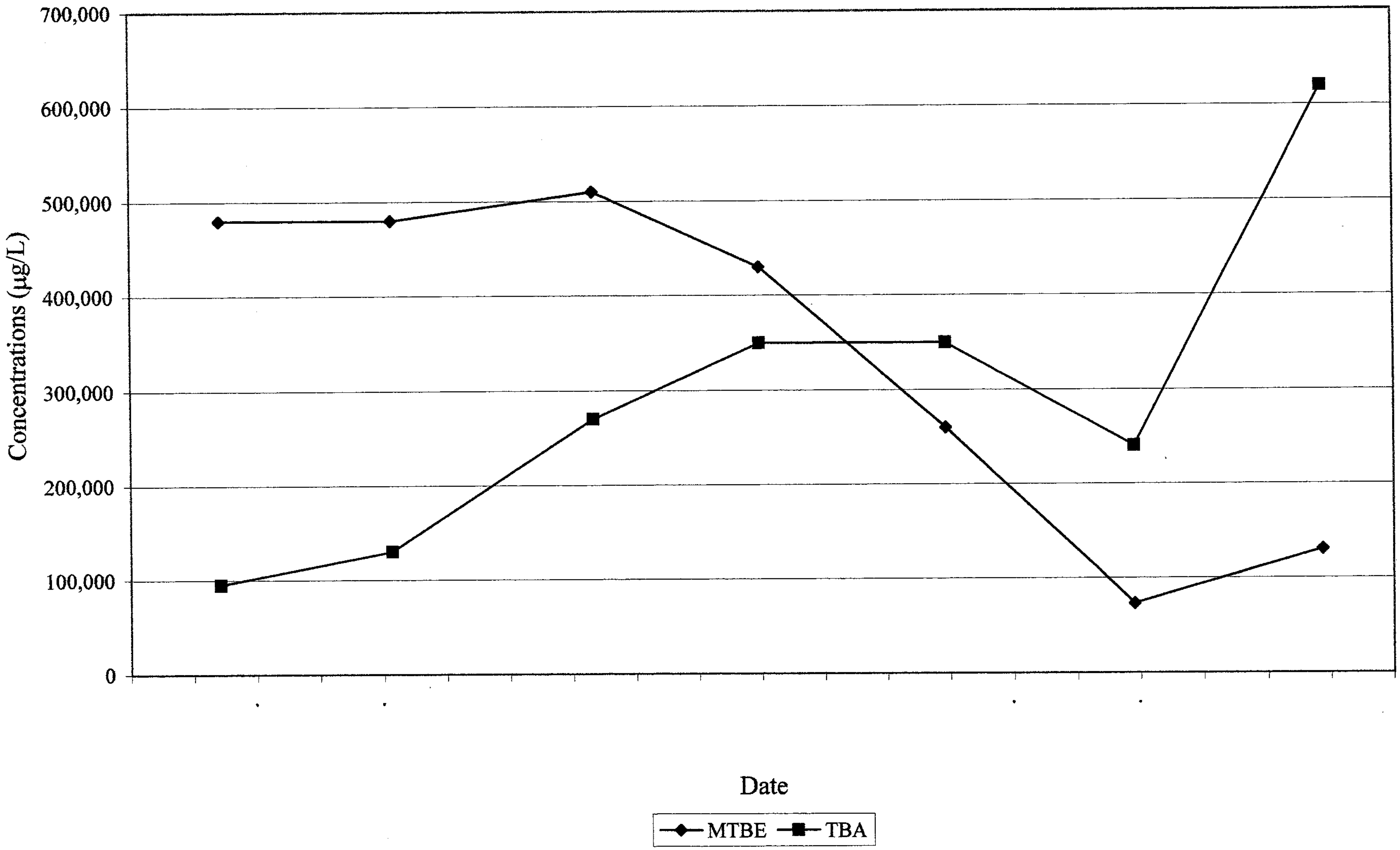
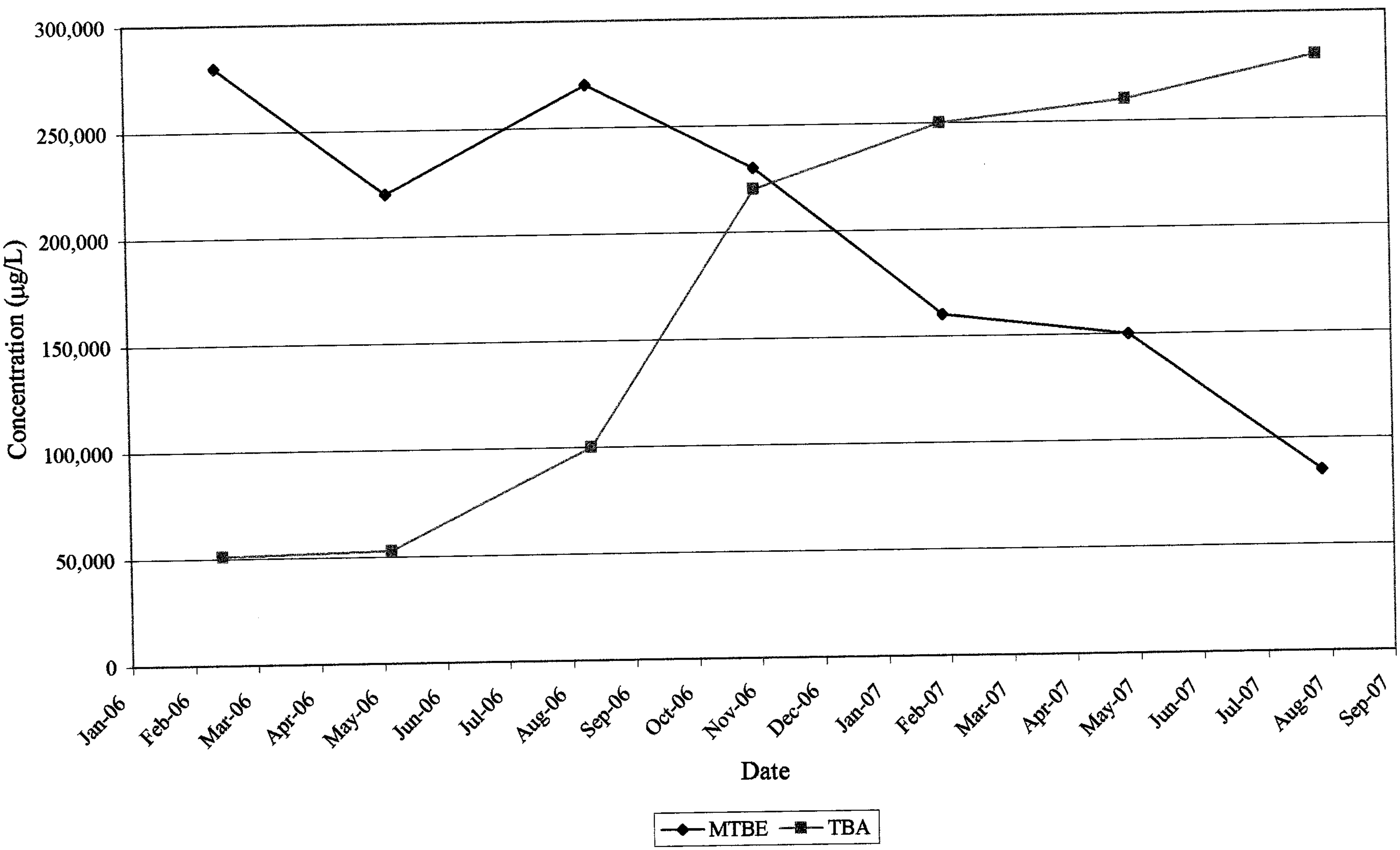


FIGURE 9
Concentrations of MTBE and TBA in Monitoring Well IS-4



TABLES

TABLE 1
WELL CONSTRUCTION DATA
4301 San Leandro Street
Oakland, California

Well I.D.	Date Installed	Installed by	Borehole Diameter (inches)	Casing Diameter (inches)	Depth of Borehole (feet)	Cement (feet)	Bentonite Seal (feet)	Filter Pack (feet)	Filter Pack Material	Screened Interval (feet)	Slot Size (inches)
MW-1	9/26/2000	West Hazmat	8	2	25	0-5	5-7	7-25	2/12 sand	10-25	0.01
MW-2	9/26/2000	West Hazmat	8	2	25	0-5	5-7	7-25	2/12 sand	10-25	0.01
MW-3	9/26/2000	West Hazmat	8	2	25	0-5	5-7	7-25	2/12 sand	10-25	0.01
MW-4	12/19/2005	HEW Drilling	8	2	25	0-5	5-8	8-25	#3 sand	10-25	0.02
MW-4D	12/19/2005	HEW Drilling	8	2	45	0-30	30-33	33-45	#3 sand	35-45	0.02
MW-5	12/15/2005	HEW Drilling	8	2	25	0-5	5-8	8-25	#3 sand	10-25	0.02
MW-5D	12/15/2005	HEW Drilling	8	2	45	0-30	30-33	33-45	#3 sand	35-45	0.02
MW-6	12/20/2005	HEW Drilling	8	2	25	0-5	5-8	8-25	#3 sand	10-25	0.02
MW-7	12/19/2005	HEW Drilling	8	2	25	0-5	5-8	8-25	#3 sand	10-25	0.02
MW-8	12/21/2005	HEW Drilling	8	2	25	0-5	5-8	8-25	#3 sand	10-25	0.02
IS-1	12/20/2005	HEW Drilling	8	2	25	0-3	3-6	6-25	#3 sand	10-25	0.02
IS-2	12/20/2005	HEW Drilling	8	2	25	0-3	3-6	6-25	#3 sand	10-25	0.02
IS-3	12/21/2005	HEW Drilling	8	2	25	0-3	3-6	6-25	#3 sand	10-25	0.02
IS-4	12/20/2005	HEW Drilling	8	2	25	0-3	3-6	6-25	#3 sand	10-25	0.02
IS-5	12/21/2005	HEW Drilling	8	2	25	0-3	3-6	6-25	#3 sand	10-25	0.02
IS-6	12/20/2005	HEW Drilling	8	2	25	0-3	3-6	6-25	#3 sand	10-25	0.02
EW-1	12/16/2005	HEW Drilling	8	4	25	0-3	3-6	6-25	#3 sand	10-25	0.02
EW-2	12/16/2005	HEW Drilling	8	4	25	0-3	3-6	6-25	#3 sand	10-25	0.02

Note: All depths and intervals are below ground surface

TABLE 2
GROUNDWATER ELEVATIONS AND GROUNDWATER SAMPLE ANALYTICAL RESULTS
4301 San Leandro Street
Oakland, California

Sample ID	Sample Date	TOC (feet)	DTW (feet)	GWE (feet)	TPH-d (µg/L)	TPH-g (µg/L)	B (µg/L)	T (µg/L)	E (µg/L)	X (µg/L)	MTBE (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	TBA (µg/L)	Methanol (µg/L)	Ethanol (µg/L)	DCA (µg/L)	EDB (µg/L)
ESL (µg/L)					640	500	46	130	290	100	1,800	--	--	--	18,000	--	50,000	200	150
MW-1	10/3/2000	18.37	8.96	9.41	460	93,000	<500	<500	<500	<500	130,000	<10,000	<10,000	<10,000	<2,000	---	---	---	---
	10/27/2000	18.37	7.27	11.10	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	1/26/2001	18.37	7.60	10.77	1,600*	51,000	270	<100	<100	<100	77,000	<5,000	<5,000	<5,000	<20,000	---	---	---	---
	5/8/2001	18.37	7.50	10.87	470*	36,000*	<100	<100	<100	<100	15,000	<5,000	<5,000	<5,000	<20,000	---	---	---	---
	8/3/2001	18.37	7.09	11.28	2,200*	19,000*	<50	59	<50	<50	96,000	<5,000	<5,000	<5,000	<20,000	---	---	---	---
	7/1/2003	18.37	7.59	10.78	3,000	<25,000	<250	<250	<250	<250	170,000	<250	<250	980	8,700	---	---	---	---
	10/1/2003	18.37	8.36	10.01	2,600	<20,000	<200	<200	<200	<200	69,000	<200	<200	270	15,000	---	---	---	---
	2/13/2004	18.37	8.80	9.57	1,800	<10,000	<100	<100	<100	<100	85,000	<100	<100	390	79,000	---	---	---	---
	5/17/2004	18.37	10.92	7.45	5,400	<15,000	<150	<150	<150	<150	60,000	<150	<150	260	160,000	---	---	---	---
	8/6/2004	18.37	7.76	10.61	510	<10,000	<100	<100	<100	<100	26,000	<100	<100	100	250,000	---	---	---	---
	11/12/2004	18.37	9.25	9.12	3,500	<5,000	<50	<50	<50	<50	25,000	<50	<50	150	160,000	---	---	---	---
	2/15/2005	18.37	10.12	8.25	2,900	<5,000	<50	<50	<50	<50	12,000	<50	<50	70	160,000	---	---	---	---
	5/9/2005	18.37	9.58	8.79	1,700	<5,000	<50	<50	<50	<50	11,000	<50	<50	53	200,000	---	---	---	---
	8/8/2005**	20.08	10.09	9.99	2,000	<5,000	<50	<50	<50	<50	8,500	<50	<50	<50	250,000	---	---	---	---
	11/16/2005	20.08	9.81	10.27	3,600	<5,000	<50	<50	<50	<50	3,800	<50	<50	<50	140,000	<5,000	<500	<50	<50
	2/22/2006	20.08	9.58	10.50	2,600	<5,000	<50	<50	<50	<50	5,800	<50	<50	<50	120,000	<5,000	<500	<50	<50
	5/16/2006	20.08	6.89	13.19	4,700	<5,000	<50	<50	<50	<50	3,700	<50	<50	<50	150,000	<5,000	<500	<50	<50
	8/23/2006'	20.08	9.21	10.87	2,000	<5,000	<50	<50	<50	<50	3,700	<50	<50	<50	110,000	<5,000	<500	<50	<50
	11/13/2006	20.08	8.55	11.53	NA	<4,000	<40	<40	<40	<40	2,000	<40	<40	<40	79,000	NA	NA	NA	NA
	2/13/2007	20.08	7.11	12.97	900	<2,500	<25	<25	<25	<25	3,700	<25	<25	25	63,000	NA	NA	NA	NA
	5/15/2007	20.08	6.63	13.45	3,000	<2,500	<25	<25	<25	<25	1,100	<25	<25	<25	52,000	NA	NA	NA	NA
	8/15/2007	20.08	9.61	10.47	**1,000**	<1,000	<10	<10	<10	<10	**230**	<10	<10	<10	**34,000**	NA	NA	NA	NA
MW-2	10/3/2000	20.28	20.26	0.02	210	250,000	<1,250	<1,250	<1,250	<1,250	400,000	<25,000	<25,000	<25,000	<100,000	---	---	---	---
	10/27/2000	20.28	13.88	6.40	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	1/26/2001	20.28	12.10	8.18	6,000*	740,000	3,800	<500	940	1,600	1,000,000	<50,000	<50,000	<50,000	<200,000	---	---	---	---
	5/8/2001	20.28	12.05	8.23	2,100*	140,000	2,800	<250	780	640	840,000	<50,000	<50,000	<50,000	<200,000	---	---	---	---
	8/3/2001	20.28	13.30	6.98	2,600*	42,000*	1,100	63	230	130	880,000	<25,000	<25,000	<25,000	<100,000	---	---	---	---
	7/1/2003	20.28	14.98	5.30	2,200	<200,000	<2,000	<2,000	<2,000	<2,000	790,000	<2,000	<2,000	3,400	<20,000	---	---	---	---
	10/1/2003	20.28	15.99	4.29	870	<100,000	<1,000	<1,000	<1,000	<1,000	620,000	<1,000	<1,000	2,700	<20,000	---	---	---	---

TABLE 2
GROUNDWATER ELEVATIONS AND GROUNDWATER SAMPLE ANALYTICAL RESULTS
4301 San Leandro Street
Oakland, California

Sample ID	Sample Date	TOC (feet)	DTW (feet)	GWE (feet)	TPH-d (μg/L)	TPH-g (μg/L)	B (μg/L)	T (μg/L)	E (μg/L)	X (μg/L)	MTBE (μg/L)	DIPE (μg/L)	ETBE (μg/L)	TAME (μg/L)	TBA (μg/L)	Methanol (μg/L)	Ethanol (μg/L)	DCA (μg/L)	EDB (μg/L)
ESL (μg/L)					640	500	46	130	290	100	1,800	--	--	--	18,000	--	50,000	200	150
MW-2	2/13/2004	20.28	13.88	6.40	1,200	<20,000	860	<200	260	<200	710,000	<200	<200	2,000	<25,000	---	---	---	---
cont'd	5/17/2004	20.38	14.68	5.70	2,500	<50000	860	<500	<500	<500	760,000	<500	<500	2,500	13,000J	---	---	---	---
	8/6/2004	20.38	15.36	5.02	2,500	<50000	590	<500	<500	<500	810,000	<500	<500	3,600	17,000J	---	---	---	---
	11/12/2004	20.38	15.49	4.89	500	<150,000	<1500	<1500	<1500	<1500	700,000	<1500	<1500	2,800	25,000J	---	---	---	---
	2/15/2005	20.38	14.16	6.22	990	<150,000	<1,500	<1,500	<1,500	<1,500	630,000	<1,500	<1,500	2,600	32,000	---	---	---	---
	5/9/2005	20.38	13.62	6.76	1,100	<150,000	<1,500	<1,500	<1,500	<1,500	570,000	<1,500	<1,500	2,300	32,000	---	---	---	---
	8/8/2005**	22.05	13.36	8.69	770	<150,000	<1,500	<1,500	<1,500	<1,500	770,000	<1,500	<1,500	2,200	85,000	---	---	---	---
	11/16/2005	22.05	14.51	7.54	890	<70,000	<700	<700	<700	<700	430,000	<700	<700	2,100	130,000	<100,000	<7,000	<700	<700
	2/22/2006	22.05	12.69	9.36	<1,500	<70,000	800	<700	<700	<700	400,000	<700	<700	1,700	130,000	<70,000	<7,000	<700	<700
	5/16/2006	22.05	12.01	10.04	1,100	<70,000	<700	<700	<700	<700	250,000	<700	<700	940	140,000	<70,000	<7,000	<700	<700
	8/23/2006'	21.98	11.33	10.65	660	<40,000	<400	<400	<400	<400	200,000	<400	<400	830	170,000	<40,000	<4,000	<400	<400
	11/13/2006	21.98	13.64	8.34	NA	<40,000	<400	<400	<400	<400	140,000	<400	<400	490	170,000	NA	NA	NA	NA
	2/13/2007	21.98	12.78	9.20	780	<20,000	250	<200	<200	<200	100,000	<200	<200	240	130,000	NA	NA	NA	NA
	5/16/2007	21.98	13.17	8.81	800	<7,000	150	<70	<70	<70	44,000	<70	<70	120	130,000	NA	NA	NA	NA
	8/16/2007	21.98	13.48	8.50	**610**	<5,000	**100**	<50	<50	<50	**21,000**	<50	<50	<80++	**100,000**	NA	NA	NA	NA
MW-3	10/3/2000	18.98	---	---	120	83,000	<500	<500	<500	<500	33,000	<2,500	<2,500	<2,500	<10,000	---	---	---	---
	10/27/2000	18.98	18.75	0.23	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	1/26/2001	18.98	13.38	5.60	900*	230,000	930	<500	<500	<500	330,000	<25,000	<25,000	<25,000	<100,000	---	---	---	---
	5/8/2001	18.98	11.82	7.16	1,100*	95,000	840	<250	<250	<250	390,000	<12,500	<12,500	<12,500	<50,000	---	---	---	---
	8/3/2001	18.98	13.44	5.54	290*	30,000*	<50	51	<50	<50	270,000	<12,500	<12,500	<12,500	<50,000	---	---	---	---
	7/1/2003	18.98	12.67	6.31	620	<50,000	<500	<500	<500	<500	230,000	<500	<500	1,800	<5,000	---	---	---	---
	10/1/2003	18.98	14.04	4.94	370	<20,000	<200	<200	<200	<200	120,000	<200	<200	1,200	<5,000	---	---	---	---
	2/13/2004	18.98	12.20	6.78	430	<20,000	280	<200	<200	<200	210,000	<200	<200	1,200	<5,000	---	---	---	---
	5/17/2004	18.98	11.87	7.11	920	<25,000	<250	<250	<250	<250	150,000	<250	<250	1,100	5,600J	---	---	---	---
	8/6/2004	18.98	13.07	5.91	78	<20,000	<200	<200	<200	<200	110,000	<200	<200	760	<2,500	---	---	---	---
	11/12/2004	18.98	12.83	6.15	120	<20,000	<200	<200	<200	<200	100,000	<200	<200	660	6,000	---	---	---	---
	2/15/2005	18.98	11.95	7.03	130	<25,000	<250	<250	<250	<250	110,000	<250	<250	760	12,000	---	---	---	---
	5/9/2005	18.98	10.51	8.47	320	<15,000	<150	<150	<150	<150	97,000	<150	<150	780	30,000	---	---	---	---
	8/8/2005**	20.73	10.98	9.75	180	<15,000	<150	<150	<150	<150	75,000	<150	<150	500	44,000	---	---	---	---

TABLE 2
GROUNDWATER ELEVATIONS AND GROUNDWATER SAMPLE ANALYTICAL RESULTS

4301 San Leandro Street
Oakland, California

Sample ID	Sample Date	TOC (feet)	DTW (feet)	GWE (feet)	TPH-d (µg/L)	TPH-g (µg/L)	B (µg/L)	T (µg/L)	E (µg/L)	X (µg/L)	MTBE (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	TBA (µg/L)	Methanol (µg/L)	Ethanol (µg/L)	DCA (µg/L)	EDB (µg/L)
ESL (µg/L)					640	500	46	130	290	100	1,800	--	--	--	18,000	--	50,000	200	150
MW-3 cont'd	11/16/2005	20.73	12.89	7.84	<200	<5,000	<50	<50	<50	<50	37,000	<50	<50	190	38,000	<5,000	<500	<50	<50
	2/22/2006	20.73	10.31	10.42	<600	<5,000	88	<50	<50	<50	57,000	<50	<50	420	65,000	<9,000	<500	<50	<50
	5/16/2006	20.73	9.03	11.70	<600^	<9,000	110	<90	<90	<90	42,000	<90	<90	340	68,000	<9,000	<900	<90	<90
	8/23/2006'	20.68	10.81	9.87	<200^	<4,000	<40	<40	<40	<40	18,000	<40	<40	120	60,000	<4,000	<400	<40	<40
	11/13/2006	20.68	12.29	8.39	NA	<2,000	<20	<20	<20	<20	6,100	<20	<20	30	54,000	NA	NA	NA	NA
	2/13/2007	20.68	11.23	9.45	<200^	<4,000	52	<40	<40	<40	13,000	<40	<40	82	65,000	NA	NA	NA	NA
	5/15/2007	20.68	10.39	10.29	<300^	<4,000	67	<40	<40	<40	12,000	<40	<40	77	71,000	NA	NA	NA	NA
	8/15/2007	20.68	11.81	8.87	<200^	<4,000	**42**	<40	<40	<40	**4,500**	<40	<40	<40	**64,000**	NA	NA	NA	NA
MW-4	2/22/2006	21.63	7.87	13.76	<8,000	<150,000	3,200	2,000	1,600	3,800	770,000	<1,500	<1,500	3,300	59,000	<150,000	<15,000	<1,500	<1,500
	5/16/2006	21.63	8.04	13.59	3,800	<70,000	2,100	<700	930	1,500	410,000	<700	<700	2,500	110,000	<70,000	<7,000	<700	<700
	8/23/2006'	21.53	9.77	11.76	8,400	89,000	4,500	<700	2,100	2,800	870,000	<700	<700	4,000	89,000	<70,000	<7,000	<700	<700
	11/13/2006	21.53	8.78	12.75	NA	<150,000	3,700	<1,500	<1,500	2,400	950,000	<1,500	<1,500	4,000	110,000	NA	NA	NA	NA
	2/13/2007	21.53	7.56	13.97	2,000	<150,000	2,000	<1,500	<1,500	<1,500	640,000	<1,500	<1,500	2,900	130,000	NA	NA	NA	NA
	5/16/2007	21.53	7.97	13.56	1,900 ^^	<70,000	3,200	<700	1,000	940	430,000	<700	<700	2,300	160,000	NA	NA	NA	NA
	8/16/2007	21.53	9.03	12.50	**4,400**	<150,000	**2,400**	<1,500	<1,500	<1,500	**630,000**	<1,500	<1,500	**4,300**	**130,000**	NA	NA	NA	NA
MW-4D	2/21/2006	21.54	15.58	5.96	<50	<90	<0.90	<0.90	<0.90	<0.90	440	<0.90	<0.90	2	<5.0	<90	<9.0	<0.90	<0.90
	5/16/2006	21.54	13.23	8.31	<50	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<5.0	<50	<5.0	<0.50	<0.50
	8/23/2006'	21.44	15.33	6.11	<50	<50	<0.50	<0.50	<0.50	<0.50	1	<0.50	<0.50	<0.50	<5.0	93	8	<0.50	<0.50
	11/13/2006	21.44	16.23	5.21	NA	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<5.0	NA	NA	NA	NA
	2/13/2007	21.44	15.73	5.71	<50	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<5.0	NA	NA	NA	NA
	5/15/2007	21.44	15.38	6.06	<50	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<5.0	NA	NA	NA	NA
	8/15/2007	21.44	16.42	5.02	**130** ^^	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<5.0	NA	NA	NA	NA
MW-5	2/21/2006	20.48	6.63	13.85	<3,000	<10,000	460	<100	170	<100	480,000	<100	<100	3,000	95,000	<90,000	<1,000	<100	<100
	5/16/2006	20.48	6.62	13.86	1,600	<90,000	<900	<900	<900	<900	480,000	<900	<900	2,300	130,000	<90,000	<9,000	<900	<900
	8/23/2006'	20.41	7.62	12.79	1,400	<90,000	<900	<900	<900	<900	510,000	<900	<900	2,400	270,000	<90,000	<9,000	<900	<900
	11/13/2006	20.41	7.31	13.10	NA	<90,000	<900	<900	<900	<900	430,000	<900	<900	2,200	350,000	NA	NA	NA	NA
	2/13/2007	20.41	6.54	13.87	1,000	<50,000	<500	<500	<500	<500	260,000	<500	<500	740	350,000	NA	NA	NA	NA
	5/16/2007	20.41	6.79	13.62	2,200 ^^	<15,000	650	<150	<150	<150	73,000	<150	<150	610	240,000	NA	NA	NA	NA
	8/16/2007	20.41	7.99	12.42	**950**	<25,000	<250	<250	<250	<250	**130,000**	<250	<250	**550**	**620,000**	NA	NA	NA	NA

TABLE 2
GROUNDWATER ELEVATIONS AND GROUNDWATER SAMPLE ANALYTICAL RESULTS
4301 San Leandro Street
Oakland, California

Sample ID	Sample Date	TOC (feet)	DTW (feet)	GWE (feet)	TPH-d (µg/L)	TPH-g (µg/L)	B (µg/L)	T (µg/L)	E (µg/L)	X (µg/L)	MTBE (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	TBA (µg/L)	Methanol (µg/L)	Ethanol (µg/L)	DCA (µg/L)	EDB (µg/L)
ESL (µg/L)					640	500	46	130	290	100	1,800	--	--	--	18,000	--	50,000	200	150
MW-5D	2/21/2006	20.32	13.68	6.64	<50	<50	<0.50	<0.50	<0.50	<0.50	8	<0.50	<0.50	<0.50	6	<50	<5.0	<0.50	<0.50
	5/16/2006	20.32	12.72	7.60	<50	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<5.0	<50	<5.0	<0.50	<0.50
	8/23/2006'	20.22	14.48	5.74	<50	<50	<0.50	<0.50	<0.50	<0.50	56	<0.50	<0.50	<0.50	<5.0	120	6	<0.50	<0.50
	11/13/2006	20.22	14.98	5.24	NA	<50	<0.50	<0.50	<0.50	<0.50	81	<0.50	<0.50	<0.50	<5.0	NA	NA	NA	NA
	2/13/2007	20.22	14.48	5.74	<50	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<5.0	NA	NA	NA	NA
	5/15/2007	20.22	14.13	6.09	<50	<50	<0.50	<0.50	<0.50	<0.50	1.1	<0.50	<0.50	<0.50	<5.0	NA	NA	NA	NA
	8/15/2007	20.22	15.21	5.01	**330** ^^	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<5.0	NA	NA	NA	NA
MW-6	2/22/2006	20.45	9.88	10.57	2,900	<10,000	620	<100	<100	<100	50,000	<100	<100	210	24,000	<10,000	<1,000	<100	<100
	5/16/2006	20.45	9.35	11.10	3,200	<9,000	1,500	<90	<90	<90	50,000	<90	<90	280	27,000	<10,000	<900	<90	<90
	8/23/2006'	20.47	10.48	9.99	3,400	<9,000	1,600	<90	<90	<90	39,000	<90	<90	190	55,000	<9,000++	<900	<90	<90
	11/13/2006	20.47	10.86	9.61	NA	<5,000	1,200	<50	<50	<50	17,000	<50	<50	66	71,000	NA	NA	NA	NA
	2/13/2007	20.47	10.31	10.16	2,400	4,900	1,800	<25	<25	<25	14,000	<25	<25	65	55,000	NA	NA	NA	NA
	5/15/2007	20.47	10.35	10.12	2,600	4,900	1,900	21	<20	<20	12,000	<20	<20	55	60,000	NA	NA	NA	NA
	8/15/2007	20.47	10.74	9.73	**2,900**	**4,000**	**1,300**	<20	<20	<20	**7,000**	<20	<20	**32**	**69,000**	NA	NA	NA	NA
MW-7	2/22/2006	21.13	11.72	9.41	400	<10,000	<100	<100	<100	<100	88,000	<100	<100	430	90,000	<10,000	<1,000	<100	<100
	5/16/2006	21.13	8.72	12.41	340	<5,000	<50	<50	<50	<50	28,000	<50	<50	120	47,000	<5,000	<500	<50	<50
	8/23/2006'	21.14	11.34	9.80	280	<9,000	<90	<90	<90	<90	62,000	<90	<90	280	160,000	<18,000++	<900	<90	<90
	11/13/2006	21.14	12.53	8.61	NA	<9,000	<90	<90	<90	<90	49,000	<90	<90	280	130,000	NA	NA	NA	NA
	2/13/2007	21.14	11.83	9.31	210	<7,000	<70	<70	<70	<70	33,000	<70	<70	170	130,000	NA	NA	NA	NA
	5/15/2007	21.14	10.99	10.15	250	<5,000	<50	<50	<50	<50	36,000	<50	<50	190	140,000	NA	NA	NA	NA
	8/15/2007	21.14	12.41	8.73	**390**	<9,000	<90	<90	<90	<90	**37,000**	<90	<90	**170**	**160,000**	NA	NA	NA	NA
MW-8	2/22/2006	21.03	7.28	13.75	6,800	<10,000	1,200	<100	270	220	400,000	<100	<100	2,100	63,000	<300,000	<1,000	<100	<100
	5/16/2006	21.03	7.48	13.55	3,800	<90,000	1,600	<900	<900	<900	620,000	<900	<900	3,000	46,000	<90,000	<9,000	<900	<900
	8/23/2006'	20.95	8.19	12.76	17,000	<90,000	940	<900	<900	<900	340,000	<900	<900	1,200	74,000	<90,000	<9,000	<900	<900
	11/13/2006	20.95	8.15	12.80	NA	<25,000	490	<250	<250	<250	120,000	<250	<250	360	130,000	NA	NA	NA	NA
	2/13/2007	20.95	6.58	14.37	4,100	<90,000	1,700	<900	<900	<900	410,000	<900	<900	1,700	160,000	NA	NA	NA	NA
	5/16/2007	20.95	7.24	13.71	3,300	<50,000	650	<500	<500	<500	190,000	<500	<500	750	170,000	NA	NA	NA	NA
	8/16/2007	20.95	8.61	12.34	**4,400**	<25,000	**420**	<250	<250	<250	**150,000**	<250	<250	**460**	**210,000**	NA	NA	NA	NA

TABLE 2
GROUNDWATER ELEVATIONS AND GROUNDWATER SAMPLE ANALYTICAL RESULTS
4301 San Leandro Street
Oakland, California

Sample ID	Sample Date	TOC (feet)	DTW (feet)	GWE (feet)	TPH-d (µg/L)	TPH-g (µg/L)	B (µg/L)	T (µg/L)	E (µg/L)	X (µg/L)	MTBE (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	TBA (µg/L)	Methanol (µg/L)	Ethanol (µg/L)	DCA (µg/L)	EDB (µg/L)
ESL (µg/L)					640	500	46	130	290	100	1,800	--	--	--	18,000	--	50,000	200	150
IS-1	2/22/2006	20.57	6.91	13.66	4,400	<5,000	160	<50	<50	<50	21,000	<50	<50	64	130,000	<5,000	<500	<50	<50
	5/16/2006	20.57	7.01	13.56	3,800	<5,000	150	<50	<50	<50	24,000	<50	<50	58	130,000	<5,000	<500	<50	<50
	8/23/2006'	20.58	7.82	12.76	3,800	<5,000	65	<50	<50	<50	5,800	<50	<50	<50	110,000	<5,000	<500	<50	<50
	11/13/2006	20.58	8.21	12.37	NA	<5,000	<50	<50	<50	<50	1,000	<50	<50	<50	100,000	NA	NA	NA	NA
	2/13/2007	20.58	6.14	14.44	1,800	<4,000	<40	<40	<40	<40	3,600	<40	<40	<40	110,000	NA	NA	NA	NA
	5/15/2007	20.58	7.04	13.54	2,000	<4,000	49	<40	<40	<40	2,800	<40	<40	<40	98,000	NA	NA	NA	NA
	8/15/2007	20.58	8.06	12.52	**2,700**	<4,000	<40	<40	<40	<40	**4,200**	<40	<40	<40	**90,000**	NA	NA	NA	NA
IS-2	2/22/2006	20.87	6.92	13.95	<4,000	8,600	1,200	<9.0	240	17	190,000	<9.0	9	1,700	29,000	<150,000	<90	<9.0	<9.0
	5/16/2006	20.87	6.99	13.88	<3,000^	<15,000	500	<150	<150	<150	130,000	<150	<150	880	24,000	<15,000	<1,500	<150	<150
	8/23/2006'	20.78	7.91	12.87	2,700	<40,000	490	<400	<400	<400	150,000	<400	<400	1,200	39,000	<40,000++	<4,000	<400	<400
	11/13/2006	20.78	8.23	12.55	NA	<40,000	<400	<400	<400	<400	160,000	<400	<400	990	120,000	NA	NA	NA	NA
	2/13/2007	20.78	6.76	14.02	<1,500^	<5,000	230	<50	<50	<50	28,000	<50	<50	250	72,000	NA	NA	NA	NA
	5/15/2007	20.78	6.87	13.91	<3,000^	<7,000	690	<70	120	<70	35,000	<70	<70	370	32,000	NA	NA	NA	NA
	8/15/2007	20.78	8.08	12.70	<3,000^	<7,000	**500**	<70	<70	<70	**20,000**	<70	<70	**160**	**160,000**	NA	NA	NA	NA
IS-3	2/22/2006	20.99	7.32	13.67	<4,000	29,000	2,700	820	1,100	2,900	750,000	<100	<100	3,400	40,000	<80,000	<1,000	<100	<100
	5/16/2006	20.99	7.86	13.13	8,000	<20,000	1,110	<200	450	<200	300,000	<200	<200	1,600	65,000	<20,000	<2,000	<200	<200
	8/23/2006'	20.87	8.19	12.68	4,800	<50,000	2,900	<500	1,100	660	970,000	<500	<500	3,900	54,000	<50,000	<5,000	<500	<500
	11/13/2006	20.87	8.03	12.84	NA	<200,000	2,800	<2,000	<2,000	<2,000	1,100,000	<2,000	<2,000	4,500	65,000	NA	NA	NA	NA
	2/13/2007	20.87	7.03	13.84	<3,000	<150,000	3,200	<1,500	<1,500	<1,500	600,000	<1,500	<1,500	3,300	49,000	NA	NA	NA	NA
	5/16/2007	20.87	7.17	13.70	<4,000^	<150,000	2,900	<1,500	<1,500	<1,500	630,000	<1,500	<1,500	3,400	88,000	NA	NA	NA	NA
	8/15/2007	20.87	8.43	12.44	<3,000^	<150,000	**2,800**	<1,500	<1,500	<1,500	**960,000**	<1,500	<1,500	**4,300**	**98,000**	NA	NA	NA	NA

TABLE 2

GROUNDWATER ELEVATIONS AND GROUNDWATER SAMPLE ANALYTICAL RESULTS

4301 San Leandro Street

Oakland, California

Sample ID	Sample Date	TOC (feet)	DTW (feet)	GWE (feet)	TPH-d (µg/L)	TPH-g (µg/L)	B (µg/L)	T (µg/L)	E (µg/L)	X (µg/L)	MTBE (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	TBA (µg/L)	Methanol (µg/L)	Ethanol (µg/L)	DCA (µg/L)	EDB (µg/L)
ESL (µg/L)					640	500	46	130	290	100	1,800	--	--	--	18,000	--	50,000	200	150
IS-4	2/22/2006	20.79	6.95	13.84	3,100	11,000	790	<100	120	<100	280,000	<100	<100	2,400	51,000	<10,000	<1,000	<100	<100
	5/16/2006	20.79	7.17	13.62	5,600	<15,000	610	<150	<150	<150	220,000	<150	<150	1,700	53,000	<15,000	<1,500	<150	<150
	8/23/2006'	20.68	7.83	12.85	4,300	6,100	280	<40	<40	<40	270,000	<40	<40	1,600	100,000	<80,000++	<400	<40	<40
	11/13/2006	20.68	8.46	12.22	NA	<50,000	<500	<500	<500	<500	230,000	<500	<500	1,100	220,000	NA	NA	NA	NA
	2/13/2007	20.68	9.02	11.66	1,500	<25,000	380	<250	<250	<250	160,000	<250	<250	570	250,000	NA	NA	NA	NA
	5/15/2007	20.68	6.99	13.69	1,700	<25,000	<250	<250	<250	<250	150,000	<250	<250	820	260,000	NA	NA	NA	NA
	8/15/2007	20.68	8.05	12.63	**1,000**	<15,000	<150	<150	<150	<150	**85,000**	<150	<150	**360**	**280,000**	NA	NA	NA	NA
IS-5	2/22/2006	21.02	7.17	13.85	35,000	66,000	4,100	<250	3,100	7,700	420,000	<250	<250	4,600	40,000	<25,000	<2,500	<250	<250
	5/16/2006	21.02	6.81	14.21	11000+	33,000	2,800	<200	1,700	1,900	350,000	<200	<200	3,400	29,000	<20,000	<2,000	<200	<200
	8/23/2006'	20.91	8.12	12.79	11,000	71,000	5,200	<500	6,200	4,500	350,000	<500	<500	3,900	32,000	<50,000	<5,000	<500	<500
	11/13/2006	20.91	8.41	12.50	NA	<50,000	930	<500	<500	<500	440,000	<500	<500	2,800	89,000	NA	NA	NA	NA
	2/13/2007	20.91	6.78	14.13	<5,000	<50,000	3,600	<500	2,200	3,800	240,000	<500	<500	3,600	28,000	NA	NA	NA	NA
	5/16/2007	20.91	7.15	13.76	<5,000^	<50,000	4,500	<500	<500	<500	200,000	<500	<500	2,700	24,000	NA	NA	NA	NA
	8/15/2007	20.91	8.32	12.59	<10,000^	<50,000	**4,300**	<500	**2,100**	**990**	**310,000**	<500	<500	**3,400**	**48,000**	NA	NA	NA	NA
IS-6	2/22/2006	20.56	6.89	13.67	3,000	11,000	1,000	<100	560	180	130,000	<100	<100	1,400	210,000	<15,000	<1,000	<100	<100
	5/16/2006	20.56	6.44	14.12	3,300	<20,000	1,300	<200	730	<200	96,000	<200	<200	1,300	260,000	<25,000	<2,500	<200	<200
	8/23/2006'	20.47	7.69	12.78	2,900	<20,000	580	<200	<200	<200	54,000	<200	<200	500	370,000	<20,000	<2,000	<200	<200
	11/13/2006	20.47	7.72	12.75	NA	<9,000	220	<90	<90	<90	20,000	<90	<90	170	260,000	NA	NA	NA	NA
	2/13/2007	20.47	6.12	14.35	1,600	<9,000	360	<90	<90	<90	28,000	<90	<90	210	310,000	NA	NA	NA	NA
	5/16/2007	20.47	6.67	13.80	1,700	9,100	1,400	<70	300	<70	21,000	<70	<70	240	240,000	NA	NA	NA	NA
	8/15/2007	20.47	7.91	12.56	**1,700**	<9,000	**560**	<90	<90	<90	**8,000**	<90	<90	**100**	**220,000**	NA	NA	NA	NA

TABLE 2
GROUNDWATER ELEVATIONS AND GROUNDWATER SAMPLE ANALYTICAL RESULTS
4301 San Leandro Street
Oakland, California

Sample ID	Sample Date	TOC (feet)	DTW (feet)	GWE (feet)	TPH-d (µg/L)	TPH-g (µg/L)	B (µg/L)	T (µg/L)	E (µg/L)	X (µg/L)	MTBE (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	TBA (µg/L)	Methanol (µg/L)	Ethanol (µg/L)	DCA (µg/L)	EDB (µg/L)
ESL (µg/L)					640	500	46	130	290	100	1,800	--	--	--	18,000	--	50,000	200	150
EW-1	2/22/2006	21.74	8.06	13.68	3,200	<150,000	3,100	<1,500	<1,500	<1,500	700,000	<1,500	<1,500	5,100	59,000	<150,000	<15,000	<1,500	<1,500
	5/16/2006	21.74	7.97	13.77	1,600	<100,000	2,000	<1,000	<1,000	<1,000	630,000	<1,000	<1,000	4,700	57,000	<100,000	<10,000	<1,000	<1,000
	8/23/2006'	21.65	9.61	12.04	2,600	<150,000	2,200	<1,500	<1,500	<1,500	1,000,000	<1,500	<1,500	5,200	79,000	<150,000	<15,000	<1,500	<1,500
	11/13/2006	21.65	8.78	12.87	NA	<100,000	<1,000	<1,000	<1,000	<1,000	610,000	<1,000	<1,000	4,000	110,000	NA	NA	NA	NA
	2/13/2007	21.65	6.31	15.34	840	<70,000	1,200	<700	<700	<700	530,000	<700	<700	2,500	100,000	NA	NA	NA	NA
	5/16/2007	21.65	8.13	13.52	1,500	<70,000	1,700	<700	<700	<700	990,000	<700	<700	3,900	150,000	NA	NA	NA	NA
	8/16/2007	21.65	8.71	12.94	**1,400**	<80,000	**1,900**	<800	<800	<800	**680,000**	<800	<800	**3,400**	**210,000**	NA	NA	NA	NA
EW-2	2/22/2006	20.46	7.31	13.15	<3,000	10,000	1,800	<100	700	670	120,000	<100	<100	1,200	36,000	<80,000	<1,000	<100	<100
	5/16/2006	20.46	7.25	13.21	<3,000^	<25,000	2,400	<250	1,110	880	180,000	<250	<250	1,400	45,000	<25,000	<2,500	<250	<250
	8/23/2006'	20.37	8.31	12.06	<2,000	<25,000	1,600	<250	520	<250	120,000	<250	<250	930	35,000	<25,000	<2,500	<250	<250
	11/13/2006	20.37	8.18	12.19	NA	<10,000	610	<100	170	<100	60,000	<100	<100	380	25,000	NA	NA	NA	NA
	2/13/2007	20.37	7.15	13.22	<2,000	<15,000	1,100	<150	230	<150	81,000	<150	<150	700	49,000	NA	NA	NA	NA
	5/16/2007	20.37	7.74	12.63	<3,000^	9,900	1,700	<50	460	170	96,000	<50	<50	870	65,000	NA	NA	NA	NA
	8/16/2007	20.37	9.45	10.92	<2,000^	<15,000	**1,300**	<150	**250**	<150	**100,000**	<150	<150	**700**	**75,000**	NA	NA	NA	NA

TABLE 2
GROUNDWATER ELEVATIONS AND GROUNDWATER SAMPLE ANALYTICAL RESULTS
4301 San Leandro Street
Oakland, California

Sample ID	Sample Date	TOC (feet)	DTW (feet)	GWE (feet)	TPH-d (µg/L)	TPH-g (µg/L)	B (µg/L)	T (µg/L)	E (µg/L)	X (µg/L)	MTBE (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	TBA (µg/L)	Methanol (µg/L)	Ethanol (µg/L)	DCA (µg/L)	EDB (µg/L)
ESL (µg/L)					640	500	46	130	290	100	1,800	--	--	--	18,000	--	50,000	200	150

Notes:

TOC	Top of well casing referenced to arbitrary datum prior to 3Q2005
DTW	Depth to water
MSL	Mean sea level
GWE	Groundwater elevation measured in feet above mean sea level
TPH-d	Total petroleum hydrocarbons as diesel by EPA Method 8015 (modified)
TPH-g	Total petroleum hydrocarbons as gasoline by EPA Method 8260B
BTEX	Benzene, toluene, ethylbenzene, total xylenes by EPA Method 8260B
MTBE	Methyl tertiary butyl ether by EPA Method 8260B
DIPE	Di-isopropyl ether by EPA Method 8260B
ETBE	Ethyl tertiary butyl ether by EPA Method 8260B
TAME	Tertiary amyl methyl ether by EPA Method 8260B
TBA	Tertiary butyl alcohol by EPA Method 8260B
DCA	1,2-Dichloroethane
EDB	1,2-Dibromoethane
ESL	Environmental Screening Levels for deep soils and groundwater is not a current or potential source of drinking water; San Francisco Bay Regional Water Quality Control Board February 2005.
(µg/L)	Micrograms per liter
Date'	TOC was re-surveyed on September 12, 2006.
NA	Not analyzed.
<#	Not detected in concentrations above laboratory reporting limit.
J	Estimated quantity because the MTBE to TBA ratio is greater than 20 to 1.
---	No samples collected, no data available
--	Not provided
*	Laboratory note:"Results within quantitation range; chromatographic pattern not typical of fuel."
**	Wells re-surveyed on 3/28/2005.
^	The method reporting limit for TPH-d is increased due to interference from gasoline-range hydrocarbons.
^^	Petroleum hydrocarbons reported as TPH-d do not exhibit a typical Diesel chromatogram pattern; they have a lower boiling point than typical Diesel fuel
+	Surrogate recovery for test method Mod. EPA 8015 was outside of control limits. This may indicate a bias in the analysis due to the sample's matrix or an interference from compounds present in the sample.
++	The method reporting limit has been increased due to the presence of an interfering compound.

TABLE 3
WATER QUALITY DATA
4301 San Leandro Street
Oakland, California

Well ID	Date	Dissolved Oxygen (DO)	Oxidation-Reduction Potential (ORP)	Total Iron	Measured Iron(II)	Calculated Iron(III)	pH	Temperature	Conductivity
		(mg/L)	(mV)	(mg/L)	(mg/L)	(mg/L)		(F)	(mS/cm)
IS-1	2/21/2006 (1)	3.06	228.10	3.30	3.30	0.0	6.92	63.68	1,090
	5/16/2006	NM	NM	NM	NM	NM	7.97	66.80	1,139
	8/23/2006	NM	NM	NM	NM	NM	6.83	71.83	1,257
	11/13/2006	NM	NM	NM	NM	NM	6.70	68.87	1,134
	2/15/2007	NM	NM	NM	NM	NM	6.95	59.10	848
	5/15/2007	NM	NM	NM	NM	NM	6.81	65.21	914
	8/15/2007	6.52	-161.70	NM	NM	NM	6.93	69.97	572
IS-2	2/21/2006 (1)	3.84	220.60	3.30	3.30	0.0	7.02	64.93	956
	5/16/2006	NM	NM	NM	NM	NM	7.45	66.43	612
	8/23/2006	NM	NM	NM	NM	NM	7.34	71.34	1,012
	11/13/2006	NM	NM	NM	NM	NM	7.04	69.46	975
	2/15/2007	NM	NM	NM	NM	NM	6.80	59.43	436
	5/15/2007	NM	NM	NM	NM	NM	6.77	64.61	674
	8/15/2007	0.81	-110.30	NM	NM	NM	6.87	73.30	941
IS-3	2/21/2006 (1)	4.07	151.10	3.30	2.56	0.7	6.90	62.30	965
	5/16/2006	NM	NM	NM	NM	NM	7.56	64.60	1,164
	8/23/2006	NM	NM	NM	NM	NM	6.73	69.07	1,099
	11/13/2006	NM	NM	NM	NM	NM	2.24	66.27	1,056
	2/15/2007	NM	NM	NM	NM	NM	6.77	61.11	425
	5/16/2007	4.37	-73.70	NM	NM	NM	6.77	60.23	751
	8/16/2007	1.34	-114.80	NM	NM	NM	6.71	70.02	1,055
IS-4	2/21/2006 (1)	3.73	184.10	3.30	2.81	0.5	6.95	64.20	1,052
	5/16/2006	NM	NM	NM	NM	NM	7.22	66.93	883
	8/23/2006	NM	NM	NM	NM	NM	6.75	74.00	1,068
	11/13/2006	NM	NM	NM	NM	NM	6.87	69.55	1,090
	2/15/2007	NM	NM	NM	NM	NM	6.81	61.98	813
	5/15/2007	NM	NM	NM	NM	NM	6.61	64.58	880
	8/16/2007	1.08	-67.40	NM	NM	NM	6.81	73.01	1,140
IS-5	2/21/2006 (1)	0.64	207.10	NM	NM	NM	6.77	63.56	1,031
	5/16/2006	NM	NM	NM	NM	NM	7.43	64.02	999
	8/23/2006	NM	NM	NM	NM	NM	6.69	68.77	1,142
	11/13/2006	NM	NM	NM	NM	NM	-0.98	67.19	1,100
	2/15/2007	1.29	-70.77	3.27	3.20	0.07	6.69	60.62	411
	5/16/2007	1.83	-65.70	NM	NM	NM	6.62	59.82	353
	8/16/2007	2.74	-76.90	NM	NM	NM	6.79	67.47	1,075

TABLE 3
WATER QUALITY DATA
4301 San Leandro Street
Oakland, California

Well ID	Date	Dissolved Oxygen (DO)	Oxidation-Reduction Potential (ORP)	Total Iron	Measured Iron(II)	Calculated Iron(III)	pH	Temperature	Conductivity
		(mg/L)	(mV)	(mg/L)	(mg/L)	(mg/L)		(F)	(mS/cm)
IS-6	2/21/2006 [(1)]	4.05	198.70	3.30	2.46	0.8	6.94	64.00	1,092
	5/16/2006	NM	NM	NM	NM	NM	8.35	67.29	1,120
	8/23/2006	NM	NM	NM	NM	NM	6.67	71.82	1,149
	11/13/2006	NM	NM	NM	NM	NM	7.08	69.35	1,088
	2/15/2007	NM	NM	NM	NM	NM	6.80	60.56	862
	5/16/2007	2.47	-94.70	NM	NM	NM	6.67	61.54	558
	8/16/2007	1.61	-97.00	NM	NM	NM	6.72	72.01	1,047
MW-1	2/21/2006 [(1)]	3.44	203.20	3.30	2.65	0.7	6.94	63.59	1,011
	5/16/2006	NM	NM	NM	NM	NM	7.96	66.24	1,023
	8/23/2006	NM	NM	NM	NM	NM	6.92	72.10	1,116
	11/13/2006	NM	NM	NM	NM	NM	7.50	68.50	1,013
	2/15/2007	NM	NM	NM	NM	NM	7.00	58.48	356
	5/15/2007	NM	NM	NM	NM	NM	7.29	63.93	661
	8/15/2007	2.17	-93.10	NM	NM	NM	7.10	69.50	854
MW-2	2/21/2006 [(1)]	3.29	205.90	3.30	3.01	0.3	6.74	62.44	1,038
	5/16/2006	NM	NM	NM	NM	NM	7.42	62.74	981
	8/23/2006	NM	NM	NM	NM	NM	6.70	65.08	1,036
	11/13/2006	NM	NM	NM	NM	NM	0.44	64.64	1,011
	2/15/2007	NM	NM	NM	NM	NM	6.77	60.79	765
	5/16/2007	1.18	-105.30	NM	NM	NM	6.63	59.76	361
	8/16/2007	3.57	-105.30	NM	NM	NM	6.74	63.91	789
MW-3	2/21/2006 [(1)]	3.55	209.60	1.08	0.95	0.1	6.89	66.20	870
	5/16/2006	NM	NM	NM	NM	NM	8.36	67.43	877
	8/23/2006	NM	NM	NM	NM	NM	6.93	71.69	908
	11/13/2006	NM	NM	NM	NM	NM	6.68	70.25	837
	2/15/2007	NM	NM	NM	NM	NM	6.94	60.52	667
	5/15/2007	NM	NM	NM	NM	NM	6.67	62.99	687
	8/15/2007	5.16	-182.30	NM	NM	NM	6.83	69.41	823
MW-4	2/21/2006 [(1)]	3.13	228.80	3.30	3.30	0.0	6.83	62.09	1,051
	5/16/2006	NM	NM	NM	NM	NM	7.63	63.42	1,045
	8/23/2006	NM	NM	NM	NM	NM	6.70	68.65	1,245
	11/13/2006	NM	NM	NM	NM	NM	1.12	66.55	1,235
	2/15/2007	1.05	-50.80	3.20	3.14	0.06	6.78	58.58	868
	5/16/2007	2.21	-118.80	NM	NM	NM	6.72	60.40	534
	8/16/2007	3.87	-133.00	NM	NM	NM	6.81	67.44	1,194
MW-4D	2/21/2006 [(1)]	5.94	187.40	0.11	0.00	0.1	7.08	64.43	830
	5/16/2006	NM	NM	NM	NM	NM	8.10	65.94	745
	8/23/2006	NM	NM	NM	NM	NM	7.12	65.49	794
	11/13/2006	NM	NM	NM	NM	NM	7.81	65.31	920
	2/15/2007	NM	NM	NM	NM	NM	7.30	60.21	609
	5/15/2007	NM	NM	NM	NM	NM	7.37	64.02	632
	8/15/2007	6.07	69.00	NM	NM	NM	7.12	65.89	741

TABLE 3
WATER QUALITY DATA
4301 San Leandro Street
Oakland, California

Well ID	Date	Dissolved Oxygen (DO)	Oxidation-Reduction Potential (ORP)	Total Iron	Measured Iron(II)	Calculated Iron(III)	pH	Temperature	Conductivity
		(mg/L)	(mV)	(mg/L)	(mg/L)	(mg/L)		(F)	(mS/cm)
MW-5	2/21/2006 (1)	3.90	241.50	3.13	2.28	0.9	6.84	63.34	978
	5/16/2006	NM	NM	NM	NM	NM	7.50	69.62	890
	8/23/2006	NM	NM	NM	NM	NM	6.72	73.21	1,127
	11/13/2006	NM	NM	NM	NM	NM	1.25	68.95	1,098
	2/15/2007	NM	NM	NM	NM	NM	6.84	59.32	385
	5/16/2007	1.43	-75.90	NM	NM	NM	6.68	62.87	490
	8/16/2007	1.24	-148.40	NM	NM	NM	6.78	70.42	1,074
MW-5D	2/21/2006 (1)	4.23	222.00	0.09	0.00	0.1	7.21	65.95	810
	5/16/2006	NM	NM	NM	NM	NM	8.02	67.45	770
	8/23/2006	NM	NM	NM	NM	NM	6.87	68.33	777
	11/13/2006	NM	NM	NM	NM	NM	8.02	65.97	915
	2/15/2007	NM	NM	NM	NM	NM	7.17	59.25	576
	5/15/2007	NM	NM	NM	NM	NM	7.07	65.30	620
	8/15/2007	6.74	50.10	NM	NM	NM	7.20	67.40	440
MW-6	2/21/2006 (1)	3.37	206.20	0.82	0.09	0.7	7.16	64.37	1,268
	5/16/2006	NM	NM	NM	NM	NM	8.06	67.14	1,126
	8/23/2006	NM	NM	NM	NM	NM	7.01	70.80	1,193
	11/13/2006	NM	NM	NM	NM	NM	7.08	70.20	1,174
	2/15/2007	NM	NM	NM	NM	NM	6.93	62.30	802
	5/15/2007	NM	NM	NM	NM	NM	6.78	64.05	872
	8/15/2007	1.41	-105.20	NM	NM	NM	6.89	70.28	1,081
MW-7	2/21/2006 (1)	3.96	207.00	0.54	0.46	0.1	7.12	65.21	1,680
	5/16/2006	NM	NM	NM	NM	NM	8.45	67.06	823
	8/23/2006	NM	NM	NM	NM	NM	6.96	70.91	1,616
	11/13/2006	NM	NM	NM	NM	NM	6.75	68.35	1,596
	2/15/2007	NM	NM	NM	NM	NM	7.04	60.58	1,137
	5/15/2007	NM	NM	NM	NM	NM	7.06	61.15	1,149
	8/15/2007	7.98	-37.40	NM	NM	NM	6.83	69.25	1,511
MW-8	2/21/2006 (1)	3.40	214.50	3.30	3.12	0.2	6.85	63.40	1,205
	5/16/2006	NM	NM	NM	NM	NM	7.23	63.54	995
	8/23/2006	NM	NM	NM	NM	NM	6.78	68.56	1,384
	11/13/2006	NM	NM	NM	NM	NM	1.18	66.05	1,347
	2/15/2007	1.07	-70.50	3.25	3.19	0.06	6.83	61.15	976
	5/16/2007	1.05	-95.50	NM	NM	NM	6.69	61.91	545
	8/16/2007	6.10	-24.00	NM	NM	NM	7.48	63.35	65
EW-1	2/21/2006 (1)	3.55	213.60	3.17	2.29	0.9	6.89	62.73	1,179
	5/16/2006	NM	NM	NM	NM	NM	7.53	63.75	1,032
	8/23/2006	NM	NM	NM	NM	NM	6.74	68.87	1,235
	11/13/2006	NM	NM	NM	NM	NM	1.31	66.45	1,198
	2/15/2007	NM	NM	NM	NM	NM	6.88	56.29	349
	5/16/2007	1.46	-82.50	NM	NM	NM	6.76	61.02	506
	8/16/2007	8.79	-107.20	NM	NM	NM	6.76	67.94	614

TABLE 3
WATER QUALITY DATA
4301 San Leandro Street
Oakland, California

Well ID	Date	Dissolved Oxygen (DO)	Oxidation-Reduction Potential (ORP)	Total Iron	Measured Iron(II)	Calculated Iron(III)	pH	Temperature	Conductivity
		(mg/L)	(mV)	(mg/L)	(mg/L)	(mg/L)		(F)	(mS/cm)
EW-2	2/21/2006 (1)	3.74	221.90	3.30	3.30	0.0	6.75	61.92	889
	5/16/2006	NM	NM	NM	NM	NM	8.34	63.92	954
	8/23/2006	NM	NM	NM	NM	NM	6.68	68.12	982
	11/13/2006	NM	NM	NM	NM	NM	0.27	66.70	901
	2/15/2007	NM	NM	NM	NM	NM	6.77	60.40	741
	5/16/2007	1.03	-111.30	NM	NM	NM	6.62	59.54	155
	8/16/2007	5.64	-83.40	NM	NM	NM	6.76	66.14	934

Notes:
mg/L milligrams per liter
mV millivolts
F degrees Fahrenheit
mS/cm micro Siemens per centimeter
(1) 2/21/2006 sampling data represent the baseline geochemical conditions
NM Not measured

ATTACHMENT A

CLEARWATER GROUP

Groundwater Monitoring and Sampling Field Procedures

Groundwater Monitoring

Prior to beginning, a decontamination area is established. Decontamination procedures consist of scrubbing downhole equipment in an Alconox® solution wash (wash solution is pumped through any purging pumps used), and rinsing in a first rinse of potable water and a second rinse of potable water or deionized water if the latter is required. Any non-dedicated downhole equipment is decontaminated prior to use.

Prior to gauging, purging, and sampling a well, caps for all on-site wells should be opened to allow atmospheric pressure to equalize if local groundwater is under confined or semi-confined conditions. The static water level is measured to the nearest 0.01 feet with an electronic water sounder. Depth to bottom is typically measured once per year, at the request of the project manager, and during Clearwater's first visit to a site. If historical analytical data are not available, with which to establish a reliable order of increasing well contamination, the water sounder and tape will be decontaminated between each well. Floating separate-phase hydrocarbons (SPH) where suspected or observed will be collected using a clear, open-ended product bailer, and the thickness is measured to the nearest 0.01 feet in the bailer. SPH may alternatively be measured with an electronic interface probe. Any monitoring well containing a measurable thickness of SPH before or during purging is not additionally purged, and no sample is collected from that well. Wells containing hydrocarbon sheen are sampled, unless otherwise specified by the project manager. Field observations of well integrity, water level, and floating product thicknesses are noted on the Gauging Data/Purge Calculations form.

Well Purging

Each monitoring well to be sampled is purged using either a PVC bailer or a submersible pump. Physical parameters (pH, temperature, and conductivity) of the purge water are monitored during purging activities to assess if the water sample collected is representative of the aquifer. If required, parameters such as dissolved oxygen, turbidity, salinity, etc. are also measured. Samples are considered representative if parameter stability is achieved. Stability is defined as a change of less than 0.25 pH units, less than 10% change in conductivity in micro mhos, and less than 1.0 degree centigrade (1.8 degrees Fahrenheit) change in temperature. Parameters are measured in a discrete sample decanted from the bailer separately from the rest of the purge water. Parameters are measured at least four times during purging: initially, and at purging volume intervals of one casing volume. Purging continues until three well casing volumes have been removed or until the well completely dewaters. Wells that dewater or demonstrate a slow recharge rate may be sampled after fewer than three well volumes have been removed. Well purging information is recorded on the Purge Data sheet. All meters used to measure parameters are calibrated daily. Investigation-derived wastes (purge and rinseate water) is handled in one of three ways: 1) Purge and rinseate water is sealed, labeled, and stored on site in D.O.T.-approved 55-gallon drums. After being chemically profiled, the water is removed to an appropriate disposal facility. 2) Purge and rinseate water is collected into a 250-gallon portable holding tank and transported to the Clearwater equipment yard in Point Richmond, CA. At the yard, the investigation-derived waste is then transferred to 55-gallon drums pending disposal at an appropriate disposal facility, or 3) Purge and rinseate water is collected in a 250-gallon portable holding tank and transported to the appropriate disposal facility. The applicable method will be indicated in the field log sheets and the corresponding technical report.

Groundwater Sample Collection

Groundwater samples are collected immediately after purging, with the following exception: If the purging rate exceeds well recharge rate, samples are collected when the well has recharged to at least 80% of its static water level. If recharge is extremely slow, the well is allowed to recharge for at least two hours, if practicable, or until sufficient volume for sampling has accumulated. The well is sampled within 24 hours of purging or is re-purged. Samples are collected using polyethylene bailers, either disposable or dedicated to the well. Samples being analyzed for compounds most sensitive to volatilization are collected first. Water samples are placed in appropriate laboratory-supplied containers, labeled, documented on a chain-of-custody form and placed on ice in a chilled cooler for transport to a state-certified analytical laboratory. Analytical detection limits match or surpass standards required by relevant local or regional guidelines.

Quality Assurance Procedures

To prevent contamination of the samples, Clearwater personnel adhere to the following procedures in the field:

- A new, clean pair of latex gloves is put on prior to sampling each well.
- Wells are gauged and purged and groundwater samples are collected in the expected order of increasing degree of contamination based on historical analytical results.
- All purging equipment is thoroughly decontaminated between each well, using the procedures previously described at the beginning of this section.
- During sample collection for volatile organic analysis, the amount of air passing through the sample is minimized. This helps prevent the air from stripping the volatiles from the water. Sample bottles are filled by slowly running the sample down the side of the bottle until there is a convex meniscus over the mouth of the bottle. The lid is carefully screwed onto the bottle such that no air bubbles are present within the bottle. If a bubble is present, the cap is removed and additional water is added to the sample container. After resealing the sample container, if bubbles still are present inside, the sample container is discarded and the procedure is repeated with a new container.

Laboratory and field handling procedures may be monitored, if required by the client or regulators, by including quality control (QC) samples for analysis with the groundwater samples. Examples of different types of QC samples are as follows:

- Trip blanks are prepared at the analytical laboratory by laboratory personnel to check field handling procedures. Trip blanks are transported to the project site in the same manner as the laboratory-supplied sample containers to be filled. They are not opened and are returned to the laboratory with the samples collected. Trip blanks are analyzed for purgeable organic compounds.
- Equipment blanks are prepared in the field to determine if decontamination of field sampling equipment has been effective. The sampling equipment used to collect the groundwater samples is rinsed with distilled water that is then decanted into laboratory-supplied containers. The equipment blanks are transported to the laboratory and are analyzed for the same chemical constituents as the samples collected at the site.
- Duplicates are collected at the same time standard groundwater samples are collected; they are analyzed for the same compounds in order to verify the reproducibility of laboratory data. They are usually collected from only one well per sampling event. The duplicate is assigned an identification number that will not associate it with the source well.

Generally, trip blanks and field blanks verify field handling and transportation procedures. Duplicates verify laboratory procedures. The configuration of QC samples is determined by Clearwater depending on site conditions and regulatory requirements.

ATTACHMENT B

updated on 10/18/2006 by ht

CLEARWATER GROUP
229 Tewksbury Avenue,
Point Richmond, CA 94801
Tel: (510) 307-9943 Fax: (510) 232-2823

WELL GAUGING/PURGING CALCULATIONS DATA SHEET

Date: 8/15-16/07

Job No.: ZP046I

Location: 4301 San Leandro St. Oakland CA.

Tech(s): Eric V. Austin, Rodney Berry

Drums on Site @ TOA/TOD

Soil: 0 Water: 0

Total number of DRUMS used for this event

Soil: 0 Water:

Well No.	Diameter (in)	DTB (ft)	DTW (ft)	ST (ft)	CV (gal)	PV (gal)	SPL (ft)	Notes
MW-50	2 in.	42.55	15.21	27.34	4.37	13.11		
MW-40	2 in.	42.14	16.42	25.72	4.12	12.36		
MW-1	2 in.	24.53	9.61	14.92	2.39	7.17		
IS-1	2 in.	24.89	8.06	16.83	2.69	8.07		
MW-7	2 in.	25.91	12.41	13.50	2.16	6.48		
MW-3	2 in.	23.04	11.81	11.23	1.80	5.40		
MW-6	2 in.	25.29	10.74	14.55	2.33	6.99		
IS-2	2 in.	25.31	8.08	17.23	2.76	8.28		

67.86
10 decon
77.86 (day 1)

Explanation:
DTB = Depth to Bottom
DTW = Depth to Water
ST = Saturated Thickness (DTB-DTW) must be > 1 foot
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 No.	Diameter (in)	DTB (ft)	DTW (ft)	ST (ft)	CV (gal)	PV (gal)	SPL (ft)	Notes
TS-4	2 in.	24.94	8.05	16.89	2.70	8.10		
TS-6	2 in.	25.36	7.91	17.45	2.80	8.40		
TS-3	2 in.	24.26	8.43	15.83	2.53	7.57		
TS-5	2 in.	14.33	8.22	6.01	0.96	2.88		
EW-2	4 in.	25.21	9.45	15.76	10.24	30.72		
MW-2	2 in.	24.61	13.48	11.13	1.78	5.34		
MW-4	2 in.	24.48	9.03	15.45	2.47	7.41		
MW-5	2 in.	25.54	7.99	17.55	2.81	8.43		
MW-8	2 in.	24.62	8.61	16.01	2.56	7.68		
EW-1	4 in.	25.12	8.71	16.41	10.67	32.01		

118.56
+10. Decon H2O
128.56

129
+ 78
205 = Total

Explanation:
DTB = Depth to Bottom
DTW = Depth to Water
ST = Saturated Thickness (DTB-DTW) must be > 1 foot
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

PURGE DATA SHEET

Sheet 1 of 9

Job No.: 2P046I **Location:** 430 San Leandro St. Oakland, CA. **Date:** 8/15/07 **Tech:** Erick Mustiles, Rodney Berry

WELL #	TIME	VOL. (gal.)	ORP	CND (µ/cm)	TMP (°F)	DO (mg/L)	pH	Fe^{2+}	Fe_T	
MW-50	9:55	4.00	50.8	437	67.38	6.79	7.23	NA	NA	Sample for: TBA/5oxys
Calc. purge	10:03	8.00	50.2	435	67.40	6.77	7.21	↓	↓	(TPHg) (TPHd) 8260
volume 13.11	10:10	13.00	50.1	440	67.40	6.74	7.20	↓	↓	(BTEX) (MTBE) Metals

Purging Method: PVC Bailer / Pump / ~~Disp. Bailer~~

COMMENTS: color, turbidity, recharge, sheen, odor Brown, High, OK - No sheen and No Odor

POST DEPTH TO WATER: 16.31 SAMPLE TIME: 10:15

Job No.: **Location:** **Date:** **Tech:**

WELL #	TIME	VOL. (gal.)	ORP	CND (µ/cm)	TMP (°F)	DO (mg/L)	pH	Fe^{2+}	Fe_T	
MW-40	10:20	4.00	68.7	739	65.85	6.18	7.11	NA	NA	Sample for: TBA/5oxys
Calc. purge	10:26	8.00	69.2	740	65.84	6.10	7.10	↓	↓	(TPHg) (TPHd) 8260
volume 12.36	10:33	12.00	69.0	741	65.89	6.07	7.12	↓	↓	(BTEX) (MTBE) Metals

Purging Method: PVC Bailer / Pump / ~~Disp. Bailer~~

COMMENTS: color, turbidity, recharge, sheen, odor Brown, Moderate - OK, Slight Sheen, No Odor

POST DEPTH TO WATER: 17.81 SAMPLE TIME: 10:45

PURGE DATA SHEET

No.: ZP046T　Location: Oakland, CA.　Date: ~~8-15-07~~ 8-15-07　Sheet 2 of 9
Tech: Eric VanAustin, Rodney Barry

WELL #	TIME	VOL. (gal.)	ORP	CND (μ/cm)	TMP (°F)	DO (mg/L)	pH	Fe^{2+}	Fe_T	
W-1	10:52	2.00	-91.2	857	69.43	2.23	7.08	NA	NA	Sample for: TBA/5 oxys
c. purge	10:59	4.00	-92.3	856	69.51	2.21	7.10	↓	↓	(TPHg TPHd) 8260
ime 7.17	11:04	7.00	-93.1	854	69.50	2.17	7.10	↓	↓	(BTEX MTBE) Metals

Purging Method: PVC Bailer / Pump / (Disp. Bailer)

COMMENTS: color, turbidity, recharge, sheen, odor　Lt. Gray, Moderate - poor - slight sheen, slight Odor

POST DEPTH TO WATER: 9.80　SAMPLE TIME: 11:15

WELL #	TIME	VOL. (gal.)	ORP	CND (μ/cm)	TMP (°F)	DO (mg/L)	pH	Fe^{2+} ✓	Fe_T ✓	
S-1	11:18	2.00	-168.2	575	69.76	6.64	6.90	3.19	3.28	Sample for: TBA/5 oxys
c. purge	11:23	5.00	-164.7	574	69.82	6.51	6.91	↓	↓	(TPHg TPHd) 8260
ime 8.07	11:30	8.00	-161.7	572	69.97	6.52	6.93	↓	↓	(BTEX MTBE) Metals

Purging Method: PVC Bailer / Pump / (Disp. Bailer)

COMMENTS: color, turbidity, recharge, sheen, odor　Gray, Moderate, poor - Has slight sheen, slight Odor

POST DEPTH TO WATER: 8.73　SAMPLE TIME: 11:30

Clearwater Group, Inc. - 229 Tewksbury Avenue, Point Richmond, California 94801
Phone : (510) 307-9943　Fax : (510) 232-2823

PURGE DATA SHEET

Job No.: 2P046I Location: Oakland, CA. Date: 8-15-07 Tech: Eric Vaughn / Rodney Berry

WELL #	TIME	VOL. (gal.)	ORP	CND (μ/cm)	TMP (°F)	DO (mg/L)	pH	Fe^{2+}	Fe_T	
MW-7	11:34	2.00	-36.8	1508	69.19	8.07	6.97	NA	NA	Sample for: TBA / 5oxys
Calc. purge	11:42	4.00	-38.1	1510	69.21	7.99	6.81			TPHg, TPHd, 8260
volume 6.48	11:49	6.00	-37.4	1511	69.25	7.98	6.83			BTEX, MTBE, Metals

Purging Method: PVC Bailer / Pump / Disp. Bailer (circled)

COMMENTS: color, turbidity, recharge, sheen, odor: Brown, Moderate, OK, No sheen, No Odor

POST DEPTH TO WATER: 12.50 SAMPLE TIME: 12:00

Job No.: Location: Date: Tech:

WELL #	TIME	VOL. (gal.)	ORP	CND (μ/cm)	TMP (°F)	DO (mg/L)	pH	Fe^{2+}	Fe_T	
MW-3	12:03	2.00	-180.6	822	69.32	5.25	6.87	NA	NA	Sample for: TBA / 5oxys
Calc. purge	12:10	3.00	-181.7	821	69.40	5.21	6.84			TPHg, TPHd, 8260
volume 5.40	12:16	5.00	-182.3	823	69.41	5.16	6.83			BTEX, MTBE, Metals

Purging Method: PVC Bailer / Pump / Disp. Bailer (circled)

COMMENTS: color, turbidity, recharge, sheen, odor: Gray, High, poor - No sheen, Slight Odor

POST DEPTH TO WATER: 11.99 SAMPLE TIME: 12:30

PURGE DATA SHEET

b No.: ZP046I Location: Oakland, CA Date: 8/16/07 Sheet 4 of 7 Tech: Eric Martin Rodney Berry

WELL #	TIME	VOL. (gal.)	ORP	CND (µ/cm)	TMP (°F)	DO (mg/L)	pH	Fe^{2+}	Fe_T	
MW-6	12:34	2.00	-102.8	1083	70.31	1.51	6.90	NA	NA	Sample for: TBA/5oxy's
lc. purge	12:40	4.00	-103.4	1081	70.21	1.40	6.92	↓	↓	TPHg TPHd 8260
ume 6.99	12:47	7.00	-105.2	1081	70.28	1.41	6.89	↓	↓	BTEX MTBE Metals

Purging Method: PVC Bailer / Pump / Disp. Bailer

COMMENTS: color, turbidity, recharge, sheen, odor Lt. Gray, Moderate, poor - Has sheen, Has Odor

POST DEPTH TO WATER: 10.98 SAMPLE TIME: 1300

WELL #	TIME	VOL. (gal.)	ORP	CND (µ/cm)	TMP (°F)	DO (mg/L)	pH	Fe^{2+}	Fe_T	
S-2	13:05	2.00	-109.2	944	73.22	0.83	6.85	NA	NA	Sample for: TBA/5oxy's
c. purge	13:11	5.00	-109.8	942	73.21	0.87	6.83	↓	↓	TPHg TPHd 8260
ume 8.28	13:18	8.00	-110.3	941	73.30	0.81	6.87	↓	↓	BTEX MTBE Metals

Purging Method: PVC Bailer / Pump / Disp. Bailer

COMMENTS: color, turbidity, recharge, sheen, odor Gray, Moderate, poor - has sheen & Odor

POST DEPTH TO WATER: 8.31 SAMPLE TIME: 13:30

Clearwater Group, Inc. - 229 Tewksbury Avenue, Point Richmond, California 94801
Phone : (510) 307-9943 Fax : (510) 232-2823

PURGE DATA SHEET

Sheet 5 of 9

Job No.: 2P046I Location: Oakland, CA. Date: 8/16/07 Tech: Eric K. Austin / Rodney Barry

WELL #	TIME	VOL. (gal.)	ORP	CND (µ/cm)	TMP (°F)	DO (mg/L)	pH	Fe^{2+}	Fe_T	
IS-4	8:47	2.00	-66.3	1141	73.04	1.15	6.83	1.73	3.24	Sample for: TBA / 5oxy's
Calc. purge	8:55	5.00	-68.2	1140	73.03	1.09	6.81	↓	↓	(TPHg) TPHd 8260
volume 8.10	9:02	8.00	-67.4	1140	73.01	1.08	6.81			(BTEX MTBE) Metals

Purging Method: PVC Bailer / Pump / (Disp. Bailer)

COMMENTS: color, turbidity, recharge, sheen, odor Gray, Moderate, OK - Slight sheen, slight Odor

POST DEPTH TO WATER: 8.01 SAMPLE TIME: 9:15

Job No.: Location: Date: Tech:

WELL #	TIME	VOL. (gal.)	ORP	CND (µ/cm)	TMP (°F)	DO (mg/L)	pH	Fe^{2+}	Fe_T	
IS-6	9:20	2.00	-95.2	1048	72.02	1.86	6.74	2.61	3.28	Sample for: TBA / 5oxy's
Calc. purge	9:26	5.00	-95.8	1048	72.00	1.72	6.74	↓	↓	(TPHg) TPHd 8260
volume 8.70	9:31	8.00	-77.0	1047	72.01	1.61	6.72			(BTEX MTBE) Metals

Purging Method: PVC Bailer / Pump / (Disp. Bailer)

COMMENTS: color, turbidity, recharge, sheen, odor Tan, Low, OK, No sheen, slight Odor

POST DEPTH TO WATER: 8.52 SAMPLE TIME: 9:45

PURGE DATA SHEET

No.: ZP046I Location: Oakland, CA. Date: 8/16/07 Sheet 6 of 9
Tech: Eric V Austin, Rodney Berry

WELL #	TIME	VOL. (gal.)	ORP	CND (µ/cm)	TMP (°F)	DO (mg/L)	pH	Fe^{2+}	Fe_T	
S-3	9:48	2.00	-114.1	1058	68.92	1.39	6.73	3.01	3.26	Sample for: TBA/5oxys
c. purge	9:53	3.00	-115.0	1057	68.99	1.37	6.71			TPHg TPHd 8260
ume 7.59	10:00	8.00	-114.8	1055	70.02	1.34	6.71			BTEX MTBE Metals

Purging Method: PVC Bailer / Pump / Disp. Bailer

COMMENTS: color, turbidity, recharge, sheen, odor Tan, Moderate, Ok - No sheen, slight Odor

POST DEPTH TO WATER: 8.49 SAMPLE TIME: 10:00

WELL #	TIME	VOL. (gal.)	ORP	CND (µ/cm)	TMP (°F)	DO (mg/L)	pH	Fe^{2+}	Fe_T	
S-5	10:05	1.00	-76.9	1077	67.47	2.98	6.79	1.65	3.21	Sample for: TBA/5oxys
c. purge	10:10	2.00	-77.2	1077	67.46	2.81	6.78			TPHg TPHd 8260
ume 2.88	10:13	3.00	-76.9	1075	67.47	2.74	6.79			BTEX MTBE Metals

Purging Method: PVC Bailer / Pump / Disp. Bailer

COMMENTS: color, turbidity, recharge, sheen, odor Grayish, High, Ok - Has sheen, & Has Odor

POST DEPTH TO WATER: 8.33 SAMPLE TIME: 10:15

Clearwater Group, Inc. - 229 Tewksbury Avenue, Point Richmond, California 94801
Phone : (510) 307-9943 Fax : (510) 232-2823

PURGE DATA SHEET

Sheet 7 of 9

Job No.: 2P04GT **Location:** Oakland, CA. **Date:** 8/16/07 **Tech:** Eric / Austin Rodney Berry

WELL #	TIME	VOL. (gal.)	ORP	CND (μ/cm)	TMP (°F)	DO (mg/L)	pH	Fe^{2+}	Fe_T	
EW-2	10:16	10.00	-79.7	925	66.40	6.44	6.78	NA	NA	Sample for: TBA/5oxy's
Calc. purge	10:26	20.00	-82.1	930	66.52	5.81	6.77	↓	↓	TPHg TPHd 8260
volume 30.72	10:38	31.00	-83.4	934	66.14	5.64	6.76	↓	↓	BTEX MTBE Metals

Purging Method: PVC Bailer / Pump / Disp. Bailer

COMMENTS: color, turbidity, recharge, sheen, odor Tan, Moderate, Poor - Has sheen & Odor

POST DEPTH TO WATER: 23.12 SAMPLE TIME: 10:45

Job No.: **Location:** **Date:** **Tech:**

WELL #	TIME	VOL. (gal.)	ORP	CND (μ/cm)	TMP (°F)	DO (mg/L)	pH	Fe^{2+}	Fe_T	
MW-2	10:48	1.00	-103.7	783	63.64	6.47	6.74	NA	NA	Sample for: TBA/5oxy's
Calc. purge	10:51	3.00	-104.9	786	63.80	4.88	6.74	↓	↓	TPHg TPHd 8260
volume 5.34	10:59	5.00	-105.3	789	63.91	3.57	6.74	↓	↓	BTEX MTBE Metals

Purging Method: PVC Bailer / Pump / Disp. Bailer

COMMENTS: color, turbidity, recharge, sheen, odor Gray, High, OK - Has sheen & Has Odor

POST DEPTH TO WATER: 13.55 SAMPLE TIME: 11:00

PURGE DATA SHEET

b No.: ZP046I Location: Oakland, CA. Date: 8/16/07 Sheet 8 of 9

Tech: Eric V Austin, Rodney Beery

WELL #	TIME	VOL. (gal.)	ORP	CND (µ/cm)	TMP (°F)	DO (mg/L)	pH	Fe^{2+}	Fe_T	
MW-4	11:05	2.00	-130.1	1192	67.41	4.19	6.77	2.61	3.21	Sample for: TBA/5oxys
lc. purge	11:09	5.00	-132.8	1194	67.45	3.91	6.79	↓	↓	TPHg TPHd 8260
ume 7.41	11:13	7.00	-133.0	1194	67.44	3.87	6.81	↓	↓	BTEX MTBE Metals

Purging Method: PVC Bailer / Pump / Disp. Bailer

COMMENTS: color, turbidity, recharge, sheen, odor Grayish, High, OR - Has sheen & Has odor

POST DEPTH TO WATER: 9.11 SAMPLE TIME: 11:15

WELL #	TIME	VOL. (gal.)	ORP	CND (µ/cm)	TMP (°F)	DO (mg/L)	pH	Fe^{2+}	Fe_T	
MW-5	11:18	2.00	-150.3	1071	70.26	1.67	6.77	NA	NA	Sample for: TBA/5oxys
c. purge	11:23	5.00	-149.3	1073	70.41	1.51	6.78	↓	↓	TPHg TPHd 8260
ıme 8.43	11:30	8.00	-148.4	1074	70.42	1.24	6.78	↓	↓	BTEX MTBE Metals

Purging Method: PVC Bailer / Pump / Disp. Bailer

COMMENTS: color, turbidity, recharge, sheen, odor Lt. Gray, Low, OR - No sheen - slight odor

POST DEPTH TO WATER: 8.09 SAMPLE TIME: 11:45

PURGE DATA SHEET

Job No.: 2P046T **Location:** Oakland, CA. **Date:** 8/16/07 **Tech:** Eric Vautier / Rodney Berry

WELL #	TIME	VOL. (gal.)	ORP	CND (μ/cm)	TMP (°F)	DO (mg/L)	pH	Fe^{2+}	Fe_T	
MW-8	11:57	2.00	-33.3	66	63.33	6.65	7.49	3.30	3.30	Sample for: TBA/5oxy's
Calc. purge	12:02	4.00	-24.2	65	63.34	6.12	7.48	↓	↓	(TPHg) TPHd 8260
volume 7.68	12:09	8.00	-24.0	65	63.35	6.10	7.48	↓	↓	(BTEX MTBE) Metals

Purging Method: PVC Bailer / Pump / (Disp. Bailer)

COMMENTS: color, turbidity, recharge, sheen, odor Gray, Moderate, Poor, Has sheen & Odor

POST DEPTH TO WATER: 8.90 SAMPLE TIME: 12:15

Job No.: **Location:** **Date:** **Tech:**

WELL #	TIME	VOL. (gal.)	ORP	CND (μ/cm)	TMP (°F)	DO (mg/L)	pH	Fe^{2+}	Fe_T	
EW-1	12:25	10.00	-109.3	616	67.84	8.43	6.78	NA	NA	Sample for: TBA/5oxy's
Calc. purge	12:35	20.00	-109.7	615	67.87	8.68	6.78	↓	↓	(TPHg TPHd) 8260
volume 32.01	12:50	32.00	-107.2	614	67.94	8.79	6.76	↓	↓	(BTEX MTBE) Metals

Purging Method: PVC Bailer / Pump / (Disp. Bailer)

COMMENTS: color, turbidity, recharge, sheen, odor Gray, High, poor & Has sheen & odor

POST DEPTH TO WATER: 24.81 SAMPLE TIME: 13:00

ATTACHMENT C

KIFF Analytical LLC

Report Number : 58075
Date : 8/27/2007

Karel Detterman
Clearwater Group, Inc.
229 Tewksbury Avenue
Point Richmond, CA 94801

Subject : 8 Water Samples
Project Name : NAZ EAGLE GAS STATION
Project Number : ZP046I

Dear Ms. Detterman,

Chemical analysis of the samples referenced above has been completed. Summaries of the data are contained on the following pages. Sample(s) were received under documented chain-of-custody. US EPA protocols for sample storage and preservation were followed.

Kiff Analytical is certified by the State of California (# 2236). If you have any questions regarding procedures or results, please call me at 530-297-4800.

Sincerely,

Joel Kiff

KIFF Analytical LLC

Report Number : 58075

Date : 8/27/2007

Project Name : **NAZ EAGLE GAS STATION**

Project Number : **ZP046I**

Sample : **MW-5D**

Matrix : Water

Lab Number : 58075-01

Sample Date :8/15/2007

Parameter	Measured Value	Method Reporting Limit	Units	Analysis Method	Date Analyzed
Benzene	**< 0.50**	0.50	ug/L	EPA 8260B	8/21/2007
Toluene	**< 0.50**	0.50	ug/L	EPA 8260B	8/21/2007
Ethylbenzene	**< 0.50**	0.50	ug/L	EPA 8260B	8/21/2007
Total Xylenes	**< 0.50**	0.50	ug/L	EPA 8260B	8/21/2007
Methyl-t-butyl ether (MTBE)	**< 0.50**	0.50	ug/L	EPA 8260B	8/21/2007
Diisopropyl ether (DIPE)	**< 0.50**	0.50	ug/L	EPA 8260B	8/21/2007
Ethyl-t-butyl ether (ETBE)	**< 0.50**	0.50	ug/L	EPA 8260B	8/21/2007
Tert-amyl methyl ether (TAME)	**< 0.50**	0.50	ug/L	EPA 8260B	8/21/2007
Tert-Butanol	**< 5.0**	5.0	ug/L	EPA 8260B	8/21/2007
TPH as Gasoline	**< 50**	50	ug/L	EPA 8260B	8/21/2007
Toluene - d8 (Surr)	94.0		% Recovery	EPA 8260B	8/21/2007
4-Bromofluorobenzene (Surr)	95.0		% Recovery	EPA 8260B	8/21/2007
TPH as Diesel	**330**	50	ug/L	M EPA 8015	8/22/2007
(Note: Discrete peaks in Diesel range, atypical for Diesel Fuel.)					
Octacosane (Diesel Surrogate)	126		% Recovery	M EPA 8015	8/22/2007

Approved By: Joel Kiff

2795 2nd Street, Suite 300 Davis, CA 95618 530-297-4800

KIFF Analytical LLC

Report Number : 58075
Date : 8/27/2007

Project Name : **NAZ EAGLE GAS STATION**
Project Number : **ZP046I**

Sample : **MW-4D** Matrix : Water Lab Number : 58075-02
Sample Date :8/15/2007

Parameter	Measured Value	Method Reporting Limit	Units	Analysis Method	Date Analyzed
Benzene	**< 0.50**	0.50	ug/L	EPA 8260B	8/21/2007
Toluene	**< 0.50**	0.50	ug/L	EPA 8260B	8/21/2007
Ethylbenzene	**< 0.50**	0.50	ug/L	EPA 8260B	8/21/2007
Total Xylenes	**< 0.50**	0.50	ug/L	EPA 8260B	8/21/2007
Methyl-t-butyl ether (MTBE)	**< 0.50**	0.50	ug/L	EPA 8260B	8/21/2007
Diisopropyl ether (DIPE)	**< 0.50**	0.50	ug/L	EPA 8260B	8/21/2007
Ethyl-t-butyl ether (ETBE)	**< 0.50**	0.50	ug/L	EPA 8260B	8/21/2007
Tert-amyl methyl ether (TAME)	**< 0.50**	0.50	ug/L	EPA 8260B	8/21/2007
Tert-Butanol	**< 5.0**	5.0	ug/L	EPA 8260B	8/21/2007
TPH as Gasoline	**< 50**	50	ug/L	EPA 8260B	8/21/2007
Toluene - d8 (Surr)	93.0		% Recovery	EPA 8260B	8/21/2007
4-Bromofluorobenzene (Surr)	95.9		% Recovery	EPA 8260B	8/21/2007
TPH as Diesel	**130**	50	ug/L	M EPA 8015	8/22/2007
(Note: Discrete peaks in Diesel range, atypical for Diesel Fuel.)					
Octacosane (Diesel Surrogate)	126		% Recovery	M EPA 8015	8/22/2007

Approved By: Joel Kiff

2795 2nd Street, Suite 300 Davis, CA 95618 530-297-4800

KIFF Analytical LLC

Report Number : 58075

Date : 8/27/2007

Project Name : **NAZ EAGLE GAS STATION**

Project Number : **ZP046I**

Sample : **MW-1**

Matrix : Water

Lab Number : 58075-03

Sample Date :8/15/2007

Parameter	Measured Value	Method Reporting Limit	Units	Analysis Method	Date Analyzed
Benzene	**< 10**	10	ug/L	EPA 8260B	8/21/2007
Toluene	**< 10**	10	ug/L	EPA 8260B	8/21/2007
Ethylbenzene	**< 10**	10	ug/L	EPA 8260B	8/21/2007
Total Xylenes	**< 10**	10	ug/L	EPA 8260B	8/21/2007
Methyl-t-butyl ether (MTBE)	**230**	10	ug/L	EPA 8260B	8/21/2007
Diisopropyl ether (DIPE)	**< 10**	10	ug/L	EPA 8260B	8/21/2007
Ethyl-t-butyl ether (ETBE)	**< 10**	10	ug/L	EPA 8260B	8/21/2007
Tert-amyl methyl ether (TAME)	**< 10**	10	ug/L	EPA 8260B	8/21/2007
Tert-Butanol	**34000**	50	ug/L	EPA 8260B	8/21/2007
TPH as Gasoline	**< 1000**	1000	ug/L	EPA 8260B	8/21/2007
Toluene - d8 (Surr)	97.3		% Recovery	EPA 8260B	8/21/2007
4-Bromofluorobenzene (Surr)	100		% Recovery	EPA 8260B	8/21/2007
TPH as Diesel	**1000**	50	ug/L	M EPA 8015	8/22/2007
Octacosane (Diesel Surrogate)	130		% Recovery	M EPA 8015	8/22/2007

Approved By: Joel Kiff

2795 2nd Street, Suite 300 Davis, CA 95618 530-297-4800

KIFF Analytical LLC

Report Number : 58075

Date : 8/27/2007

Project Name : **NAZ EAGLE GAS STATION**

Project Number : **ZP046I**

Sample : **IS-1**

Matrix : Water

Lab Number : 58075-04

Sample Date :8/15/2007

Parameter	Measured Value	Method Reporting Limit	Units	Analysis Method	Date Analyzed
Benzene	**< 40**	40	ug/L	EPA 8260B	8/20/2007
Toluene	**< 40**	40	ug/L	EPA 8260B	8/20/2007
Ethylbenzene	**< 40**	40	ug/L	EPA 8260B	8/20/2007
Total Xylenes	**< 40**	40	ug/L	EPA 8260B	8/20/2007
Methyl-t-butyl ether (MTBE)	**4200**	40	ug/L	EPA 8260B	8/20/2007
Diisopropyl ether (DIPE)	**< 40**	40	ug/L	EPA 8260B	8/20/2007
Ethyl-t-butyl ether (ETBE)	**< 40**	40	ug/L	EPA 8260B	8/20/2007
Tert-amyl methyl ether (TAME)	**< 40**	40	ug/L	EPA 8260B	8/20/2007
Tert-Butanol	**90000**	200	ug/L	EPA 8260B	8/20/2007
TPH as Gasoline	**< 4000**	4000	ug/L	EPA 8260B	8/20/2007
Toluene - d8 (Surr)	98.0		% Recovery	EPA 8260B	8/20/2007
4-Bromofluorobenzene (Surr)	89.3		% Recovery	EPA 8260B	8/20/2007
TPH as Diesel	**2700**	50	ug/L	M EPA 8015	8/22/2007
Octacosane (Diesel Surrogate)	121		% Recovery	M EPA 8015	8/22/2007

Approved By: Joel Kiff

KIFF Analytical LLC

Report Number : 58075

Date : 8/27/2007

Project Name : **NAZ EAGLE GAS STATION**

Project Number : **ZP046I**

Sample : **MW-7**

Matrix : Water

Lab Number : 58075-05

Sample Date :8/15/2007

Parameter	Measured Value	Method Reporting Limit	Units	Analysis Method	Date Analyzed
Benzene	**< 90**	90	ug/L	EPA 8260B	8/21/2007
Toluene	**< 90**	90	ug/L	EPA 8260B	8/21/2007
Ethylbenzene	**< 90**	90	ug/L	EPA 8260B	8/21/2007
Total Xylenes	**< 90**	90	ug/L	EPA 8260B	8/21/2007
Methyl-t-butyl ether (MTBE)	**37000**	90	ug/L	EPA 8260B	8/21/2007
Diisopropyl ether (DIPE)	**< 90**	90	ug/L	EPA 8260B	8/21/2007
Ethyl-t-butyl ether (ETBE)	**< 90**	90	ug/L	EPA 8260B	8/21/2007
Tert-amyl methyl ether (TAME)	**170**	90	ug/L	EPA 8260B	8/21/2007
Tert-Butanol	**160000**	500	ug/L	EPA 8260B	8/21/2007
TPH as Gasoline	**< 9000**	9000	ug/L	EPA 8260B	8/21/2007
Toluene - d8 (Surr)	98.4		% Recovery	EPA 8260B	8/21/2007
4-Bromofluorobenzene (Surr)	89.3		% Recovery	EPA 8260B	8/21/2007
TPH as Diesel	**390**	50	ug/L	M EPA 8015	8/22/2007
Octacosane (Diesel Surrogate)	126		% Recovery	M EPA 8015	8/22/2007

Approved By: Joel Kiff

2795 2nd Street, Suite 300 Davis, CA 95618 530-297-4800

KIFF Analytical LLC

Report Number : 58075

Date : 8/27/2007

Project Name : **NAZ EAGLE GAS STATION**

Project Number : **ZP046I**

Sample : **MW-3** Matrix : Water Lab Number : 58075-06

Sample Date :8/15/2007

Parameter	Measured Value	Method Reporting Limit	Units	Analysis Method	Date Analyzed
Benzene	**42**	40	ug/L	EPA 8260B	8/20/2007
Toluene	**< 40**	40	ug/L	EPA 8260B	8/20/2007
Ethylbenzene	**< 40**	40	ug/L	EPA 8260B	8/20/2007
Total Xylenes	**< 40**	40	ug/L	EPA 8260B	8/20/2007
Methyl-t-butyl ether (MTBE)	**4500**	40	ug/L	EPA 8260B	8/20/2007
Diisopropyl ether (DIPE)	**< 40**	40	ug/L	EPA 8260B	8/20/2007
Ethyl-t-butyl ether (ETBE)	**< 40**	40	ug/L	EPA 8260B	8/20/2007
Tert-amyl methyl ether (TAME)	**< 40**	40	ug/L	EPA 8260B	8/20/2007
Tert-Butanol	**64000**	200	ug/L	EPA 8260B	8/20/2007
TPH as Gasoline	**< 4000**	4000	ug/L	EPA 8260B	8/20/2007
Toluene - d8 (Surr)	98.7		% Recovery	EPA 8260B	8/20/2007
4-Bromofluorobenzene (Surr)	87.3		% Recovery	EPA 8260B	8/20/2007
TPH as Diesel	**< 200**	200	ug/L	M EPA 8015	8/23/2007
(Note: MRL increased due to interference from Gasoline-range hydrocarbons.)					
Octacosane (Diesel Surrogate)	106		% Recovery	M EPA 8015	8/23/2007

Approved By: Joel Kiff

KIFF Analytical LLC

Report Number : 58075

Date : 8/27/2007

Project Name : **NAZ EAGLE GAS STATION**

Project Number : **ZP046I**

Sample : **MW-6**

Matrix : Water

Lab Number : 58075-07

Sample Date :8/15/2007

Parameter	Measured Value	Method Reporting Limit	Units	Analysis Method	Date Analyzed
Benzene	**1300**	20	ug/L	EPA 8260B	8/21/2007
Toluene	**< 20**	20	ug/L	EPA 8260B	8/21/2007
Ethylbenzene	**< 20**	20	ug/L	EPA 8260B	8/21/2007
Total Xylenes	**< 20**	20	ug/L	EPA 8260B	8/21/2007
Methyl-t-butyl ether (MTBE)	**7000**	20	ug/L	EPA 8260B	8/21/2007
Diisopropyl ether (DIPE)	**< 20**	20	ug/L	EPA 8260B	8/21/2007
Ethyl-t-butyl ether (ETBE)	**< 20**	20	ug/L	EPA 8260B	8/21/2007
Tert-amyl methyl ether (TAME)	**32**	20	ug/L	EPA 8260B	8/21/2007
Tert-Butanol	**69000**	150	ug/L	EPA 8260B	8/21/2007
TPH as Gasoline	**4000**	2000	ug/L	EPA 8260B	8/21/2007
Toluene - d8 (Surr)	92.2		% Recovery	EPA 8260B	8/21/2007
4-Bromofluorobenzene (Surr)	95.5		% Recovery	EPA 8260B	8/21/2007
TPH as Diesel	**2900**	50	ug/L	M EPA 8015	8/25/2007
Octacosane (Diesel Surrogate)	101		% Recovery	M EPA 8015	8/25/2007

Approved By: Joel Kiff

2795 2nd Street, Suite 300 Davis, CA 95618 530-297-4800

KIFF Analytical LLC

Report Number : 58075

Date : 8/27/2007

Project Name : **NAZ EAGLE GAS STATION**

Project Number : **ZP046I**

Sample : **IS-2**

Matrix : Water

Lab Number : 58075-08

Sample Date :8/15/2007

Parameter	Measured Value	Method Reporting Limit	Units	Analysis Method	Date Analyzed
Benzene	**500**	70	ug/L	EPA 8260B	8/21/2007
Toluene	**< 70**	70	ug/L	EPA 8260B	8/21/2007
Ethylbenzene	**< 70**	70	ug/L	EPA 8260B	8/21/2007
Total Xylenes	**< 70**	70	ug/L	EPA 8260B	8/21/2007
Methyl-t-butyl ether (MTBE)	**20000**	70	ug/L	EPA 8260B	8/21/2007
Diisopropyl ether (DIPE)	**< 70**	70	ug/L	EPA 8260B	8/21/2007
Ethyl-t-butyl ether (ETBE)	**< 70**	70	ug/L	EPA 8260B	8/21/2007
Tert-amyl methyl ether (TAME)	**160**	70	ug/L	EPA 8260B	8/21/2007
Tert-Butanol	**160000**	400	ug/L	EPA 8260B	8/21/2007
TPH as Gasoline	**< 7000**	7000	ug/L	EPA 8260B	8/21/2007
Toluene - d8 (Surr)	98.5		% Recovery	EPA 8260B	8/21/2007
4-Bromofluorobenzene (Surr)	88.0		% Recovery	EPA 8260B	8/21/2007
TPH as Diesel	**< 3000**	3000	ug/L	M EPA 8015	8/25/2007
(Note: MRL increased due to interference from Gasoline-range hydrocarbons.)					
Octacosane (Diesel Surrogate)	107		% Recovery	M EPA 8015	8/25/2007

Approved By: Joel Kiff

2795 2nd Street, Suite 300 Davis, CA 95618 530-297-4800

Report Number : 58075

Date : 8/27/2007

QC Report : Method Blank Data

Project Name : **NAZ EAGLE GAS STATION**

Project Number : **ZP046I**

Parameter	Measured Value	Method Reporting Limit	Units	Analysis Method	Date Analyzed
TPH as Diesel	< 50	50	ug/L	M EPA 8015	8/21/2007
Octacosane (Diesel Surrogate)	115		%	M EPA 8015	8/21/2007
TPH as Diesel	< 50	50	ug/L	M EPA 8015	8/23/2007
Octacosane (Diesel Surrogate)	122		%	M EPA 8015	8/23/2007
Benzene	< 0.50	0.50	ug/L	EPA 8260B	8/20/2007
Toluene	< 0.50	0.50	ug/L	EPA 8260B	8/20/2007
Ethylbenzene	< 0.50	0.50	ug/L	EPA 8260B	8/20/2007
Total Xylenes	< 0.50	0.50	ug/L	EPA 8260B	8/20/2007
Methyl-t-butyl ether (MTBE)	< 0.50	0.50	ug/L	EPA 8260B	8/20/2007
Diisopropyl ether (DIPE)	< 0.50	0.50	ug/L	EPA 8260B	8/20/2007
Ethyl-t-butyl ether (ETBE)	< 0.50	0.50	ug/L	EPA 8260B	8/20/2007
Tert-amyl methyl ether (TAME)	< 0.50	0.50	ug/L	EPA 8260B	8/20/2007
Tert-Butanol	< 5.0	5.0	ug/L	EPA 8260B	8/20/2007
TPH as Gasoline	< 50	50	ug/L	EPA 8260B	8/20/2007
Toluene - d8 (Surr)	98.6		%	EPA 8260B	8/20/2007
4-Bromofluorobenzene (Surr)	89.4		%	EPA 8260B	8/20/2007
Benzene	< 0.50	0.50	ug/L	EPA 8260B	8/21/2007
Toluene	< 0.50	0.50	ug/L	EPA 8260B	8/21/2007
Ethylbenzene	< 0.50	0.50	ug/L	EPA 8260B	8/21/2007
Total Xylenes	< 0.50	0.50	ug/L	EPA 8260B	8/21/2007
Methyl-t-butyl ether (MTBE)	< 0.50	0.50	ug/L	EPA 8260B	8/21/2007
Diisopropyl ether (DIPE)	< 0.50	0.50	ug/L	EPA 8260B	8/21/2007
Ethyl-t-butyl ether (ETBE)	< 0.50	0.50	ug/L	EPA 8260B	8/21/2007
Tert-amyl methyl ether (TAME)	< 0.50	0.50	ug/L	EPA 8260B	8/21/2007
Tert-Butanol	< 5.0	5.0	ug/L	EPA 8260B	8/21/2007
TPH as Gasoline	< 50	50	ug/L	EPA 8260B	8/21/2007
Toluene - d8 (Surr)	93.7		%	EPA 8260B	8/21/2007
4-Bromofluorobenzene (Surr)	96.0		%	EPA 8260B	8/21/2007

Parameter	Measured Value	Method Reporting Limit	Units	Analysis Method	Date Analyzed

Approved By: Joel Kiff

KIFF ANALYTICAL, LLC

2795 2nd Street, Suite 300 Davis, CA 95618 530-297-4800

Report Number : 58075

QC Report : Matrix Spike/ Matrix Spike Duplicate

Date : 8/27/2007

Project Name : **NAZ EAGLE GAS**

Project Number : **ZP046I**

Parameter	Spiked Sample	Sample Value	Spike Level	Spike Dup. Level	Spiked Sample Value	Duplicate Spiked Sample Value	Units	Analysis Method	Date Analyzed	Spiked Sample Percent Recov.	Duplicate Spiked Sample Percent Recov.	Relative Percent Diff.	Spiked Sample Percent Recov. Limit	Relative Percent Diff. Limit
Benzene	58073-01	<0.50	39.9	39.8	43.6	43.8	ug/L	EPA 8260B	8/20/07	109	110	0.599	70-130	25
Toluene	58073-01	<0.50	39.9	39.8	42.6	43.3	ug/L	EPA 8260B	8/20/07	107	108	1.70	70-130	25
Tert-Butanol	58073-01	<5.0	200	199	215	213	ug/L	EPA 8260B	8/20/07	108	107	0.834	70-130	25
Methyl-t-Butyl Ether	58073-01	<0.50	39.9	39.8	41.1	39.0	ug/L	EPA 8260B	8/20/07	103	97.8	4.99	70-130	25
Benzene	58055-05	15	39.9	40.0	55.6	54.6	ug/L	EPA 8260B	8/21/07	102	99.6	2.76	70-130	25
Toluene	58055-05	62	39.9	40.0	97.3	91.6	ug/L	EPA 8260B	8/21/07	87.0	72.6	18.1	70-130	25
Tert-Butanol	58055-05	<5.0	200	200	216	213	ug/L	EPA 8260B	8/21/07	108	106	1.64	70-130	25
Methyl-t-Butyl Ether	58055-05	1.1	39.9	40.0	38.4	39.3	ug/L	EPA 8260B	8/21/07	93.5	95.5	2.12	70-130	25
TPH as Diesel	Blank	<50	1000	1000	1010	932	ug/L	M EPA 8015	8/21/07	101	93.2	8.34	70-130	25
TPH as Diesel	Blank	<50	1000	1000	907	1000	ug/L	M EPA 8015	8/23/07	90.7	100	9.78	70-130	25

Approved By: Joel Kiff

KIFF ANALYTICAL, LLC

2795 2nd Street, Suite 300 Davis, CA 95618 530-297-4800

Report Number : 58075

QC Report : Laboratory Control Sample (LCS)

Date : 8/27/2007

Project Name : **NAZ EAGLE GAS**

Project Number : **ZP046I**

Parameter	Spike Level	Units	Analysis Method	Date Analyzed	LCS Percent Recov.	LCS Percent Recov. Limit
Benzene	40.0	ug/L	EPA 8260B	8/20/07	111	70-130
Toluene	40.0	ug/L	EPA 8260B	8/20/07	109	70-130
Tert-Butanol	200	ug/L	EPA 8260B	8/20/07	109	70-130
Methyl-t-Butyl Ether	40.0	ug/L	EPA 8260B	8/20/07	97.5	70-130
Benzene	40.0	ug/L	EPA 8260B	8/21/07	107	70-130
Toluene	40.0	ug/L	EPA 8260B	8/21/07	104	70-130
Tert-Butanol	200	ug/L	EPA 8260B	8/21/07	101	70-130
Methyl-t-Butyl Ether	40.0	ug/L	EPA 8260B	8/21/07	100	70-130

Approved By: Joel Kiff

KIFF ANALYTICAL, LLC

2795 2nd Street, Suite 300 Davis, CA 95618 530-297-4800

KIFF Analytical LLC
2795 2nd Street, Suite 300
Davis, CA 95616
Lab: 530.297.4800
Fax: 530.297.4802

SRG # / Lab No. 58075 Page 1 of 1

Chain-of-Custody Record and Analysis Request

Project Contact (Hardcopy or PDF To):	Karel Detterman
Company / Address:	Clearwater Group, 229 Tewksbury Ave Pt. Richmond CA
Phone #:	(510) 307-9943
Fax #:	(510) 232-2823
Project #:	ZP046I
P.O. #:	
Project Name:	NAZ Eagle Gas Station
Project Address:	4301 San Leandro St. Oakland, CA
California EDF Report?	☒ Yes ☐ No
Sampling Company Log Code:	CWGO
Global ID:	T0605300219
EDF Deliverable To (Email Address):	[illegible]@clearwatergroup.com
Sampler Signature:	Rodney Berry

Analysis Request columns: MTBE (EPA 8260B) per EPA 8021 level @ 5.0 ppb; MTBE (EPA 8260B) @ 0.5 ppb; BTEX (EPA 8260B); TPH Gas (EPA 8260B); 5 Oxygenates (EPA 8260B); 7 Oxygenates (EPA 8260B); Lead Scav. (1,2 DCA & 1,2 EDB-EPA 8260B); Volatile Halocarbons (EPA 8260B); Volatile Organics Full List (EPA 8260B); Volatile Organics (EPA 524.2 Drinking Water); TPH as Diesel (EPA 8015M); TPH as Motor Oil (EPA 8015M); Total Lead (EPA 6010); W.E.T. Lead (STLC); TBA

TAT: ☐ 12 hr ☐ 24 hr ☐ 48 hr ☐ 72 hr ☒ 1 Wk

Sample Designation	Date	Time	40 ml VOA	HCl	Water	MTBE @ 0.5 ppb	BTEX	TPH Gas	5 Oxygenates	TPH as Diesel	TBA	TAT 1 Wk	For Lab Use Only
MW-5D	8/15/07	1015	X	X	X	X	X	X	X	X	X	X	01
MW-4D	↓	1045	X	X	X	X	X	X	X	X	X	X	02
MW-1	↓	1115	X	X	X	X	X	X	X	X	X	X	03
15-1	↓	1130	X	X	X	X	X	X	X	X	X	X	04
MW-7	↓	1200	X	X	X	X	X	X	X	X	X	X	05
MW-3	↓	1230	X	X	X	X	X	X	X	X	X	X	06
MW-6	↓	1300	X	X	X	X	X	X	X	X	X	X	07
15-2	↓	1330	X	X	X	X	X	X	X	X	X	X	08

Relinquished by	Date	Time	Received by
Rodney Berry	8/15/07	15:15	
	082007	1206	Received by Laboratory: [signature] Kiff Analytical

Remarks:

Bill to:

For Lab Use Only: Sample Receipt

Temp °C	Initials	Date	Time	Therm. ID #	Coolant Present
1.4	JGB	082007	1621	IR5	(Yes) / No

Distribution: White - Lab; Pink - Originator
Rev: 051805

KIFF Analytical LLC

Report Number : 58076
Date : 08/27/2007

Karel Detterman
Clearwater Group, Inc.
229 Tewksbury Avenue
Point Richmond, CA 94801

Subject : 10 Water Samples
Project Name : NAZ EAGLE GAS STATION
Project Number : ZP046I

Dear Ms. Detterman,

Chemical analysis of the samples referenced above has been completed. Summaries of the data are contained on the following pages. Sample(s) were received under documented chain-of-custody. US EPA protocols for sample storage and preservation were followed.

Kiff Analytical is certified by the State of California (# 2236). If you have any questions regarding procedures or results, please call me at 530-297-4800.

Sincerely,

Joel Kiff

KIFF Analytical LLC

Report Number : 58076

Date : 08/27/2007

Subject : 10 Water Samples

Project Name : NAZ EAGLE GAS STATION

Project Number : ZP046I

Case Narrative

The Method Reporting Limit for Tert-amyl methyl ether has been increased due to the presence of an interfering compound for sample MW-2.

Sample IS-3 did not contain visible sediment. Sample IS-5 contained a trace of sediment, which was not included in the aliquot that was analyzed by EPA Method 8260B.

Approved By: Joel Kiff

KIFF Analytical LLC

Report Number : 58076

Date : 08/27/2007

Project Name : **NAZ EAGLE GAS STATION**

Project Number : **ZP046I**

Sample : **IS-4**　　Matrix : Water　　Lab Number : 58076-01

Sample Date :08/16/2007

Parameter	Measured Value	Method Reporting Limit	Units	Analysis Method	Date Analyzed
Benzene	**< 150**	150	ug/L	EPA 8260B	08/27/2007
Toluene	**< 150**	150	ug/L	EPA 8260B	08/27/2007
Ethylbenzene	**< 150**	150	ug/L	EPA 8260B	08/27/2007
Total Xylenes	**< 150**	150	ug/L	EPA 8260B	08/27/2007
Methyl-t-butyl ether (MTBE)	**85000**	150	ug/L	EPA 8260B	08/27/2007
Diisopropyl ether (DIPE)	**< 150**	150	ug/L	EPA 8260B	08/27/2007
Ethyl-t-butyl ether (ETBE)	**< 150**	150	ug/L	EPA 8260B	08/27/2007
Tert-amyl methyl ether (TAME)	**360**	150	ug/L	EPA 8260B	08/27/2007
Tert-Butanol	**280000**	700	ug/L	EPA 8260B	08/27/2007
TPH as Gasoline	**< 15000**	15000	ug/L	EPA 8260B	08/27/2007
Toluene - d8 (Surr)	102		% Recovery	EPA 8260B	08/27/2007
4-Bromofluorobenzene (Surr)	92.8		% Recovery	EPA 8260B	08/27/2007
TPH as Diesel	**1000**	50	ug/L	M EPA 8015	08/25/2007
Octacosane (Diesel Surrogate)	105		% Recovery	M EPA 8015	08/25/2007

Approved By: Joel Kiff

KIFF Analytical LLC

Report Number : 58076
Date : 08/27/2007

Project Name : **NAZ EAGLE GAS STATION**
Project Number : **ZP046I**

Sample : **IS-6**
Matrix : Water
Lab Number : 58076-02
Sample Date :08/16/2007

Parameter	Measured Value	Method Reporting Limit	Units	Analysis Method	Date Analyzed
Benzene	**560**	90	ug/L	EPA 8260B	08/21/2007
Toluene	**< 90**	90	ug/L	EPA 8260B	08/21/2007
Ethylbenzene	**< 90**	90	ug/L	EPA 8260B	08/21/2007
Total Xylenes	**< 90**	90	ug/L	EPA 8260B	08/21/2007
Methyl-t-butyl ether (MTBE)	**8000**	90	ug/L	EPA 8260B	08/21/2007
Diisopropyl ether (DIPE)	**< 90**	90	ug/L	EPA 8260B	08/21/2007
Ethyl-t-butyl ether (ETBE)	**< 90**	90	ug/L	EPA 8260B	08/21/2007
Tert-amyl methyl ether (TAME)	**100**	90	ug/L	EPA 8260B	08/21/2007
Tert-Butanol	**220000**	500	ug/L	EPA 8260B	08/21/2007
TPH as Gasoline	**< 9000**	9000	ug/L	EPA 8260B	08/21/2007
Toluene - d8 (Surr)	99.3		% Recovery	EPA 8260B	08/21/2007
4-Bromofluorobenzene (Surr)	99.5		% Recovery	EPA 8260B	08/21/2007
TPH as Diesel	**1700**	50	ug/L	M EPA 8015	08/23/2007
Octacosane (Diesel Surrogate)	110		% Recovery	M EPA 8015	08/23/2007

Approved By: Joel Kiff

2795 2nd Street, Suite 300 Davis, CA 95618 530-297-4800

KIFF Analytical LLC

Report Number : 58076
Date : 08/27/2007

Project Name : **NAZ EAGLE GAS STATION**
Project Number : **ZP046I**

Sample : **IS-3**
Matrix : Water
Lab Number : 58076-03
Sample Date :08/16/2007

Parameter	Measured Value	Method Reporting Limit	Units	Analysis Method	Date Analyzed
Benzene	**2800**	1500	ug/L	EPA 8260B	08/21/2007
Toluene	**< 1500**	1500	ug/L	EPA 8260B	08/21/2007
Ethylbenzene	**< 1500**	1500	ug/L	EPA 8260B	08/21/2007
Total Xylenes	**< 1500**	1500	ug/L	EPA 8260B	08/21/2007
Methyl-t-butyl ether (MTBE)	**960000**	2500	ug/L	EPA 8260B	08/23/2007
Diisopropyl ether (DIPE)	**< 1500**	1500	ug/L	EPA 8260B	08/21/2007
Ethyl-t-butyl ether (ETBE)	**< 1500**	1500	ug/L	EPA 8260B	08/21/2007
Tert-amyl methyl ether (TAME)	**4300**	1500	ug/L	EPA 8260B	08/21/2007
Tert-Butanol	**98000**	15000	ug/L	EPA 8260B	08/23/2007
TPH as Gasoline	**< 150000**	150000	ug/L	EPA 8260B	08/21/2007
Toluene - d8 (Surr)	104		% Recovery	EPA 8260B	08/21/2007
4-Bromofluorobenzene (Surr)	101		% Recovery	EPA 8260B	08/21/2007
TPH as Diesel	**< 3000**	3000	ug/L	M EPA 8015	08/23/2007
Octacosane (Diesel Surrogate)	109		% Recovery	M EPA 8015	08/23/2007

(Note: MRL increased due to interference from Gasoline-range hydrocarbons.)

Approved By: Joel Kiff

2795 2nd Street, Suite 300 Davis, CA 95618 530-297-4800

KIFF Analytical LLC

Report Number : 58076

Date : 08/27/2007

Project Name : **NAZ EAGLE GAS STATION**

Project Number : **ZP046I**

Sample : **IS-5**   Matrix : Water   Lab Number : 58076-04

Sample Date :08/16/2007

Parameter	Measured Value	Method Reporting Limit	Units	Analysis Method	Date Analyzed
Benzene	**4300**	500	ug/L	EPA 8260B	08/21/2007
Toluene	**< 500**	500	ug/L	EPA 8260B	08/21/2007
Ethylbenzene	**2100**	500	ug/L	EPA 8260B	08/21/2007
Total Xylenes	**990**	500	ug/L	EPA 8260B	08/21/2007
Methyl-t-butyl ether (MTBE)	**310000**	500	ug/L	EPA 8260B	08/21/2007
Diisopropyl ether (DIPE)	**< 500**	500	ug/L	EPA 8260B	08/21/2007
Ethyl-t-butyl ether (ETBE)	**< 500**	500	ug/L	EPA 8260B	08/21/2007
Tert-amyl methyl ether (TAME)	**3400**	500	ug/L	EPA 8260B	08/21/2007
Tert-Butanol	**48000**	2500	ug/L	EPA 8260B	08/23/2007
TPH as Gasoline	**< 50000**	50000	ug/L	EPA 8260B	08/21/2007
Toluene - d8 (Surr)	99.2		% Recovery	EPA 8260B	08/21/2007
4-Bromofluorobenzene (Surr)	98.4		% Recovery	EPA 8260B	08/21/2007
TPH as Diesel	**< 10000**	10000	ug/L	M EPA 8015	08/23/2007

(Note: MRL increased due to interference from Gasoline-range hydrocarbons.)

Octacosane (Diesel Surrogate)	80.2		% Recovery	M EPA 8015	08/23/2007

Approved By: Joel Kiff

2795 2nd Street, Suite 300 Davis, CA 95618 530-297-4800

KIFF Analytical LLC

Report Number : 58076

Date : 08/27/2007

Project Name : **NAZ EAGLE GAS STATION**

Project Number : **ZP046I**

Sample : **EW-2**

Matrix : Water

Lab Number : 58076-05

Sample Date :08/16/2007

Parameter	Measured Value	Method Reporting Limit	Units	Analysis Method	Date Analyzed
Benzene	**1300**	150	ug/L	EPA 8260B	08/21/2007
Toluene	**< 150**	150	ug/L	EPA 8260B	08/21/2007
Ethylbenzene	**250**	150	ug/L	EPA 8260B	08/21/2007
Total Xylenes	**< 150**	150	ug/L	EPA 8260B	08/21/2007
Methyl-t-butyl ether (MTBE)	**100000**	150	ug/L	EPA 8260B	08/21/2007
Diisopropyl ether (DIPE)	**< 150**	150	ug/L	EPA 8260B	08/21/2007
Ethyl-t-butyl ether (ETBE)	**< 150**	150	ug/L	EPA 8260B	08/21/2007
Tert-amyl methyl ether (TAME)	**700**	150	ug/L	EPA 8260B	08/21/2007
Tert-Butanol	**75000**	700	ug/L	EPA 8260B	08/21/2007
TPH as Gasoline	**< 15000**	15000	ug/L	EPA 8260B	08/21/2007
Toluene - d8 (Surr)	99.3		% Recovery	EPA 8260B	08/21/2007
4-Bromofluorobenzene (Surr)	99.7		% Recovery	EPA 8260B	08/21/2007
TPH as Diesel	**< 2000**	2000	ug/L	M EPA 8015	08/23/2007
(Note: MRL increased due to interference from Gasoline-range hydrocarbons.)					
Octacosane (Diesel Surrogate)	110		% Recovery	M EPA 8015	08/23/2007

Approved By: Joel Kiff

KIFF Analytical LLC

Report Number : 58076

Date : 08/27/2007

Project Name : **NAZ EAGLE GAS STATION**

Project Number : **ZP046I**

Sample : **MW-2** Matrix : Water Lab Number : 58076-06

Sample Date :08/16/2007

Parameter	Measured Value	Method Reporting Limit	Units	Analysis Method	Date Analyzed
Benzene	**100**	50	ug/L	EPA 8260B	08/22/2007
Toluene	**< 50**	50	ug/L	EPA 8260B	08/22/2007
Ethylbenzene	**< 50**	50	ug/L	EPA 8260B	08/22/2007
Total Xylenes	**< 50**	50	ug/L	EPA 8260B	08/22/2007
Methyl-t-butyl ether (MTBE)	**21000**	50	ug/L	EPA 8260B	08/22/2007
Diisopropyl ether (DIPE)	**< 50**	50	ug/L	EPA 8260B	08/22/2007
Ethyl-t-butyl ether (ETBE)	**< 50**	50	ug/L	EPA 8260B	08/22/2007
Tert-amyl methyl ether (TAME)	**< 80**	80	ug/L	EPA 8260B	08/22/2007
Tert-Butanol	**100000**	250	ug/L	EPA 8260B	08/22/2007
TPH as Gasoline	**< 5000**	5000	ug/L	EPA 8260B	08/22/2007
Toluene - d8 (Surr)	98.4		% Recovery	EPA 8260B	08/22/2007
4-Bromofluorobenzene (Surr)	101		% Recovery	EPA 8260B	08/22/2007
TPH as Diesel	**610**	50	ug/L	M EPA 8015	08/23/2007
Octacosane (Diesel Surrogate)	110		% Recovery	M EPA 8015	08/23/2007

Approved By: Joel Kiff

2795 2nd Street, Suite 300 Davis, CA 95618 530-297-4800

KIFF Analytical LLC

Report Number : 58076

Date : 08/27/2007

Project Name : **NAZ EAGLE GAS STATION**

Project Number : **ZP046I**

Sample : **MW-4**

Matrix : Water

Lab Number : 58076-07

Sample Date :08/16/2007

Parameter	Measured Value	Method Reporting Limit	Units	Analysis Method	Date Analyzed
Benzene	**2400**	1500	ug/L	EPA 8260B	08/23/2007
Toluene	**< 1500**	1500	ug/L	EPA 8260B	08/23/2007
Ethylbenzene	**< 1500**	1500	ug/L	EPA 8260B	08/23/2007
Total Xylenes	**< 1500**	1500	ug/L	EPA 8260B	08/23/2007
Methyl-t-butyl ether (MTBE)	**630000**	1500	ug/L	EPA 8260B	08/23/2007
Diisopropyl ether (DIPE)	**< 1500**	1500	ug/L	EPA 8260B	08/23/2007
Ethyl-t-butyl ether (ETBE)	**< 1500**	1500	ug/L	EPA 8260B	08/23/2007
Tert-amyl methyl ether (TAME)	**4300**	1500	ug/L	EPA 8260B	08/23/2007
Tert-Butanol	**130000**	7000	ug/L	EPA 8260B	08/23/2007
TPH as Gasoline	**< 150000**	150000	ug/L	EPA 8260B	08/23/2007
Toluene - d8 (Surr)	96.8		% Recovery	EPA 8260B	08/23/2007
4-Bromofluorobenzene (Surr)	100		% Recovery	EPA 8260B	08/23/2007
TPH as Diesel	**4400**	50	ug/L	M EPA 8015	08/23/2007
Octacosane (Diesel Surrogate)	112		% Recovery	M EPA 8015	08/23/2007

Approved By: Joel Kiff

2795 2nd Street, Suite 300 Davis, CA 95618 530-297-4800

KIFF Analytical LLC

Report Number : 58076

Date : 08/27/2007

Project Name : **NAZ EAGLE GAS STATION**

Project Number : **ZP046I**

Sample : **MW-5**

Matrix : Water

Lab Number : 58076-08

Sample Date :08/16/2007

Parameter	Measured Value	Method Reporting Limit	Units	Analysis Method	Date Analyzed
Benzene	**< 250**	250	ug/L	EPA 8260B	08/22/2007
Toluene	**< 250**	250	ug/L	EPA 8260B	08/22/2007
Ethylbenzene	**< 250**	250	ug/L	EPA 8260B	08/22/2007
Total Xylenes	**< 250**	250	ug/L	EPA 8260B	08/22/2007
Methyl-t-butyl ether (MTBE)	**130000**	250	ug/L	EPA 8260B	08/22/2007
Diisopropyl ether (DIPE)	**< 250**	250	ug/L	EPA 8260B	08/22/2007
Ethyl-t-butyl ether (ETBE)	**< 250**	250	ug/L	EPA 8260B	08/22/2007
Tert-amyl methyl ether (TAME)	**550**	250	ug/L	EPA 8260B	08/22/2007
Tert-Butanol	**620000**	1500	ug/L	EPA 8260B	08/22/2007
TPH as Gasoline	**< 25000**	25000	ug/L	EPA 8260B	08/22/2007
Toluene - d8 (Surr)	98.6		% Recovery	EPA 8260B	08/22/2007
4-Bromofluorobenzene (Surr)	100		% Recovery	EPA 8260B	08/22/2007
TPH as Diesel	**950**	50	ug/L	M EPA 8015	08/23/2007
Octacosane (Diesel Surrogate)	112		% Recovery	M EPA 8015	08/23/2007

Approved By: Joel Kiff

KIFF Analytical LLC

Report Number : 58076

Date : 08/27/2007

Project Name : **NAZ EAGLE GAS STATION**

Project Number : **ZP046I**

Sample : **MW-8**

Matrix : Water

Lab Number : 58076-09

Sample Date :08/16/2007

Parameter	Measured Value	Method Reporting Limit	Units	Analysis Method	Date Analyzed
Benzene	**420**	250	ug/L	EPA 8260B	08/23/2007
Toluene	**< 250**	250	ug/L	EPA 8260B	08/23/2007
Ethylbenzene	**< 250**	250	ug/L	EPA 8260B	08/23/2007
Total Xylenes	**< 250**	250	ug/L	EPA 8260B	08/23/2007
Methyl-t-butyl ether (MTBE)	**150000**	250	ug/L	EPA 8260B	08/23/2007
Diisopropyl ether (DIPE)	**< 250**	250	ug/L	EPA 8260B	08/23/2007
Ethyl-t-butyl ether (ETBE)	**< 250**	250	ug/L	EPA 8260B	08/23/2007
Tert-amyl methyl ether (TAME)	**460**	250	ug/L	EPA 8260B	08/23/2007
Tert-Butanol	**210000**	1500	ug/L	EPA 8260B	08/23/2007
TPH as Gasoline	**< 25000**	25000	ug/L	EPA 8260B	08/23/2007
Toluene - d8 (Surr)	93.6		% Recovery	EPA 8260B	08/23/2007
4-Bromofluorobenzene (Surr)	96.8		% Recovery	EPA 8260B	08/23/2007
TPH as Diesel	**4400**	50	ug/L	M EPA 8015	08/25/2007
Octacosane (Diesel Surrogate)	112		% Recovery	M EPA 8015	08/25/2007

Approved By: Joel Kiff

2795 2nd Street, Suite 300 Davis, CA 95618 530-297-4800

KIFF Analytical LLC

Report Number : 58076

Date : 08/27/2007

Project Name : **NAZ EAGLE GAS STATION**

Project Number : **ZP046I**

Sample : **EW-1**

Matrix : Water

Lab Number : 58076-10

Sample Date :08/16/2007

Parameter	Measured Value	Method Reporting Limit	Units	Analysis Method	Date Analyzed
Benzene	**1900**	800	ug/L	EPA 8260B	08/21/2007
Toluene	**< 800**	800	ug/L	EPA 8260B	08/21/2007
Ethylbenzene	**< 800**	800	ug/L	EPA 8260B	08/21/2007
Total Xylenes	**< 800**	800	ug/L	EPA 8260B	08/21/2007
Methyl-t-butyl ether (MTBE)	**680000**	2500	ug/L	EPA 8260B	08/23/2007
Diisopropyl ether (DIPE)	**< 800**	800	ug/L	EPA 8260B	08/21/2007
Ethyl-t-butyl ether (ETBE)	**< 800**	800	ug/L	EPA 8260B	08/21/2007
Tert-amyl methyl ether (TAME)	**3400**	800	ug/L	EPA 8260B	08/21/2007
Tert-Butanol	**210000**	15000	ug/L	EPA 8260B	08/23/2007
TPH as Gasoline	**< 80000**	80000	ug/L	EPA 8260B	08/21/2007
Toluene - d8 (Surr)	103		% Recovery	EPA 8260B	08/21/2007
4-Bromofluorobenzene (Surr)	102		% Recovery	EPA 8260B	08/21/2007
TPH as Diesel	**1400**	50	ug/L	M EPA 8015	08/25/2007
Octacosane (Diesel Surrogate)	112		% Recovery	M EPA 8015	08/25/2007

Approved By: Joel Kiff

2795 2nd Street, Suite 300 Davis, CA 95618 530-297-4800

Report Number : 58076

Date : 08/27/2007

QC Report : Method Blank Data

Project Name : **NAZ EAGLE GAS STATION**

Project Number : **ZP046I**

Parameter	Measured Value	Method Reporting Limit	Units	Analysis Method	Date Analyzed
TPH as Diesel	< 50	50	ug/L	M EPA 8015	08/22/2007
Octacosane (Diesel Surrogate)	117		%	M EPA 8015	08/22/2007
Benzene	< 0.50	0.50	ug/L	EPA 8260B	08/21/2007
Toluene	< 0.50	0.50	ug/L	EPA 8260B	08/21/2007
Ethylbenzene	< 0.50	0.50	ug/L	EPA 8260B	08/21/2007
Total Xylenes	< 0.50	0.50	ug/L	EPA 8260B	08/21/2007
Methyl-t-butyl ether (MTBE)	< 0.50	0.50	ug/L	EPA 8260B	08/21/2007
Diisopropyl ether (DIPE)	< 0.50	0.50	ug/L	EPA 8260B	08/21/2007
Ethyl-t-butyl ether (ETBE)	< 0.50	0.50	ug/L	EPA 8260B	08/21/2007
Tert-amyl methyl ether (TAME)	< 0.50	0.50	ug/L	EPA 8260B	08/21/2007
Tert-Butanol	< 5.0	5.0	ug/L	EPA 8260B	08/21/2007
TPH as Gasoline	< 50	50	ug/L	EPA 8260B	08/21/2007
Toluene - d8 (Surr)	99.0		%	EPA 8260B	08/21/2007
4-Bromofluorobenzene (Surr)	90.6		%	EPA 8260B	08/21/2007
Benzene	< 0.50	0.50	ug/L	EPA 8260B	08/22/2007
Toluene	< 0.50	0.50	ug/L	EPA 8260B	08/22/2007
Ethylbenzene	< 0.50	0.50	ug/L	EPA 8260B	08/22/2007
Total Xylenes	< 0.50	0.50	ug/L	EPA 8260B	08/22/2007
Methyl-t-butyl ether (MTBE)	< 0.50	0.50	ug/L	EPA 8260B	08/22/2007
Diisopropyl ether (DIPE)	< 0.50	0.50	ug/L	EPA 8260B	08/22/2007
Ethyl-t-butyl ether (ETBE)	< 0.50	0.50	ug/L	EPA 8260B	08/22/2007
Tert-amyl methyl ether (TAME)	< 0.50	0.50	ug/L	EPA 8260B	08/22/2007
Tert-Butanol	< 5.0	5.0	ug/L	EPA 8260B	08/22/2007
TPH as Gasoline	< 50	50	ug/L	EPA 8260B	08/22/2007
Toluene - d8 (Surr)	98.4		%	EPA 8260B	08/22/2007
4-Bromofluorobenzene (Surr)	87.6		%	EPA 8260B	08/22/2007

Parameter	Measured Value	Method Reporting Limit	Units	Analysis Method	Date Analyzed
Benzene	< 0.50	0.50	ug/L	EPA 8260B	08/22/2007
Toluene	< 0.50	0.50	ug/L	EPA 8260B	08/22/2007
Ethylbenzene	< 0.50	0.50	ug/L	EPA 8260B	08/22/2007
Total Xylenes	< 0.50	0.50	ug/L	EPA 8260B	08/22/2007
Methyl-t-butyl ether (MTBE)	< 0.50	0.50	ug/L	EPA 8260B	08/22/2007
Diisopropyl ether (DIPE)	< 0.50	0.50	ug/L	EPA 8260B	08/22/2007
Ethyl-t-butyl ether (ETBE)	< 0.50	0.50	ug/L	EPA 8260B	08/22/2007
Tert-amyl methyl ether (TAME)	< 0.50	0.50	ug/L	EPA 8260B	08/22/2007
Tert-Butanol	< 5.0	5.0	ug/L	EPA 8260B	08/22/2007
TPH as Gasoline	< 50	50	ug/L	EPA 8260B	08/22/2007
Toluene - d8 (Surr)	98.4		%	EPA 8260B	08/22/2007
4-Bromofluorobenzene (Surr)	89.9		%	EPA 8260B	08/22/2007
Benzene	< 0.50	0.50	ug/L	EPA 8260B	08/27/2007
Toluene	< 0.50	0.50	ug/L	EPA 8260B	08/27/2007
Ethylbenzene	< 0.50	0.50	ug/L	EPA 8260B	08/27/2007
Total Xylenes	< 0.50	0.50	ug/L	EPA 8260B	08/27/2007
Methyl-t-butyl ether (MTBE)	< 0.50	0.50	ug/L	EPA 8260B	08/27/2007
Diisopropyl ether (DIPE)	< 0.50	0.50	ug/L	EPA 8260B	08/27/2007
Ethyl-t-butyl ether (ETBE)	< 0.50	0.50	ug/L	EPA 8260B	08/27/2007
Tert-amyl methyl ether (TAME)	< 0.50	0.50	ug/L	EPA 8260B	08/27/2007
Tert-Butanol	< 5.0	5.0	ug/L	EPA 8260B	08/27/2007
TPH as Gasoline	< 50	50	ug/L	EPA 8260B	08/27/2007
Toluene - d8 (Surr)	99.2		%	EPA 8260B	08/27/2007
4-Bromofluorobenzene (Surr)	96.3		%	EPA 8260B	08/27/2007

Approved By: Joel Kiff

KIFF ANALYTICAL, LLC

2795 2nd Street, Suite 300 Davis, CA 95618 530-297-4800

Report Number : 58076

Date : 08/27/2007

QC Report : Method Blank Data

Project Name : **NAZ EAGLE GAS STATION**

Project Number : **ZP046I**

Parameter	Measured Value	Method Reporting Limit	Units	Analysis Method	Date Analyzed
Benzene	< 0.50	0.50	ug/L	EPA 8260B	08/22/2007
Toluene	< 0.50	0.50	ug/L	EPA 8260B	08/22/2007
Ethylbenzene	< 0.50	0.50	ug/L	EPA 8260B	08/22/2007
Total Xylenes	< 0.50	0.50	ug/L	EPA 8260B	08/22/2007
Methyl-t-butyl ether (MTBE)	< 0.50	0.50	ug/L	EPA 8260B	08/22/2007
Diisopropyl ether (DIPE)	< 0.50	0.50	ug/L	EPA 8260B	08/22/2007
Ethyl-t-butyl ether (ETBE)	< 0.50	0.50	ug/L	EPA 8260B	08/22/2007
Tert-amyl methyl ether (TAME)	< 0.50	0.50	ug/L	EPA 8260B	08/22/2007
Tert-Butanol	< 5.0	5.0	ug/L	EPA 8260B	08/22/2007
TPH as Gasoline	< 50	50	ug/L	EPA 8260B	08/22/2007
Toluene - d8 (Surr)	100		%	EPA 8260B	08/22/2007
4-Bromofluorobenzene (Surr)	101		%	EPA 8260B	08/22/2007

Parameter	Measured Value	Method Reporting Limit	Units	Analysis Method	Date Analyzed

Approved By: Joel Kiff

KIFF ANALYTICAL, LLC

2795 2nd Street, Suite 300 Davis, CA 95618 530-297-4800

Report Number : 58076

QC Report : Matrix Spike/ Matrix Spike Duplicate

Date : 08/27/2007

Project Name : **NAZ EAGLE GAS**

Project Number : **ZP046I**

Parameter	Spiked Sample	Sample Value	Spike Level	Spike Dup. Level	Spiked Sample Value	Duplicate Spiked Sample Value	Units	Analysis Method	Date Analyzed	Spiked Sample Percent Recov.	Duplicate Spiked Sample Percent Recov.	Relative Percent Diff.	Spiked Sample Percent Recov. Limit	Relative Percent Diff. Limit
TPH as Diesel	Blank	<50	1000	1000	930	1030	ug/L	M EPA 8015	8/22/07	93.0	103	9.93	70-130	25
Benzene	58055-01	<0.50	39.8	39.8	40.0	40.3	ug/L	EPA 8260B	8/21/07	101	101	0.413	70-130	25
Toluene	58055-01	28	39.8	39.8	66.2	65.7	ug/L	EPA 8260B	8/21/07	96.2	94.8	1.49	70-130	25
Tert-Butanol	58055-01	<5.0	199	199	206	204	ug/L	EPA 8260B	8/21/07	103	102	0.866	70-130	25
Methyl-t-Butyl Ether	58055-01	<0.50	39.8	39.8	31.4	32.2	ug/L	EPA 8260B	8/21/07	79.0	80.9	2.34	70-130	25
Benzene	58095-03	<0.50	39.9	39.9	42.3	42.1	ug/L	EPA 8260B	8/22/07	106	105	0.555	70-130	25
Toluene	58095-03	<0.50	39.9	39.9	41.7	41.4	ug/L	EPA 8260B	8/22/07	104	104	0.801	70-130	25
Tert-Butanol	58095-03	64	200	200	272	272	ug/L	EPA 8260B	8/22/07	104	104	0.0549	70-130	25
Methyl-t-Butyl Ether	58095-03	4.6	39.9	39.9	41.9	41.6	ug/L	EPA 8260B	8/22/07	93.3	92.7	0.690	70-130	25
Benzene	58097-05	<0.50	40.0	40.0	42.2	42.4	ug/L	EPA 8260B	8/22/07	106	106	0.330	70-130	25
Toluene	58097-05	<0.50	40.0	40.0	41.3	41.6	ug/L	EPA 8260B	8/22/07	103	104	0.536	70-130	25
Tert-Butanol	58097-05	<5.0	200	200	212	207	ug/L	EPA 8260B	8/22/07	106	103	2.37	70-130	25
Methyl-t-Butyl Ether	58097-05	<0.50	40.0	40.0	36.5	37.4	ug/L	EPA 8260B	8/22/07	91.2	93.5	2.50	70-130	25
Benzene	58167-07	<0.50	39.7	39.8	40.4	40.0	ug/L	EPA 8260B	8/27/07	102	101	1.19	70-130	25
Toluene	58167-07	<0.50	39.7	39.8	41.0	41.0	ug/L	EPA 8260B	8/27/07	103	103	0.0353	70-130	25
Tert-Butanol	58167-07	<5.0	198	199	199	198	ug/L	EPA 8260B	8/27/07	100	99.5	0.908	70-130	25
Methyl-t-Butyl Ether	58167-07	1.6	39.7	39.8	39.9	40.0	ug/L	EPA 8260B	8/27/07	96.4	96.4	0.0263	70-130	25

Approved By: Joel Kiff

KIFF ANALYTICAL, LLC

2795 2nd Street, Suite 300 Davis, CA 95618 530-297-4800

Report Number : 58076

Date : 08/27/2007

QC Report : Matrix Spike/ Matrix Spike Duplicate

Project Name : **NAZ EAGLE GAS**

Project Number : **ZP046I**

Parameter	Spiked Sample	Sample Value	Spike Level	Spike Dup. Level	Spiked Sample Value	Duplicate Spiked Sample Value	Units	Analysis Method	Date Analyzed	Spiked Sample Percent Recov.	Duplicate Spiked Sample Percent Recov.	Relative Percent Diff.	Spiked Sample Percent Recov. Limit	Relative Percent Diff. Limit
Benzene	58096-01	<0.50	40.0	40.0	39.1	36.6	ug/L	EPA 8260B	8/22/07	97.8	91.5	6.65	70-130	25
Toluene	58096-01	<0.50	40.0	40.0	38.8	36.5	ug/L	EPA 8260B	8/22/07	96.9	91.2	6.09	70-130	25
Tert-Butanol	58096-01	80	200	200	271	276	ug/L	EPA 8260B	8/22/07	95.6	97.9	2.33	70-130	25
Methyl-t-Butyl Ether	58096-01	11	40.0	40.0	47.0	47.0	ug/L	EPA 8260B	8/22/07	90.0	89.9	0.0414	70-130	25

Approved By: Joel Kiff

KIFF ANALYTICAL, LLC

2795 2nd Street, Suite 300 Davis, CA 95618 530-297-4800

Report Number : 58076

Date : 08/27/2007

QC Report : Laboratory Control Sample (LCS)

Project Name : **NAZ EAGLE GAS**

Project Number : **ZP046I**

Parameter	Spike Level	Units	Analysis Method	Date Analyzed	LCS Percent Recov.	LCS Percent Recov. Limit
Benzene	40.0	ug/L	EPA 8260B	8/21/07	101	70-130
Toluene	40.0	ug/L	EPA 8260B	8/21/07	101	70-130
Tert-Butanol	200	ug/L	EPA 8260B	8/21/07	98.3	70-130
Methyl-t-Butyl Ether	40.0	ug/L	EPA 8260B	8/21/07	77.7	70-130
Benzene	40.0	ug/L	EPA 8260B	8/22/07	106	70-130
Toluene	40.0	ug/L	EPA 8260B	8/22/07	104	70-130
Tert-Butanol	200	ug/L	EPA 8260B	8/22/07	104	70-130
Methyl-t-Butyl Ether	40.0	ug/L	EPA 8260B	8/22/07	95.6	70-130
Benzene	40.0	ug/L	EPA 8260B	8/22/07	106	70-130
Toluene	40.0	ug/L	EPA 8260B	8/22/07	103	70-130
Tert-Butanol	200	ug/L	EPA 8260B	8/22/07	105	70-130
Methyl-t-Butyl Ether	40.0	ug/L	EPA 8260B	8/22/07	92.9	70-130
Benzene	40.0	ug/L	EPA 8260B	8/27/07	103	70-130
Toluene	40.0	ug/L	EPA 8260B	8/27/07	107	70-130
Tert-Butanol	200	ug/L	EPA 8260B	8/27/07	95.0	70-130
Methyl-t-Butyl Ether	40.0	ug/L	EPA 8260B	8/27/07	100	70-130
Benzene	40.0	ug/L	EPA 8260B	8/22/07	94.8	70-130

Approved By: Joel Kiff

KIFF ANALYTICAL, LLC

2795 2nd Street, Suite 300 Davis, CA 95618 530-297-4800

Report Number : 58076

Date : 08/27/2007

QC Report : Laboratory Control Sample (LCS)

Project Name : **NAZ EAGLE GAS**

Project Number : **ZP046I**

Parameter	Spike Level	Units	Analysis Method	Date Analyzed	LCS Percent Recov.	LCS Percent Recov. Limit
Toluene	40.0	ug/L	EPA 8260B	8/22/07	93.0	70-130
Tert-Butanol	200	ug/L	EPA 8260B	8/22/07	97.4	70-130
Methyl-t-Butyl Ether	40.0	ug/L	EPA 8260B	8/22/07	98.8	70-130

Approved By: Joel Kiff

KIFF ANALYTICAL, LLC

2795 2nd Street, Suite 300 Davis, CA 95618 530-297-4800

KIFF Analytical LLC

2795 2nd Street, Suite 300
Davis, CA 95616
Lab: 530.297.4800
Fax: 530.297.4802

SRG # / Lab No. 58076 Page 1 of 1

Chain-of-Custody Record and Analysis Request

Project Contact (Hardcopy or PDF To): KAREL DETTERMAN
California EDF Report? [X] Yes [ ] No
Company / Address: CLEARWATER GROUP 229 TEWKSBURY AVE Pt. Richmond, CA
Sampling Company Log Code: CWGO
Phone #: (510)307-9943 Fax #: (510)232-2823
Global ID: T0605300219
Project #: ZP046I P.O. #:
EDF Deliverable To (Email Address): GFISCO@CLEARWATERGROUP.COM
Project Name: NAZ EAGLE GAS STATION
Sampler Signature: RODNEY BERRY
Project Address: 4301 SAN LEANDRO ST OAKLAND, CA

Analysis Request columns: MTBE (EPA 8260B) per EPA 8021 level @ 5.0 ppb; MTBE (EPA 8260B) @ 0.5 ppb; BTEX (EPA 8260B); TPH Gas (EPA 8260B); 5 Oxygenates (EPA 8260B); 7 Oxygenates (EPA 8260B); Lead Scav. (1,2 DCA & 1,2 EDB-EPA 8260B); Volatile Halocarbons (EPA 8260B); Volatile Organics Full List (EPA 8260B); Volatile Organics (EPA 524.2 Drinking Water); TPH as Diesel (EPA 8015M); TPH as Motor Oil (EPA 8015M); Total Lead (EPA 6010); W.E.T. Lead (STLC); TBA

TAT: [ ] 12 hr [ ] 24 hr [ ] 48 hr [ ] 72 hr [X] 1 wk

Sample Designation	Date	Time	40 ml VOA	HCl	Water	MTBE 0.5 ppb	BTEX	TPH Gas	5 Oxygenates	TPH as Diesel	TBA	TAT	For Lab Use Only
15-4	8/16/07	915	6	X	X	X	X	X	X	X	X	1WK	01
15-6	↓	945	X	X	X	X	X	X	X	X	X	X	02
15-3	↓	1000	X	X	X	X	X	X	X	X	X	X	03
15-5	↓	1015	X	X	X	X	X	X	X	X	X	X	04
EW-2	↓	1045	X	X	X	X	X	X	X	X	X	X	05
MW-2	↓	1100	X	X	X	X	X	X	X	X	X	X	06
MW-4	↓	1115	X	X	X	X	X	X	X	X	X	X	07
MW-5	↓	1145	X	X	X	X	X	X	X	X	X	X	08
MW-8	↓	1215	X	X	X	X	X	X	X	X	X	X	09
EW-1	↓	1300	X	X	X	X	X	X	X	X	X	X	10

Relinquished by	Date	Time	Received by
RODNEY BERRY	8/16/07	1430	
	082007	1206	Received by Laboratory: Kiff Analytical

Remarks:

Bill to:

For Lab Use Only: Sample Receipt

Temp °C	Initials	Date	Time	Therm. ID #	Coolant Present
1.4	[illegible]	082007	1621	IR5	Yes

Distribution: White - Lab; Pink - Originator
Rev: 051805

ATTACHMENT D

CLEARWATER GROUP

Natural Attenuation Processes and Recommended Monitoring Guidelines

---

The following document details the processes involved in the natural attenuation of petroleum hydrocarbons in soil and groundwater and presents recommendations for monitoring and confirming these processes. By confirming natural attenuation, a conceptual basis is provided for regulatory site closure.

Natural Attenuation Processes

The predominant attenuation process is intrinsic biodegradation (aerobic and anaerobic) mediated by hydrocarbon degrading bacteria. Other factors in natural attenuation include physical and chemical processes such as volatilization, dispersion, sorption and hydrolysis. Unless otherwise referenced, the following information was derived from McAllister and Chiang (1994).

Aerobic degradation.

In aerobic respiration, microbes utilize dissolved oxygen (DO) as an electron acceptor during hydrocarbon oxidation (degradation), producing carbon dioxide, water, and microbial biomass. The electron acceptor is a substance that facilitates the reaction by taking up the electrons released by oxidation; the electron acceptor then becomes reduced during the process of biodegradation.

The aerobic process is the most important form of biodegradation wherever DO concentrations exceed 1 to 2 mg/L. Under hypoxic conditions (0.1 to 2 mg/L DO), aerobic degradation may occur along the edges of the plume while anaerobic degradation predominates in the center of the plume.

Anaerobic degradation.

Microbes may also degrade hydrocarbons via anaerobic processes by utilizing alternate biochemical pathways when DO concentrations are insufficient for aerobic degradation. Anaerobic degradation is much slower than the aerobic process and not all BTEX compounds (benzene, toluene, ethylbenzene, and xylenes) are consistently degraded. Some studies indicate benzene is recalcitrant to anaerobic degradation while others have demonstrated limited degradation (Rifai et al, 1995). Anaerobic degradation generally occurs in the center of the plume where DO has been depleted by aerobic degradation. Research into the efficacy of anaerobic processes is ongoing.

Anaerobic electron acceptors include [in order of sequential use and decreasing redox potential (Eh)]:

- nitrate (NO_3^-),
- oxides of ferric iron (Fe^{3+}),
- sulfate (SO_4^{2+}),
- water.

The associated biochemical processes are: denitrification (or nitrate reduction), iron reduction, sulfate reduction, and methanogenesis. Manganese (Mn^{4+}) may also function as an electron acceptor. Nitrate and sulfate reduction do not degrade alkanes such as methane, propane, and butane.

Volatilization

Dissolved plume mass can be reduced by volatilization of contaminants to the vapor phase in the unsaturated zone. Normally volatilization is a negligible component of natural attenuation, however, it may contribute 5% or more of total mass loss in shallow (<15 feet), warm and/or fluctuating water table conditions in permeable soils (Rifai et al, 1995).

Dispersion

Mechanical/molecular mixing reduces dissolved concentrations substantially by lateral spread. No dissolved contaminant mass is removed from the system by this process. Dispersion (D) is generally modeled based on the length of the plume (x). Conservative practice calls for dispersion in the downgradient direction (longitudinal dispersivity, D_X) to be modeled at 0.1 times the plume length. Dispersion in the transverse direction (transverse dispersivity, D_y) is modeled at 0.33 times D_x; dispersion in the vertical direction (vertical dispersivity, D_z) is modeled at 0.05 times D_x (Connor, et al., 1995).

Sorption
Contaminants partition between the aqueous phase and the soil matrix. Adsorption onto the soil surface significantly retards migration but does not permanently remove BTEX which may desorb later. Carbon is the most effective sorption material in soils, and although clay minerals and amorphous minerals such as iron hydroxides also have some influence, only sorption to carbon in soil is included in most contaminant fate and transport computer models.

Sorption is controlled by the organic carbon content of soil (f_{OC}), the chemical specific organic carbon partition coefficient (K_{OC}), the soil bulk density (ρ_S), and the water content of the soil as measured by the porosity (ϕ_S). K_{OC} is a measure of the affinity of a given chemical to sorb from water onto solid organic material (Table 1). Once the porosity, bulk density, K_{OC}, and f_{OC} have been established, the retardation factor (R) for the site can be calculated as follows:

$$R = (1 + k_S * \rho_S / \phi_S) \qquad \text{where: } k_S = f_{OC} * K_{OC}$$

The retardation factor is used in transport models (discussed below) as a measure of the degree to which the rate of plume migration is reduced by sorption processes.

Hydrolysis etc.
Other chemical reactions such as hydrolysis may reduce contaminant mass without microbial mediation. Hydrolysis occurs when an organic molecule reacts with water or a component ion of water. Unlike biodegradation, hydrolysis is not catalyzed by microorganisms. Hydrolysis has not been observed to reduce BTEX concentrations, but is significant for halogenated volatile organics (solvents, etc.).

Monitoring Groundwater For Natural Attenuation
Assessment and monitoring of natural attenuation should be performed to confirm that intrinsic bioremediation and other forms of natural attenuation are occurring in the subsurface and are sufficient to limit plume migration by achieving an equilibrium between hydraulic transport (advection) and removal/degradation/reduction of mobile contaminants. To confirm natural attenuation, it needs to be demonstrated that intrinsic factors are limiting migration, and that they will continue to do so until the plume has degraded to acceptable levels.

Natural attenuation can be evaluated by monitoring specific indicator parameters over a given period of time. As further confirmation, simple fate and transport models can be applied to the site using the site-specific information obtained. Several lines of evidence will generally need to be combined to provide a convincing case of natural attenuation. First, it is necessary to establish that the plume is stable or being reduced in terms of size and concentrations, by review of historical data, possibly including statistical analysis. At least one year of monitoring data utilizing an adequate distribution of wells should be sufficient. For all chemical parameters, background concentrations need to be established by sampling one or more clean wells. In addition to plume concentrations, Rifai et al., (1995), recommends, at a minimum, monitoring the following parameters:

- Microbial enumeration [total heterotrophic bacteria (plate count), and total hydrocarbon using bacteria (ASTM method G-2)].
- Temperature (field measurement)
- pH (field measurement)
- Dissolved Oxygen (field measurement or EPA Method 360.1)

If DO is depleted relative to background concentrations, additional monitoring for anaerobic processes may be considered and should include the following:

- Eh (field measurement)
- Sulfate (EPA method 300 or 375.4)
- Nitrate/nitrite (EPA method 300, 353.1 or 353.2)
- Dissolved iron (EPA method 200.7)
- Total iron (EPA Method 236.1 or 6010)

- Methane (field measurement)
- Alkalinity (EPA method 310.1)
- Dissolved carbon dioxide (with alkalinity or method SM406C)

Certain parameters, notably DO and Eh, may be measured in the field using downhole meters. Most of the other parameters require laboratory analysis of a groundwater sample for accurate quantification. Trends in methane concentrations may be identified using an organic vapor meter fitted with an appropriate filter at the wellhead.

The combination of parameters that Clearwater will monitor at a particular site will depend on site-specific conditions and previous site investigation. The minimum set of parameters as defined by Rifai will always be included for at least one clean (background) well and at least one well representative of mid-plume conditions.

The following sections provide a detailed description of monitoring methods and anticipated results for indicator parameters outlined above.

Microbial Populations

Hydrocarbon degrading bacteria are generally ubiquitous; however, the total population of microbes (measured in counts per liter) is dependent on the available energy source (ie., hydrocarbons). To evaluate natural attenuation, microbial counts should include separate enumerations for hydrocarbon degrading bacteria and for total heterotrophic bacteria, both normally obtained from cultured plate counts. The ratio of hydrocarbon degraders to total heterotrophs is the most useful in assessing natural attenuation. This ratio should be relatively large in samples from contaminated wells, compared to the ratio in samples from clean wells, indicating a proliferation of the indicator species in contaminated areas, independent of overall microbial population variations. Such a distribution of bacteria may require 1 to 2 years to become established once hydrocarbon contamination is present. As further confirmation, it may be useful to establish that sufficient concentrations of microbial nutrients such as nitrogen and phosphorous are present in the subsurface.

Groundwater typically contains total microbial counts of 10^3 to 10^8 counts per liter. Lower counts in contaminated areas may indicate toxic conditions. In sites with organic rich soils, microbial populations may be high but hydrocarbon degradation may be inhibited because the microbes preferentially degrade the naturally occurring carbon compounds found in the soils (Cookson, 1995).

pH

pH is best measured with a meter or by collecting a sample for laboratory analysis. The probe portion of pH meters must be regularly cleaned and periodically soaked in solutions designed to remove oil and protein build up. Lowered pH corresponding spatially to the plume may be indicative of the production of organic acid metabolic end-products of aerobic hydrocarbon degradation. Uncontaminated groundwater is commonly slightly alkaline, but pH varies widely depending on many natural and human influenced factors. pH between 6 and 8 is optimal for BTEX degradation.

Redox Potential (Eh)

Eh is a measure of electron activity within a solution. Each pathway of degradation is generally restricted to a prescribed range of Eh values. Hydrocarbon degradation reduces the Eh of the system in which it occurs, unless the groundwater recharge rate exceeds the utilization rate of the electron acceptor (this is normally not the case since mixing is limited). Once an electron acceptor has been utilized and thereby depleted in the system, Eh conditions determine which next electron acceptor in the sequence will become predominant.

The utility of Eh measurement is as an adjunct to electron acceptor concentration measurements (discussed below). Eh must be measured in situ to avoid atmospheric influence as described in the section on DO sampling. Eh units are millivolts (mV). Decreased Eh should coincide with elevated contaminant concentrations, and depleted DO. Very low Eh (reducing conditions: <0 mV) should coincide with depleted anaerobic electron acceptors. Table 2 presents Eh values typical of each biodegradation pathway.

Dissolved Oxygen (DO)

DO is best measured with a downhole meter measuring in mg/L. Some meters also read DO as a percentage of saturation at a given temperature, however, the volumetric concentration has more utility in fate and transport models. Measurement of DO and Eh are both sensitive to several factors associated with field methodologies, particularly exposure to atmospheric oxygen; hence the preferred use of a downhole meter. It is necessary to strictly adhere to instructions provided with a given model of instrument. DO meters function by permitting a small quantity of oxygen to diffuse across a porous membrane. Consequently, it is necessary to keep water moving in the vicinity of the membrane to prevent a depletion of DO immediately adjacent to the membrane. This can be achieved manually, by a gentle raising and lowering of the meter in the well. The membrane is delicate and must be carefully maintained.

A negative correlation should occur between DO concentrations and hydrocarbon concentrations. Background concentrations should exceed 1 to 2 mg/L for effective aerobic degradation. DO in groundwater is derived from the atmosphere at the recharge area or the vadose zone. Surface water saturated with oxygen by contact with atmospheric air will contain between approximately 7.5 mg/L at 5°C and 12.75 mg/L at 30°C, though these figures may vary somewhat depending on other chemical parameters. DO concentrations in groundwater are generally less than those for surface water by an amount dependent on the quantity of oxidizable materials (e.g. sulfides) in contact with the groundwater, and the length of time the groundwater has been stored in the aquifer. Background groundwater DO concentrations in shallow aquifers can be as high as 12 mg/L in warm conditions or as low as 1 mg/L in cool conditions. (Hem, 1985). DO may be increased by local groundwater recharge (e.g. irrigation). Aerobic degradation typically occurs when Eh is approximately +800 mV (discussed below).

Anaerobic Electron Acceptors

Analysis of water samples for nitrate, dissolved iron, and/or sulfate can provide data indicative of intrinsic bioremediation. The higher the background concentrations the better, unless they are so high as to create toxicity for the microbes or exceed water quality standards. Depleted dissolved electron acceptor concentrations (except iron, see below) in areas of high hydrocarbon concentration are indicative of microbial degradation.

Nitrate. Nitrate concentrations may be derived by analyzing nitrate plus nitrite as N (EPA Method 353.2). This laboratory method calculates total nitrate, since nitrite is metastable in groundwater and seldom present in sufficient quantities to affect the ionic balance (Wiedemeier et al, 1995). The bulk of nitrates in groundwater are derived from human contamination (e.g.. agricultural runoff/septic systems). Background concentrations vary widely with human activity in the site vicinity, and would otherwise be commonly less than 1 mg/L. Concentrations considered indicative of a significant biodegradation capacity might be those in excess of 20 mg/L. Denitrification/nitrate reduction typically occurs when Eh is approximately +750 mV (but more than 0 mV).

Iron. Laboratory analysis of iron concentration may be accomplished by collecting an unfiltered groundwater sample to obtain the total iron content (precipitated and dissolved), or by passing the sample through a 0.45 micron filter immediately after collection to obtain the dissolved iron concentration. Iron in groundwater is derived primarily from soil minerals. Dissolved iron concentrations are very sensitive to changes in pH and Eh. Free dissolved ferric iron can only exist stably under extremely acidic conditions (pH<2) (Hem, 1985). Ferric iron reduction to ferrous iron occurs at intermediate Eh values. Under aerobic, moderately acidic or alkaline conditions, dissolved iron is typically present as a hydroxide; the ferric species is ferric orthohydroxide (Wiedemeier et al, 1995). Dissolved ferric iron is usually rapidly reprecipitated as a sulfide, oxide or hydroxide. Since microbes utilize insoluble sedimentary ferric iron oxides as their energy source, producing more soluble ferrous iron, an increase in total dissolved iron is indicative of microbial hydrocarbon degradation.

The solubility of ferrous iron is significantly reduced by the presence of sulfides, the end-product of sulfate reduction (Barker et al, 1995). Analytical results of dissolved ferrous iron concentration will likely give an underestimate, since it is not based on the actual amount of ferric hydroxide (the electron acceptor) present in the aquifer, but the amount of reduced ferrous iron (the end-product) remaining in solution at the time of sampling.

Typical background concentrations of total dissolved iron in groundwater are below 1.0 mg/L. Results in excess of 1.0 mg/L indicate iron-reducing conditions (Cookson, 1995) which may have resulted from anaerobic hydrocarbon degradation. High dissolved iron concentrations may also indicate the presence of very fine particulates, low pH, or high organic content. High organic content induces stability of soluble iron complexes (Hem, 1985). Measurement of the total iron content of a sample is useful as a background datum against which to compare changes in the dissolved concentration.

Sulfate. Sulfate is derived primarily from soil minerals. The occurrence of sulfate reduction may be inferred from the presence of black acid volatile sulfide deposits on materials in long-term contact with contaminated groundwater

(Barker et al, 1995). Pyrite may be precipitated in the soil. Sulfate concentrations in groundwater are naturally higher than those for nitrate. Sulfate concentrations of 100 mg/L might be considered moderate and several hundred mg/L is not uncommon. Concentrations below 40 mg/L are indicative of methanogenic conditions (Cookson, 1995). Sulfate reduction typically occurs when Eh is approximately -200 mV.

Methanogenesis. Under methanogenic conditions (Eh of approximately -250 mV), carbon dioxide and methane are both produced by hydrocarbon oxidation. The utility of measurement of these compounds is discussed below (metabolic end-products).

Carbonate/Hardness/Total alkalinity

One of these associated analyses is typically conducted at the laboratory on collected water samples. Increased carbonate concentration will commonly occur where acidity dissolves carbonates from the soil. Sufficient concentrations of carbonate will buffer the pH and prevent acid toxicity that may result from hydrocarbon degradation. Total alkalinity (as carbonate) concentrations exceeding 100 mg/L may be considered conducive to effective buffering. Dissolved carbon dioxide may be assessed in conjunction with total alkalinity analysis.

Metabolic end-products

Metabolic end-products of hydrocarbon biodegradation include carbon dioxide, water, nitrogen, nitrites, ferrous iron, sulfites, sulfides, hydrogen sulfide, and methane. Carbon dioxide, hydrogen sulfide and methane may be measured with a gas meter at the wellhead. Reduced ferrous iron, sulfite and sulfide may be analyzed in water samples. Sulfides may precipitate into the soil and be under-represented in groundwater samples. Nitrite is metastable and therefore nitrite detection (generally <0.1 mg/L) is indicative of ongoing denitrification. Ammonium ions in excess of 1.0 mg/L may also be indicative of anaerobic conditions. Elevated concentrations of all metabolic end-products should correlate positively with elevated hydrocarbons.

Field measurement of dissolved carbon dioxide (DCD) is of secondary importance but may provide useful data. Dissolved carbon dioxide is derived primarily from the atmosphere. Elevated DCD spatially correlated with decreased DO concentration, may be indicative of aerobic microbial hydrocarbon degradation as DCD is a metabolic end-product. Elevated DCD may also result from anaerobic degradation. High background DCD is a desirable feature in terms of the capacity of the groundwater to buffer decreases in pH produced by microbial hydrocarbon degradation which may otherwise limit biological activity. Carbon dioxide is more soluble than oxygen and average concentrations are around an order of magnitude higher.

Contaminant Fate and Transport Modeling

Plume transport can be modeled using simple analytical equations. Transport assuming no attenuation can be modeled and the results compared with field data to provide a preliminary indication of the extent of natural attenuation. Transport models can be modified to include various natural attenuation factors based on actual site data. Comparison of these modeling results to actual field results can be used to confirm natural attenuation.

To model plume transport, the following basic site characteristics need to be determined:

- Historical dissolved hydrocarbon distribution
- Hydraulic conductivity
- Soil density/porosity
- Aquifer thickness
- Groundwater gradient/depth fluctuations
- Possible preferential migration pathways
- Organic content of the soil, f_{OC}.

Laboratory analysis of soil samples may be necessary to establish f_{OC}, which is useful for modeling sorption. Hydraulic conductivity may be obtained as an estimate from the literature based on soil type (for homogeneous lithologies), or by performing an aquifer test (slug or pump).

For plumes under steady-state conditions, contaminant transport models such as the Domenico Transport Equation can be modified to include the processes of dispersion and sorption to predict contaminant concentrations at a given distance from the source (Connor et al, 1995). In addition, biological and chemical degradation may be collectively modeled by a first-order decay function requiring assignment of a literature-based decay half-life value (in days) for each contaminant. Conservative decay half-life default values from Connor et al (1995) are provided in Table 1. Alternatively, for most realistic results, biodegradation may be modeled based on actual concentrations of electron acceptors, by determining the biodegradation capacity (BC) for each electron acceptor and contaminant concentration (Connor et al, 1995).

The biodegradation capacity is a measure of the actual potential of an electron acceptor (n) to remove contaminant mass. The BC_n is calculated for each contaminant and electron acceptor by dividing the concentration of the acceptor in the groundwater by its utilization factor (UF_n). The UF_n can be easily derived from the stoichiometric equation for the particular degradation reaction and represents the ratio of mass of electron acceptor utilized to the mass of hydrocarbon degraded (Wiedemeier, 1995). Values of UF_n for benzene for each pathway are presented in Table 2. The sum of the BC_n values obtained for the principal electron acceptors is the total biodegradation capacity of the groundwater (BC_t) (Connor et al, 1995). This datum is necessary in contaminant fate and transport models to realistically evaluate the potential for plume attenuation resulting from intrinsic biodegradation.

MTBE is almost completely recalcitrant to biological degradation and does not sorb onto the soil. Due to these properties, MTBE concentrations generally mimic non-attenuated plume transport. Therefore, MTBE may be used as a conservative tracer or "internal standard" for modeling plume transport with no attenuation.

Confirming Natural Attenuation

To best confirm natural attenuation in anticipation of site closure, the assessment and monitoring activities should confirm the following plume characteristics:

1) Fieldscale contaminant mass has been reduced (based on historical groundwater analyses). Figure 1 illustrates a generally accepted methodology for calculating residual dissolved contaminant mass.

2) Microbial activity is occuring in the plume (based on microbial counts)

3) The less recalcitrant compounds are reduced in concentration and extent relative to the more recalcitrant compounds. The approximate order of increasing recalcitrance for BTEX aromatics is: toluene, o-xylene, m- and p-xylene, benzene, ethylbenzene. That is, toluene concentrations should be most attenuated; ethylbenzene least attenuated.

3) Electron acceptors such as DO, nitrate and sulfate are depleted within the plume

4) Metabolic end-products such as carbon dioxide, hydrogen sulfide and methane have accumulated within the plume relative to outside of the plume.

References

Arulanantham, R. and Salhotra, A., 1996. Risk and Decision Making at Petroleum Contaminated Sites. University of California Extension, Programs in Environmental Management.

Barker, G. et al, 1995. "Assessment of Natural Hydrocarbon Bioremediation at Two Gas Condensate Production Sites." In R. E. Hinchee, J. T. Wilson, and D. C. Downey (Eds.), *Intrinsic Bioremediation*, pp. 181-188. Battelle Press, Columbus, OH.

Cookson, J.T., Jr., 1995. Bioremediation Engineering: Design and Application: (Ed. Nalven, G.). McGraw - Hill, Inc., New York, NY.

Connor, J., Nevin, P.J., Fisher, R.T., Bowers, R.L., and Newell, C.J., 1995. Tier 2 Guidance Manual for Risk-Based Corrective Action, Appendix A. Groundwater Services, Inc., Houston, TX.

Hem, J., 1985. *Study and Interpretation of the Chemical Characteristics of Natural Water*. U.S. Geological Survey Water - Supply Paper 2254. U.S. Government Printing Office.

McAllister, P.M. and Chiang, C.Y., 1994. "A Practical Approach to Evaluating Natural Attenuation of Contaminants in Ground Water." In *Ground Water Monitoring and Remediation,* Spring 1994.

Rifai, H.S. et al, 1995. "Intrinsic Bioattenuation for Subsurface Restoration." In R. E. Hinchee, J. T. Wilson, and D. C. Downey (Eds.), *Intrinsic Bioremediation*, pp. 1 - 25. Battelle Press, Columbus, OH.

Wiedemeier, T.H., 1995. "Patterns of Intrinsic Bioremediation at Two U.S. Air Force Bases." In R. E. Hinchee, J. T. Wilson, and D. C. Downey (Eds.), *Intrinsic Bioremediation*, pp. 31 - 50. Battelle Press, Columbus, OH.