



# W. A. Craig, Inc.

Engineering & Construction

## **QUARTERLY GROUNDWATER MONITORING REPORT THIRD QUARTER 2003**

**PROJECT SITE:**

**Oakland Truck Stop  
1107 5<sup>th</sup> Street  
Oakland, California**

*Alameda County*

*SEP 0 11*

*Environmental Health*

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**Project No. 3628**

**September 30, 2003**

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# PROFESSIONAL CERTIFICATION

## *QUARTERLY GROUNDWATER MONITORING REPORT Third Quarter 2003*

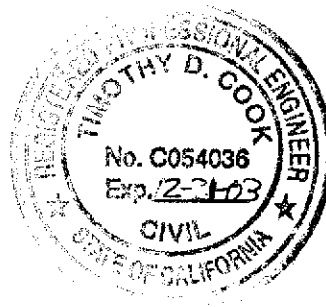
Oakland Truck Stop  
1107 5th Street  
Oakland, California  
Fuel Leak Site No. RO0000234

by W.A. Craig, Inc.

Project No. 3628  
September 30, 2003

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A handwritten signature in black ink that reads "Tim Cook".

Tim Cook, P.E.  
Principal Engineer

## INTRODUCTION

This report has been prepared to document the results of quarterly groundwater monitoring at the Oakland Truck Stop in Oakland, California (the "Site"). The quarterly monitoring was conducted on August 11, 2003. The monitoring is part of an ongoing investigation of subsurface contamination caused by accidental fuel releases from underground storage tanks (USTs). The work is being performed by W.A. Craig, Inc. (WAC) on behalf of Rinehart Distributing, Inc. The lead regulatory agency overseeing the investigation is Alameda County Health Care Services (ACHCS). The corrective action case has been designated as Fuel Leak Site No. RO0000234.

### *Site Location and Description*

The Oakland Truck Stop is located at 1107 5th Street in Oakland, California (**Figure 1**). The property is owned by Mr. Tony Muir, who has leased the Site to Rino Pacific, Inc. and Rinehart Distributing, Inc. (Rinehart). The Site is located in a commercial and industrial part of west Oakland. Developments on the property include a service station building, two underground storage tanks, four fuel dispenser islands, a truck scale, and a scale house. The principal features at the Site are shown on **Figure 2**.

The property is bounded on the north by 5th Street, an elevated BART rail track, and the Nimitz Freeway, on the west by Adeline Street, on the east by Chestnut Street, and on the south by Oliver's Hoffbrau (restaurant) and a parking lot. The surface elevation at the Site is approximately 10 feet above mean sea level. The topography is flat, with a gentle slope to the southwest. The nearest surface water body is the Oakland Estuary, located approximately 2,400 feet to the south.

The groundwater table fluctuates seasonally between about 10 inches and 6 feet below grade. The direction of groundwater flow has varied from southwest to north, and may be affected by localized recharge from leaking water or sewer lines.

### *Site Background*

The Site was developed as a truck stop approximately 40 years ago and has been in operation throughout the subsequent period. Three 10,000-gallon USTs and one 8,000-gallon UST were formerly maintained at the Site. Two of the 10,000-gallon USTs were used to store diesel fuel and the third was for unleaded gasoline. The 8,000-gallon UST also stored unleaded gasoline. Prior to a recent remodel of the Site, fuel system product lines were of single-wall fiberglass construction.

In 1995 an accidental release of fuel occurred due to a leak in a product line. The faulty product line was replaced as soon as the leak was discovered. Groundwater monitoring wells MW-1

through MW-3 were installed in November 1996 for an assessment of contamination caused by the release. Interim remediation was performed by installing two product recovery sumps equipped with skimmers. Approximately six gallons of gasoline were recovered and the free product thickness was reduced to a sheen in the recovery sumps. The sumps were removed from the Site during leaseholder improvements in 1999.

The four older USTs were replaced with two 15,000-gallon, double-wall fiberglass USTs in March 1999. An interim remedial action was necessary during the UST replacement in order to address contaminated soil and groundwater. The following table presents a summary of the interim remedial activities performed at the Site by Trinity Excavating and Engineering, Inc. of Santa Rosa, California.

Feb 8-10, 1999	Excavated to top of tanks and rinsed four USTs
Feb 11, 1999	Removed and disposed the USTs offsite (observed by Fire Inspector)
Mar 3-4, 1999	Removed approximately 2,100 tons of contaminated soil from excavation bottom and sides. Collected soil samples as directed by Fire Inspector. Tested excavation and stockpile samples. Removed groundwater from pit as needed. Pumped approximately 33,000 gallons of contaminated groundwater into temporary storage tanks.
Feb 24 - May 19, 1999	Loaded, manifested, and disposed 2,000 tons of contaminated soil at the Forward non-hazardous disposal facility near Stockton, California.
Feb 11 - May 6, 1999	Placed approximately 1,700 tons of backfill.
May 3-5, 1999	Transported and disposed contaminated water at Seaport Environmental, Inc., a licensed disposal facility in Redwood City, California.

Groundwater monitoring wells MW-4 through MW-9 were installed in August of 2000 during additional site characterization activities. Petroleum hydrocarbon contamination was detected in each of the new wells, and particularly in MW-7. Well MW-7 was noted to contain floating petroleum product on several occasions.

The ACHCS issued a letter to Rinehart on July 27, 2001 requesting that additional investigation be performed to delineate the extent of petroleum hydrocarbon contamination. A *Site Investigation Work Plan* was subsequently prepared by WAC and approved by the ACHCS. The ensuing investigation included the installation of two monitoring wells on the adjacent property to the south (Oliver's Hoffbrau), and the replacement of monitoring well MW-3 with MW-3N. These tasks were completed on May 8, 2002.

On May 23, 2002 ACHCS requested an investigation to determine whether hydrocarbons were migrating offsite along preferential pathways such as utility trenches. WAC submitted a Work Plan to ACHCS, which was approved with only minor changes. The utility conduit investigation was conducted on July 19, 2002 and focused upon the sanitary sewer lines underlying 5th Street

and Chestnut Street. The resulting sampling data indicated high concentrations of contaminants directly north of the Site. Methyl tert-butyl ether (MtBE) concentrations ranged from 170,000 to 460,000 µg/L in grab groundwater samples from borings drilled along the 5th Street sewer line. In contrast, borings along the Chestnut Street sewer indicated there was little migration of contaminants east of the Site. The results of this investigation were described in WAC's October 28, 2002 report entitled *Quarterly Groundwater Monitoring and Utility Corridor Investigation Report, Third Quarter 2002*.

WAC prepared an *Interim Remedial Action Plan (IRAP)* for the Site on December 31, 2002. The IRAP recommended that four major tasks be implemented: 1) free product removal from well MW-7; 2) installation of two monitoring wells north of 5th Street, and another well at the corner of 5th and Chestnut; 3) conduct additional investigation along the sewer line corridor of 5th Street; and 4) installation of an ozone-sparge system to reduce contaminant concentrations in the vicinity of the former USTs. The ACHCS requested several minor changes to the proposed IRAP, but otherwise granted its approval on March 4, 2003.

On January 9, 2003 a passive skimmer bailer was placed inside monitoring well MW-7 to remove free product. This skimmer has been periodically emptied of free product.

On August 12, 2003 WAC submitted a cost pre-approval request for construction and implementation of the ozone-sparge system. WAC is currently waiting for a response from the UST cleanup fund.

## SCOPE OF WORK

The scope of work performed during this quarter included the following tasks:

- Performed periodic visits to the Site to empty product from the skimmer bailer in well MW-7;
- Measured dissolved oxygen concentrations in 10 monitoring wells before purging, after purging one well casing volume, and after purging the wells;
- Measured static water levels in ten monitoring wells;
- Purged 10 monitoring wells of stagnant water while collecting field measurements of water quality parameters;
- Collected groundwater samples from the 10 monitoring wells;
- Analyzed the groundwater samples for: total petroleum hydrocarbons as diesel and as gasoline (TPH-d and TPH-g) by EPA method 8015CM, benzene, toluene, ethylbenzene, and xylenes (BTEX) and MtBE by EPA method 8021B, and the fuel additives di-

isopropyl ether (DIPE), ethyl tertiary butyl ether (EtBE), MtBE, tertiary amyl methyl ether (tAME), tertiary butyl alcohol (tBA), methanol, ethanol, ethylene dibromide (EDB), and 1,2-dichloroethane (DCA) by EPA method 8260B, and;

- Prepared this *Quarterly Groundwater Monitoring Report*.

## FIELD METHODS

### *Groundwater Level Measurements*

Depth-to-water levels were measured in 10 monitoring wells with an electronic water level indicator. Prior to taking a measurement, the cap was removed from each well and the water level was allowed to equilibrate with atmospheric pressure. The static depth-to-water measurements, along with the surveyed elevations of the top-of-casings of each well, were used to obtain groundwater elevations.

### *Groundwater Purging and Sampling*

WAC staff purged and sampled groundwater from the 10 monitoring wells. At least three well casing volumes of groundwater were purged from each well prior to collecting the groundwater samples. Purging was performed using a disposable polyethylene bailer. The temperature, pH, conductivity, and turbidity of the groundwater were intermittently monitored with portable instrumentation during purging of each well. These parameters were allowed to stabilize to ensure the water in the well was representative of surrounding groundwater. Dissolved oxygen concentrations were measured before purging, after one well casing volume had been purged, and again after the sample was collected by lowering an insitu dissolved oxygen probe into the groundwater via the monitoring well. Field measurements were recorded on monitoring well sampling logs included in **Appendix A**.

Groundwater samples were collected using disposable polyethylene bailers and then decanted into 40-ml volatile organic analysis (VOA) vials, and 1-liter amber bottles. Samples were stored in the field in ice chests cooled with ice until delivery to the laboratory. The samples were submitted under chain-of-custody control to McCampbell Analytical, Inc. (MAI). MAI is a DHS-certified laboratory located in Pacheco, California. Samples were analyzed for TPH-g and TPH-d by EPA method 8015CM, MtBE, and BTEX by EPA method 8021B, and the fuel additives DIPE, EtBE, MtBE, tAME, tBA, methanol, ethanol, EDB, and DCA by EPA method 8260B. All analytical results are electronically submitted to the state GeoTracker database per regulation AB2886 (Water Code Sections 13195-13198), in accordance with emergency regulations adopted by the SWRCB (Article 12, Chapter 16, Division 3, Title 23 of the California Code of Regulations).

All reusable down-well equipment was decontaminated after each use by washing in a laboratory-grade detergent solution followed by a tap water rinse. Well purge water was placed into 55-gallon DOT-approved drums and stored on-site pending the receipt of the laboratory analyses. Drummed purge water was transported to Seaport Environmental, Inc., a licensed disposal facility located in Redwood City, California.

### *Free Product Removal*

The skimmer bailer in well MW-7 has a maximum capacity of one liter of free product before it must be emptied. WAC staff visited the Site periodically to service the skimmer. Approximately 1.7 liters of free product have been removed from well MW-7 from the time of the installation of the skimmer in January 2003 to the present. The product emptied from the skimmer was placed in a 55-gallon DOT approved drum for temporary on-site storage. A record of the free product removed from MW-7 is included in **Appendix B**.

## DATA EVALUATION

### *Groundwater Levels*

The depth to water measurements this quarter ranged from 1.44 feet below top of casing (TOC) in well MW-10 to 6.24 feet below TOC in well MW-7. The groundwater elevation was highest in well MW-10 at 9.63 feet amsl, and lowest in well MW-7 at 5.45 feet amsl (disregarding well MW-11). The elevation in well MW-11 is considerably lower than would be predicted by interpolation from the groundwater elevations in other monitoring wells. Inconsistent water levels have been observed in wells MW-1 and MW-11 in previous sampling events. Groundwater level data are summarized in **Table 1**.

The groundwater flow direction this sampling period is north to northeasterly. This is consistent with previous observations. Using groundwater elevations in MW-3N, MW-4, and MW-9 the groundwater flow direction is N17°E with a gradient of 0.02 ft/ft. Groundwater elevations for this sampling event are shown on **Figure 2**.

Hydrographs illustrate a seasonal cycle in water levels. In general, water levels rise in winter and decline in summer. The magnitude of the rise and fall ranges from ½ foot to 1 foot. Groundwater elevations in wells MW-10 and MW-11 behave differently than the other wells. Hydrographs are shown on **Figure 3**.

### *Groundwater Analytical Results*

MtBE was detected in all 10 monitoring wells this quarter. Eight of these wells exceeded the primary maximum contaminant level (MCL) for one or more hydrocarbon constituents. MtBE



concentrations this quarter ranged from a low of 0.73 µg/L in upgradient well MW-10 to a high of 140,000 µg/L in well MW-7. As in the past, MtBE concentrations were generally higher in wells on the north (downgradient) side of the Site. In July 2002, WAC investigated possible contamination in the sewer trench line running along 5<sup>th</sup> Street and along Chestnut Street adjacent to the Site. Significant levels of MtBE were detected in groundwater along 5<sup>th</sup> Street and samples along Chestnut Street were mainly non-detect. MtBE concentrations in groundwater are shown on **Figure 4**. Graphs of MtBE concentrations in more highly impacted wells are shown on **Figure 5**.

Other fuel additives/oxygenates have generally not been detected in the groundwater samples. The single exception is tBA, which was first detected in MW-6 during the August 2002 monitoring event. Since then, tBA has also been detected in MW-5. These two wells are located adjacent to the former USTs. The tBA concentration this quarter was 14,000 µg/L in MW-5 and 27,000 µg/L in MW-6, which are record highs for both wells.

TPH-d was detected in all 10 monitoring wells this sampling event. Concentrations of TPH-d ranged from 66 µg/L in well MW-4 to 23,000 µg/L in well MW-8. This is a record high concentration for TPH-d in well MW-8. TPH-g was detected in 3 of the monitoring wells. MW-5 had a TPH-g concentration of 71 µg/L, MW-6 had 110 µg/L, and MW-7 had 90,000 µg/L. Benzene was detected in four monitoring wells at concentrations above the MCL (1 µg/L). Toluene, ethylbenzene and xylenes were detected above their respective MCLs only in well MW-7. Analytical results from this and previous sampling events are summarized in **Table 2**.

## CONCLUSIONS

The groundwater gradient is north-northeasterly, which is consistent with previous monitoring events.

Higher concentrations of hydrocarbon contamination are located along the northern side of the Site near wells MW-4 and MW-7. MtBE is the primary constituent of concern impacting shallow groundwater. The lateral extent of shallow groundwater contamination to the north of the Site has not yet been delineated. The sewer line trench beneath 5th Street is apparently acting as a conduit for offsite migration of hydrocarbon contamination.

There is a slight trend of decreasing MtBE concentrations in the monitoring wells. Considering the high concentrations of MtBE in groundwater, the absence of correspondingly elevated TPH-g and BTEX concentrations is surprising. MtBE is the primary constituent of concern at this Site. The fuel additive tBA can form as a result of the incomplete breakdown of MtBE. The presence of tBA in wells at this Site may indicate that indigenous aerobic microbes are partially metabolizing dissolved MtBE.

## RECOMMENDATIONS

The ACHCS conditionally approved WAC's IRAP in a letter to the owner dated March 4, 2003. The IRAP has been modified to incorporate the changes requested by ACHCS. At present, the UST cleanup fund is reviewing the cost to implement the IRAP. We expect to implement the IRAP by the end of 2003. We will continue with quarterly groundwater monitoring and servicing the product skimmer in well MW-7 as needed. The next quarterly monitoring event will occur in November 2003.

**TABLES**

**Table 1**  
**Groundwater Levels In Monitoring Wells**  
**1107 5th Street**  
**Oakland, California**

Well ID (screen depth)	Date	Casing Elevation	Depth to Water	Groundwater Elevation
MW-1 (10-20)	10/21/1996	10.34	5.08	5.26
	11/4/1996		3.02	7.32
	3/4/1997		2.28	8.06
	6/12/1997		4.80	5.54
	7/14/1997		2.66	7.68
	9/9/1997		2.45	7.89
	9/19/1997		2.60	7.74
	2/13/1998		2.76	7.58
	7/7/1998		2.15	8.19
	10/1/1998		3.63	6.71
	12/30/1998		4.40	5.94
	3/21/2000		2.62	7.72
	8/30/2000		3.21	7.13
	11/6/2000		3.10	7.24
	2/22/2001		3.50	6.84
	5/7/2001		2.94	7.40
	8/22/2001		3.70	6.64
	11/4/2001		3.89	6.45
	2/15/2002		2.95	7.39
	5/20/2002		3.29	7.05
8/1/2002	3.51	6.83		
11/11/2002	4.00	6.34		
2/12/2003	3.40	6.94		
5/12/2003	3.65	6.69		
8/12/2003	3.04	7.30		
MW-3 (12-17)	10/21/1996	10.52	7.66	2.86
	11/4/1996		5.70	4.82
	3/4/1997		11.38	-0.86
	6/12/1997		5.18	5.34
	7/14/1997		7.96	2.56
	9/9/1997		10.16	0.36
	9/19/1997		12.80	-2.28
	2/13/1998		11.42	-0.90
	7/7/1998		11.76	-1.24
	10/1/1998		11.34	-0.82
	12/30/1998		4.56	5.96
	3/21/2000		10.92	-0.40
	8/30/2000		5.12	5.40
	11/6/2000		4.10	6.42
	2/22/2001		6.60	3.92
	5/7/2001		6.30	4.22
	8/22/2001		5.21	5.31
11/4/2001	5.47	5.05		
2/15/2002	4.65	5.87		
Well Abandoned				

**Table 1**  
**Groundwater Levels In Monitoring Wells**  
**1107 5th Street**  
**Oakland, California**

<b>Well ID (screen depth)</b>	<b>Date</b>	<b>Casing Elevation</b>	<b>Depth to Water</b>	<b>Groundwater Elevation</b>
<b>MW-3N (5-12)</b>	5/20/2002	11.67	3.91	7.76
	8/1/2002		4.22	7.45
	11/11/2002		4.42	7.25
	2/12/2003		3.71	7.96
	5/12/2003		3.49	8.18
	8/12/2003		4.18	7.49
<b>MW-4 (5-20)</b>	8/30/2000	10.46	3.74	6.72
	11/6/2000		3.85	6.61
	2/22/2001		4.66	5.80
	5/7/2001		2.66	7.80
	8/22/2001		4.13	6.33
	11/4/2001		4.53	5.93
	2/15/2002		3.62	6.84
	5/20/2002		3.65	6.81
	8/1/2002		4.25	6.21
	11/11/2002		4.85	5.61
	2/12/2003		4.24	6.22
	5/12/2003		4.20	6.26
	8/12/2003		4.47	5.99
	<b>MW-5 (5-20)</b>		8/30/2000	10.24
11/6/2000		3.35	6.89	
2/22/2001		3.00	7.24	
5/7/2001		2.73	7.51	
8/22/2001		3.88	6.36	
11/4/2001		3.95	6.29	
2/15/2002		2.84	7.40	
5/20/2002		2.86	7.38	
8/1/2002		3.21	7.03	
11/11/2002		4.04	6.20	
2/12/2003		3.12	7.12	
5/12/2003		3.18	7.06	
8/12/2003		3.75	6.49	
<b>MW-6 (5-20)</b>		8/30/2000	10.62	
	11/6/2000	3.72		6.90
	2/22/2001	3.34		7.28
	5/7/2001	3.08		7.54
	8/22/2001	3.77		6.85
	11/4/2001	4.33		6.29
	2/15/2002	3.22		7.40
	5/20/2002	3.24		7.38
	8/1/2002	3.60		7.02
	11/11/2002	4.41		6.21
	2/12/2003	3.52		7.10
	5/12/2003	3.34		7.28
	8/12/2003	3.91		6.71

**Table 1**  
**Groundwater Levels In Monitoring Wells**  
**1107 5th Street**  
**Oakland, California**

Well ID (screen depth)	Date	Casing Elevation	Depth to Water	Groundwater Elevation
MW-7 (5-20)	8/30/2000	11.69	6.72	4.97
	11/6/2000		6.85	4.84
	2/22/2001		6.00	5.69
	5/7/2001		6.35	5.34
	8/22/2001		6.86	4.83
	11/4/2001		6.66	5.03
	2/15/2002		6.45	5.24
	5/20/2002		6.59	5.10
	8/1/2002		6.72	4.97
	11/11/2002		6.61	5.08
	2/12/2003		5.64	6.05
	5/12/2003		5.68	6.01
	8/12/2003		6.24	5.45
MW-8 (5-20)	8/30/2000	10.06	3.06	7.00
	11/6/2000		2.98	7.08
	2/22/2001		2.46	7.60
	5/7/2001		2.76	7.30
	8/22/2001		3.56	6.50
	11/4/2001		3.76	6.30
	2/15/2002		2.72	7.34
	5/20/2002		2.82	7.24
	8/1/2002		3.06	7.00
	11/11/2002		3.54	6.52
	2/12/2003		3.07	6.99
	5/12/2003		2.69	7.37
	8/12/2003		3.10	6.96
MW-9 (5-20)	8/30/2000	10.03	2.81	7.22
	11/6/2000		2.68	7.35
	2/22/2001		2.20	7.83
	5/7/2001		2.75	7.28
	8/22/2001		3.80	6.23
	11/4/2001		3.61	6.42
	2/15/2002		2.92	7.11
	5/20/2002		2.38	7.65
	8/1/2002		2.72	7.31
	11/11/2002		2.87	7.16
	2/12/2003		2.43	7.60
	5/12/2003		2.41	7.62
	8/12/2003		2.61	7.42

**Table 1**  
**Groundwater Levels In Monitoring Wells**  
**1107 5th Street**  
**Oakland, California**

Well ID (screen depth)	Date	Casing Elevation	Depth to Water	Groundwater Elevation
MW-10 (5-12)	5/20/2002	11.07	4.54	6.53
	6/18/2002		4.25	6.82
	8/1/2002		1.80	9.27
	11/11/2002		1.50	9.57
	2/12/2003		1.07	10.00
	5/12/2003		1.01	10.06
	8/12/2003		1.44	9.63
MW-11 (5-12)	5/20/2002	9.64	0.84	8.80
	6/18/2002		1.71	7.93
	8/1/2002		4.88	4.76
	11/11/2002		5.18	4.46
	2/12/2003		3.85	5.79
	5/12/2003		4.00	5.64
	8/12/2003		4.31	5.33

**Notes:**

All measurements are in feet. Depth to water measurements are from top of casing.

Casing and groundwater elevations are based on USGS "Port 1" benchmark  
(elevation 9.39 ft NGVD88).

Well MW-2 was destroyed after the December 1998 monitoring event.

**Table 2**  
**Analytical Results for Groundwater Samples**  
**1107 5th Street**  
**Oakland, California**

Well ID	Date	TPH-d	TPH-g	Benzene	Toluene	Ethyl- benzene	Xylenes	MtBE (8021)	MtBE (8260)	DIPE	EtBE	tAME	tBA	Methanol	Ethanol	EDB	DCA	
MW-1	11/4/1996	220	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
	3/5/1997	230	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
	6/12/1997	290	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
	9/9/1997	180	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
	2/13/1998	590	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
	7/7/1998	1,400	ND	ND	ND	ND	ND	NA	2.7	NA	NA	NA	NA	NA	NA	NA	NA	
	10/1/1998	1,100	ND	ND	ND	ND	ND	NA	1.8	NA	NA	NA	NA	NA	NA	NA	NA	
	12/30/1998	1,700	ND	ND	ND	ND	ND	NA	2.3	NA	NA	NA	NA	NA	NA	NA	NA	
	3/21/2000	3,100	220	11	ND	ND	ND	NA	4,800	NA	NA	NA	NA	NA	NA	NA	NA	NA
	8/30/2000	1,600	140	5.3	<0.5	<0.5	<0.5	2,900	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	11/6/2000	1,500	51	1.0	<0.5	<0.5	<0.5	1,700	2,100	<50	<50	<50	<250	NA	NA	NA	NA	
	2/22/2001	3,000	140	<0.5	<0.5	<0.5	<0.5	1,000	1,100	<20	<20	<20	<100	<4,000	<1,000	<20	<20	
	5/7/2001	3,800	<50	<0.5	<0.5	<0.5	<0.5	780	1,100	<20	<20	<20	<100	<10,000	<1,000	<20	<20	
	8/22/2001	1,800	<110	<0.5	<0.5	<0.5	<0.5	1,900	1,600	<25	<25	<25	<130	NA	NA	<25	<25	
	11/4/2001	1,300	<50	<0.5	<0.5	<0.5	<0.5	1600	1,500	<50	<50	<50	<250	NA	NA	<50	<50	
	2/15/2002	2,000	<50	<0.5	<0.5	<0.5	<0.5	610	770	<20	<20	<20	<100	<10,000	<1,000	<20	<20	
	5/20/2002	160	<50	<0.5	<0.5	<0.5	<0.5	570	730	<10	<10	<10	<100	<10,000	<1,000	<10	<10	
	8/1/2002	600	<50	<0.5	<0.5	<0.5	<0.5	480	610	<10	<10	<10	<100	<10,000	<1,000	<10	<10	
	11/11/2002	2,200	<50	<0.5	<0.5	<0.5	<0.5	510	600	<10	<10	<10	<100	<10,000	<1,000	<10	<10	
	2/12/2003	1,200	<50	<0.5	<0.5	<0.5	<0.5	540	640	<10	<10	<10	<100	<10,000	<1,000	<10	<10	
5/12/2003	520	<50	<0.5	<0.5	<0.5	<0.5	610	580	<10	<10	<10	<100	<10,000	<1,000	<10	<10		
8/11/2003	180	<50	<0.5	<0.5	<0.5	<0.5	740	660	<12	<12	<12	<120	<12,000	<1,200	<12	<12		



**Table 2**  
**Analytical Results for Groundwater Samples**  
**1107 5th Street**  
**Oakland, California**

Well ID	Date	TPH-d	TPH-g	Benzene	Toluene	Ethyl-benzene	Xylenes	MtBE (8021)	MtBE (8260)	DIPE	EtBE	tAME	tBA	Methanol	Ethanol	EDB	DCA
MW-3	11/4/1996	310	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	3/5/1997	210	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	6/12/1997	94	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	9/9/1997	2,300	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	2/13/1998	570	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	7/7/1998	1,100	ND	ND	ND	ND	ND	NA	6.6	NA	NA	NA	NA	NA	NA	NA	NA
	10/1/1998	390	ND	ND	ND	ND	ND	NA	4.8	NA	NA	NA	NA	NA	NA	NA	NA
	12/30/1998	64	ND	ND	ND	ND	ND	NA	4.5	NA	NA	NA	NA	NA	NA	NA	NA
	3/21/2000	2,800	ND	ND	ND	ND	ND	NA	4.8	NA	NA	NA	NA	NA	NA	NA	NA
	8/30/2000	260	<50	1.3	<0.5	<0.5	<0.5	<0.5	12	NA	NA	NA	NA	NA	NA	NA	NA
	11/6/2000	940	<50	<0.5	<0.5	<0.5	<0.5	<0.5	25	12	<1	<1	<1	<5	NA	NA	NA
	2/22/2001	340	<50	1.2	1.5	<0.5	0.74	18	26	<1	<1	<1	<5	<200	<50	<1	<1
	5/7/2001	460	140	0.76	4.7	2.2	14	25	33	<1	<1	<1	<5	<200	<50	<1	<1
	8/22/2001	130	<50	<0.5	<0.5	<0.5	<0.5	41	44	<1	<1	<1	<5	NA	NA	<1	<1
11/4/2001	190	<50	<0.5	<0.5	<0.5	<0.5	36	43	<1	<1	<1	<5	NA	NA	<1	<1	
Abandoned	2/15/2002	780	<50	<0.5	<0.5	<0.5	<0.5	38	45	<1	<1	<1	<5	<500	<50	<1	<1
MW-3N	5/20/2002	1,800	<50	<0.5	<0.5	<0.5	<0.5	1,100	1,500	<25	<25	<25	<250	<25,000	<2,500	<25	<25
	8/1/2002	2,900	<50	<0.5	<0.5	<0.5	<0.5	350	540	<10	<10	14	<100	<10,000	<1,000	<10	<10
	11/11/2002	1,100	<50	<0.5	<0.5	<0.5	<0.5	280	270	<5	<5	7.1	<50	<5,000	<500	<5	<5
	2/12/2003	1,300	<50	<0.5	<0.5	<0.5	<0.5	380	410	<5	<5	<5	<50	<5,000	<500	<5	<5
	5/12/2003	1,500	<50	<0.5	<0.5	<0.5	<0.5	330	360	<6.2	<6.2	<6.2	<62	<6,200	<620	<6.2	<6.2
	8/11/2003	720	<50	<0.5	<0.5	<0.5	<0.5	250	280	<5	<5	<5	<50	<5,000	<500	<5	<5
MW-4	8/30/2000	390	1,300	64	63	9.7	110	210,000	NA	NA	NA	NA	NA	NA	NA	NA	NA
	11/6/2000	170	<3,300	80	<4	<5	<3	130,000	120,000	<2,500	<2,500	<2,500	<13,000	NA	NA	<2,500	<2,500
	11/6/00*	NA	<3,300	86	<4	<7	<6	130,000	120,000	<2,500	<2,500	<2,500	<13,000	NA	NA	<2,500	<2,500
	2/22/2001	120	<3,300	30	<3	<3	<3	120,000	150,000	<2,500	<2,500	<2,500	<13,000	<500,000	<130,000	<2,500	<2,500
	5/7/2001	240	<4,200	<20	<10	<5	<5	150,000	200,000	<5,000	<5,000	<5,000	<25,000	<2,500,000	<250,000	<5,000	<5,000
	8/22/2001	300	<5,400	<5	<5	<5	<5	160,000	190,000	<5,000	<5,000	<5,000	<25,000	NA	NA	<5,000	<5,000
	11/4/2001	210	<5,000	<5	<5	<5	<5	130,000	170,000	<2,500	<2,500	<2,500	<13,000	NA	NA	<2,500	<2,500
	2/15/2002	340	<5,000	<5	<5	<5	<10	160,000	160,000	<2,500	<2,500	<2,500	<12,500	<1,250,000	<125,000	<2,500	<2,500
	5/20/2002	200	<2,500	<25	<25	<25	<25	98,000	130,000	<1,700	<1,700	<1,700	<17,000	<2,500,000	<170,000	<1,700	<1,700
	8/1/2002	200	<2,500	<25	<25	<25	<25	89,000	100,000	<1,700	<1,700	<1,700	<17,000	<1,700,000	<170,000	<1,700	<1,700
	11/11/2002	200	<3,000	<25	<25	<25	<25	99,000	84,000	<1,700	<1,700	<1,700	<17,000	<1,700,000	<170,000	<1,700	<1,700
	2/12/2003	88	<2,500	<25	<25	<25	<25	78,000	70,000	<1,700	<1,700	<1,700	<17,000	<1,700,000	<170,000	<1,700	<1,700
	5/12/2003	88	<2,500	<25	<25	<25	<25	88,000	86,000	<1,700	<1,700	<1,700	<17,000	<1,700,000	<170,000	<1,700	<1,700
8/11/2003	66	<2,500	<25	<25	<25	<25	77,000	74,000	<1,700	<1,700	<1,700	<17,000	<1,700,000	<170,000	<1,700	<1,700	

**Table 2**  
**Analytical Results for Groundwater Samples**  
**1107 5th Street**  
**Oakland, California**

Well ID	Date	TPH-d	TPH-g	Benzene	Toluene	Ethyl-benzene	Xylenes	MtBE (8021)	MtBE (8260)	DIPE	EtBE	tAME	tBA	Methanol	Ethanol	EDB	DCA
MW-5	8/30/2000	450	1,000	<5	<5	<5	<5	52,000	NA	NA	NA	NA	NA	NA	NA	NA	NA
	11/6/2000	520	<1,000	<1	<1	<1	<1	44,000	42,000	<1,000	<1,000	<1,000	<5,000	NA	NA	<1,000	<1,000
	2/22/2001	270	<1,000	<1	<1	<1	<1	30,000	39,000	<500	<500	<500	<2,500	<100,000	<25,000	<500	<500
	5/7/2001	470	<1,800	<5	<2	<2	<2	48,000	59,000	<1,000	<1,000	<1,000	<5,000	<500,000	<50,000	<1,000	<1,000
	8/22/2001	780	<2,200	<3	<3	<3	<3	63,000	70,000	<1,000	<1,000	<1,000	<5,000	NA	NA	<1,000	<1,000
	11/4/2001	670	<1,700	<2	<2	<2	<2	44,000	37,000	<1,000	<1,000	<1,000	<5,000	NA	NA	<1,000	<1,000
	2/15/2002	480	<1,100	<1	<1	<1	<1	33,000	33,000	<1,250	<1,250	<1,250	<6,250	<625,000	<62,500	<1,250	<1,250
	5/20/2002	1,600	<500	<5	<5	<5	<5	21,000	28,000	<500	<500	<500	<5,000	<500,000	<50,000	<500	<500
	8/1/2002	810	<500	<5	<5	<5	<5	21,000	24,000	<500	<500	<500	<5,000	<500,000	<50,000	<500	<500
	11/11/2002	2,100	<500	<5	<5	<5	<5	10,000	8,800	<200	<200	<200	10,000	<200,000	<20,000	<200	<200
	2/12/2003	2,900	<170	30	<1.7	<1.7	<1.7	3,700	3,200	<100	<100	<100	4,100	<100,000	<10,000	<100	<100
	5/12/2003	1,500	<500	13	<5	<5	<5	19,000	21,000	<500	<500	<500	5,200	<500,000	<50,000	<500	<500
	8/11/2003	2,200	71	9.5	<0.5	<0.5	<0.5	1,500	1,700	<50	<50	<50	14,000	<50,000	<5,000	<50	<50
MW-6	8/30/2000	1,300	1,300	55	<0.5	16	27	23,000	NA	NA	NA	NA	NA	NA	NA	NA	NA
	11/6/2000	1,100	<630	7	8.1	<3	5.2	26,000	27,000	<630	<630	<630	<3,200	NA	NA	<630	<630
	2/22/2001	420	<200	<5	<5	<5	<5	6,500	8,000	<100	<100	<100	<500	<20,000	<5,000	<100	<100
	5/7/2001	900	<1,000	<2	<2	<1	<1	37,000	40,000	<500	<500	<500	<2,500	<250,000	<25,000	<500	<500
	8/22/2001	520	<350	<2	<1	<0.5	<0.5	8,600	8,800	<200	<200	<200	<1,000	NA	NA	<200	<200
	11/4/2001	420	<500	<2	<2	<0.5	<0.5	12,000	17,000	<250	<250	<250	<1,300	NA	NA	<250	<250
	2/15/2002	910	<960	2.6	4.5	<1	4.2	23,000	26,000	<1,000	<1,000	<1,000	<5,000	<500,000	<50,000	<1,000	<1,000
	5/12/2003	690	<620	<6.2	<6.2	<6.2	<6.2	25,000	37,000	<500	<500	<500	<5,000	<500,000	<50,000	<500	<500
	8/1/2002	1,100	<250	8.0	<2.5	<2.5	<2.5	8,100	9,100	<170	<170	<170	3,800	<170,000	<17,000	<170	<170
	11/11/2002	1,000	<500	<5	<5	<5	<5	11,000	11,000	<250	<250	<250	8,600	<250,000	<25,000	<250	<250
	2/12/2003	970	<250	<2.5	<2.5	<2.5	<2.5	7,400	8,300	<120	<120	<120	4,600	<120,000	<12,000	<120	<120
8/11/2003	630	110	6.8	1.1	<1	<1	2,800	2,300	<100	<100	<100	27,000	<100,000	<10,000	<100	<100	

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**Analytical Results for Groundwater Samples**  
**1107 5th Street**  
**Oakland, California**

Well ID	Date	TPH-d	TPH-g	Benzene	Toluene	Ethyl-benzene	Xylenes	MtBE (8021)	MtBE (8260)	DIPE	EtBE	tAME	tBA	Methanol	Ethanol	EDB	DCA
MW-7	8/30/2000	2,600	160,000	28,000	15,000	1,200	5,900	800,000	NA	NA	NA	NA	NA	NA	NA	NA	NA
	11/6/2000	1,700	80,000	23,000	12,000	1,200	5,000	540,000	920,000	<13,000	<13,000	<13,000	<63,000	NA	NA	<13,000	<13,000
	2/22/2001	2,000	80,000	19,000	12,000	1,100	3,200	440,000	460,000	<5,000	<5,000	<5,000	<2,500	<1,000,000	<250,000	<5,000	<5,000
	2/22/01*	2,400	84,000	20,000	13,000	1,200	3,400	400,000	500,000	<5,000	<5,000	<5,000	<25,000	<1,000,000	<250,000	<5,000	<5,000
	5/7/2001	7,600	100,000	25,000	16,000	1,700	6,600	460,000	520,000	<5,000	<5,000	<5,000	<2,500	<2,500,000	<250,000	<5,000	<5,000
	5/7/01*	8,200	100,000	25,000	17,000	1,700	6,700	530,000	500,000	<5,000	<5,000	<5,000	<25,000	<2,500,000	<5,000	<5,000	<5,000
	8/22/2001	22,000	110,000	18,000	12,000	2,000	9,400	240,000	250,000	<5,000	<5,000	<5,000	<25,000	NA	NA	<5,000	<5,000
	11/4/2001	6,500	85,000	17,000	2,700	2,100	9,700	150,000	180,000	<2,500	<2,500	<2,500	<13,000	NA	NA	<2,500	<2,500
	2/15/2002	21,000	96,000	21,000	7,300	2,600	13,000	180,000	200,000	<5,000	<5,000	<5,000	<25,000	<2,500,000	<250,000	<5,000	<5,000
	2/15/02*	29,000	160,000	30,000	27,000	3,700	19,000	170,000	200,000	<5,000	<5,000	<5,000	<25,000	<2,500,000	<250,000	<5,000	<5,000
	5/20/2002	310,000	140,000	24,000	21,000	3,800	20,000	180,000	220,000	<5,000	<5,000	<5,000	<50,000	<5,000,000	<500,000	<5,000	<5,000
	8/1/2002	160,000	110,000	15,000	16,000	4,000	21,000	120,000	150,000	<2,500	<2,500	<2,500	<25,000	<2,500,000	<250,000	<2,500	<2,500
	11/11/2002	240,000	110,000	14,000	11,000	4,100	19,000	74,000	77,000	<1,200	<1,200	<1,200	<12,000	<1,200,000	<120,000	<1,200	<1,200
	2/12/2003	75,000	130,000	25,000	8,900	3,400	17,000	87,000	110,000	<1,700	<1,700	<1,700	<17,000	<1,700,000	<170,000	<1,700	<1,700
5/12/2003	7,100	98,000	25,000	520	2,600	12,000	140,000	220,000	<5,000	<5,000	<5,000	<50,000	<5,000,000	<500,000	<5,000	<5,000	
8/11/2003	12,000	90,000	15,000	1,100	2,600	12,000	140,000	140,000	<5,000	<5,000	<5,000	<50,000	<5,000,000	<500,000	<5,000	<5,000	
MW-8	8/30/2000	690	<1,000	18	<1	<1	<1	28,000	NA	NA	NA	NA	NA	NA	NA	NA	NA
	11/6/2000	810	<3,300	<8	<5	<3	<7	120,000	76,000	<2,500	<2,500	<2,500	<13,000	NA	NA	<2,500	<2,500
	2/22/2001	1,100	<2,500	53	<3	<3	<3	99,000	130,000	<2,000	<2,000	<2,000	<10,000	<400,000	<100,000	<2,000	<2,000
	5/7/2001	1,300	<5,000	32	<10	<5	<5	110,000	120,000	<2,500	<2,500	<2,500	<13,000	<1,300,000	<13,000	<2,500	<2,500
	8/22/2001	1,200	<4,000	<5	<5	<5	16	76,000	86,000	<1,700	<1,700	<1,700	<8,500	NA	NA	<1,700	<1,700
	11/4/2001	1,100	590	6.9	<0.5	<0.5	<0.5	60,000	49,000	<2,500	<2,500	<2,500	<13,000	NA	NA	<2,500	<2,500
	2/15/2002	1,500	<3,400	<5	<5	<5	<5	110,000	91,000	<2,500	<2,500	<2,500	<12,500	<1,250,000	<125,000	<2,500	<2,500
	5/20/2002	2,200	<1,700	<17	<17	<17	<17	66,000	86,000	<1,000	<1,000	<1,000	<10,000	<1,000,000	<100,000	<1,000	<1,000
	8/1/2002	2,800	<1,200	<12	<12	<12	<12	53,000	67,000	<1,000	<1,000	<1,000	<10,000	<1,000,000	<100,000	<1,000	<1,000
	11/11/2002	11,000	<2,000	<10	18	<10	<10	48,000	51,000	<1,000	<1,000	<1,000	<10,000	<1,000,000	<100,000	<1,000	<1,000
	2/12/2003	5,800	<1,700	<17	<17	<17	<17	49,000	51,000	<1,000	<1,000	<1,000	<10,000	<1,000,000	<100,000	<1,000	<1,000
	5/12/2003	4,500	<2,500	94	<25	<25	<25	52,000	60,000	<1,000	<1,000	<1,000	<10,000	<1,000,000	<100,000	<1,000	<1,000
8/11/2003	23,000	<2,500	92	<25	<25	<25	42,000	42,000	<1,000	<1,000	<1,000	<10,000	<1,000,000	<100,000	<1,000	<1,000	

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**1107 5th Street**  
**Oakland, California**

Well ID	Date	TPH-d	TPH-g	Benzene	Toluene	Ethyl-benzene	Xylenes	MtBE (8021)	MtBE (8260)	DIPE	EtBE	tAME	tBA	Methanol	Ethanol	EDB	DCA
MW-9	8/30/2000	770	<50	<0.5	<0.5	<0.5	<0.5	97	NA	NA	NA	NA	NA	NA	NA	NA	NA
	11/6/2000	390	<50	<0.5	<0.5	<0.5	<0.5	190	220	<25	<25	<25	<125	NA	NA	<5	<5
	2/22/2001	240	<50	<0.5	<0.5	<0.5	<0.5	120	160	<2	<2	<2	<1	<400	<100	<2	<2
	5/7/2001	190	<50	<0.5	<0.5	<0.5	<0.5	120	150	<2.5	<2.5	<2.5	<13	<1,300	<130	<2.5	<2.5
	8/22/2001	120	<50	<0.5	<0.5	<0.5	<0.5	120	120	<5	<5	<5	<25	NA	NA	<5	<5
	11/4/2001	160	<50	<0.5	<0.5	<0.5	<0.5	130	120	<5	<5	<5	<25	NA	NA	<5	<5
	2/15/2002	150	<50	<0.5	<0.5	<0.5	<0.5	92	98	<2.5	<2.5	<2.5	<12.5	<1,250	<125	<2.5	<2.5
	5/20/2002	380	<50	<0.5	<0.5	<0.5	<0.5	79	85	<2.5	<2.5	<2.5	<25	<2,500	<250	<2.5	<2.5
	8/1/2002	320	<50	<0.5	<0.5	<0.5	<0.5	74	84	<1.0	<1.0	<1.0	<10	<1,000	<100	<1.0	<1.0
	11/11/2002	150	<50	<0.5	<0.5	<0.5	<0.5	76	61	<2.5	<2.5	<2.5	<25	<2,500	<250	<2.5	<2.5
	2/12/2003	350	<50	<0.5	<0.5	<0.5	<0.5	55	50	<1	<1	<1	<10	<1,000	<100	<1	<1
	5/12/2003	380	<50	<0.5	<0.5	<0.5	<0.5	45	45	<1	<1	<1	<10	<1,000	<100	<1	<1
8/11/2003	88	<50	<0.5	<0.5	<0.5	<0.5	36	42	<1	<1	<1	<10	<1,000	<100	<1	<1	
MW-10	8/1/2002	720	<50	1.0	<0.5	<0.5	<0.5	<5.0	1.1	<0.5	<0.5	<0.5	<5	<500	<50	<0.5	<0.5
	11/11/2002	100	<50	0.72	<0.5	<0.5	<0.5	<5.0	0.7	<0.5	<0.5	<0.5	<5	<500	<50	<0.5	<0.5
	2/12/2003	71	<50	0.63	<0.5	<0.5	<0.5	<5.0	<0.5	<0.5	<0.5	<0.5	<5	<500	<50	<0.5	<0.5
	5/12/2003	96	<50	0.56	<0.5	<0.5	<5	<5	0.59	<0.5	<0.5	<0.5	<5	<500	<50	<0.5	<0.5
	8/11/2003	110	<50	0.93	<0.5	<0.5	<0.5	<5	0.73	<0.5	<0.5	<0.5	<5	<500	<50	<0.5	<0.5
MW-11	5/20/2002	95	<50	1.5	3.0	<0.5	1.4	260	310	<5	<5	<5	<50	<5,000	<500	<5	<5
	8/1/2002	190	<50	<0.5	1.9	0.6	<0.5	52	65	<1.0	<1.0	<1.0	<10	<1,000	<100	<1.0	<1.0
	11/11/2002	140	<50	<0.5	2.1	1.1	<0.5	23	15	<0.5	<0.5	<0.5	<5	<500	<50	<0.5	<0.5
	2/12/2003	86	<50	<0.5	1.7	<0.5	<0.5	<5	2.6	<0.5	<0.5	<0.5	<5	<500	<50	<0.5	<0.5
	5/12/2003	62	<50	<0.5	1.1	<0.5	<0.5	<5	2.3	<0.5	<0.5	<0.5	<5	<500	<50	<0.5	<0.5
	8/11/2003	72	<50	<0.5	0.66	<0.5	<0.5	<5	3.3	<0.5	<0.5	<0.5	<5	<500	<50	<0.5	<0.5
<b>MCL</b>	<b>NE</b>	<b>NE</b>	<b>1</b>	<b>150</b>	<b>700</b>	<b>1,750</b>	<b>13</b>	<b>13</b>	<b>NE</b>	<b>NE</b>	<b>NE</b>	<b>12**</b>	<b>NE</b>	<b>NE</b>	<b>0.05</b>	<b>0.5</b>	

Notes: Units are micrograms per liter (ug/L). ND, Not detected. NA, Not analyzed. \* Duplicate Sample.

MCL, Primary Maximum Contaminant Level for Drinking Water in California. \*\* Denotes a Drinking Water Action Level, not an MCL.

NE, An MCL or Action Level has not been established.

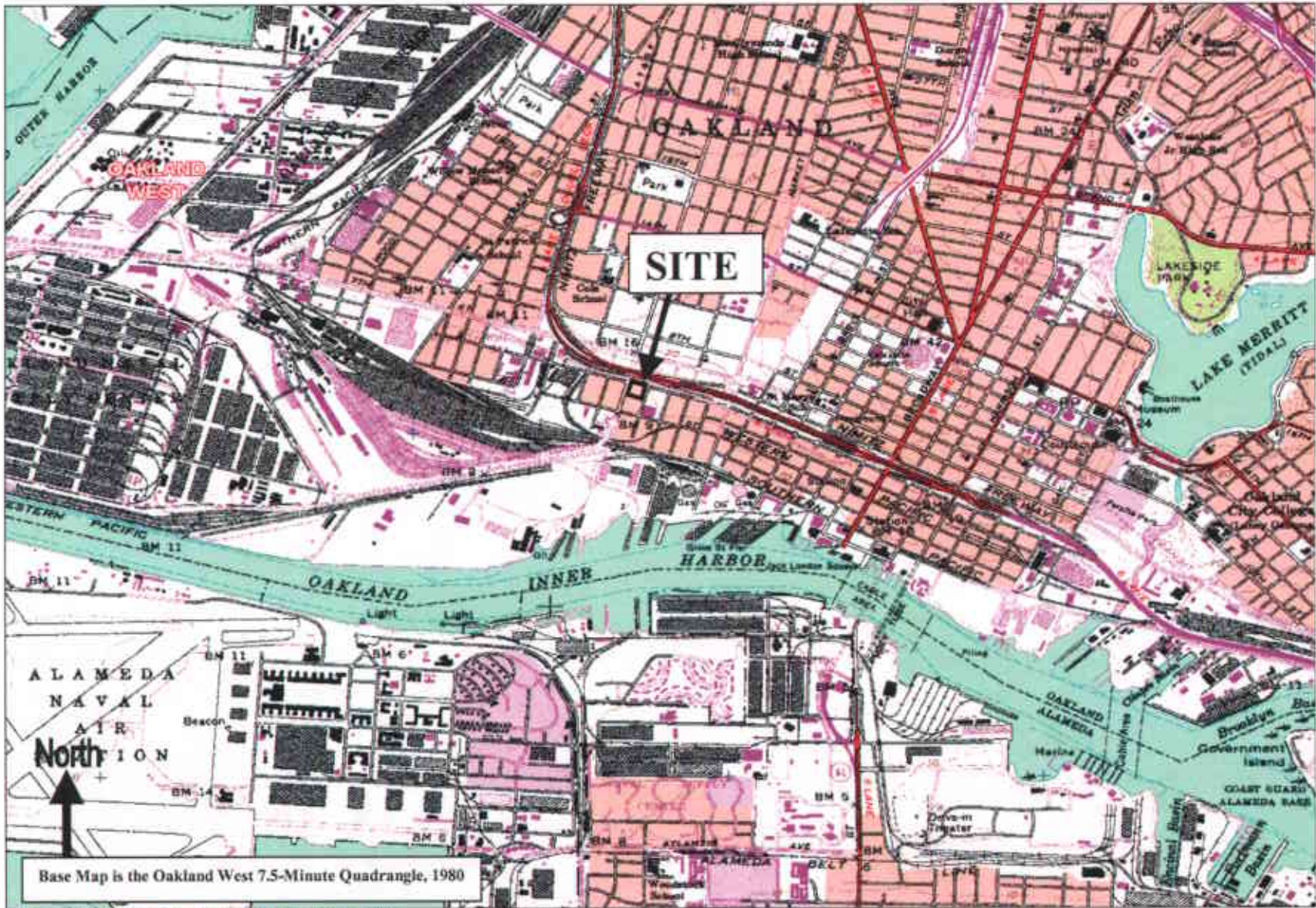
TPH-d, Total Petroleum Hydrocarbons as diesel. TPH-g, Total Petroleum Hydrocarbons as gasoline.

MtBE, Methyl tert-Butyl Ether; (8021, analyzed by Method 8021B; 8260, analyzed by Method 8260B).

DIPE, Di-isopropyl Ether. EtBE, Ethyl tert-Butyl Ether. tAME, tert-Amyl Methyl Ether. tBA, tert-Butyl Alcohol.

EDB, Ethylene Dibromide (1,2-Dibromoethane). DCA, 1,2-Dichloroethane.

# FIGURES



1:0 Topo Quad Copyright © 1999 DeLorme Yearwood, ME 04090 Source Data: USGS 742 R Scale: 1:25,000 Detail: 13-0 Datum: WGS84



**W. A. CRAIG, INC.**

Environmental Contracting and Consulting

6940 Tremont Road  
Dixon, California 95620

## LOCATION MAP

Oakland Truck Stop  
1107 5th Street, Oakland, California

**FIGURE**

**1**

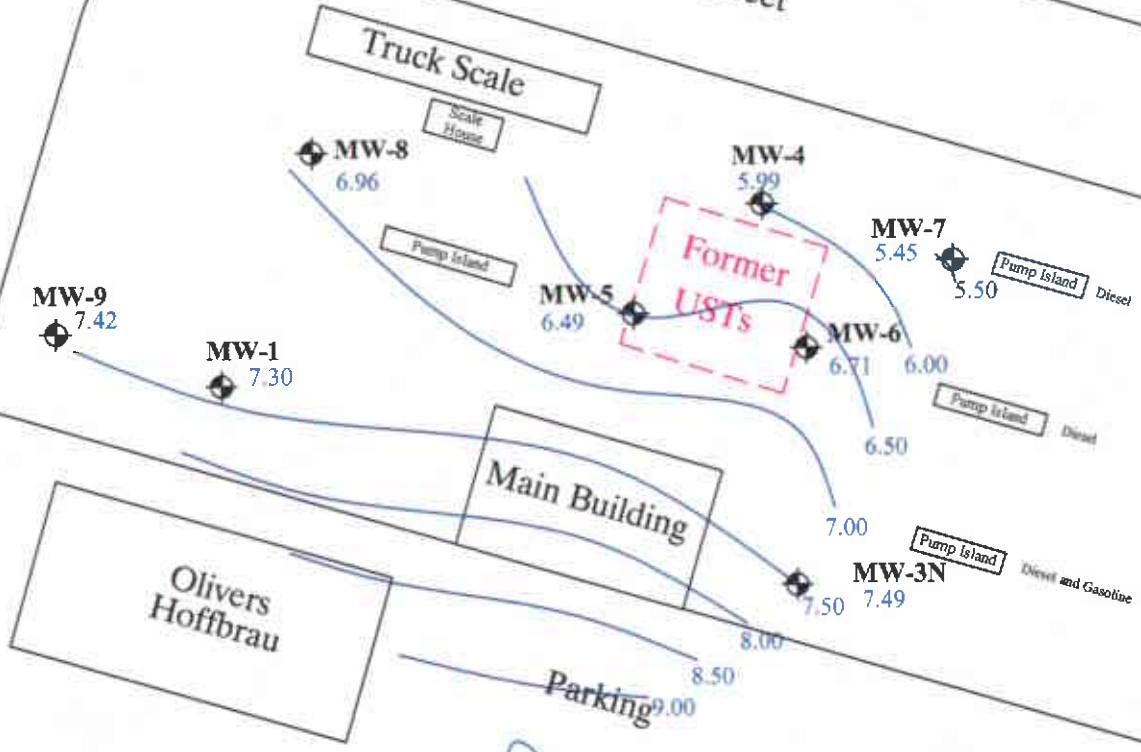
Job No. 3628

Adeline Street

Bay Area Rapid Transit (BART) District Right-of-Way

5th Street

Chestnut Street



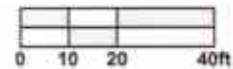
LEGEND

Monitoring Well

9.63 Groundwater Elevation (feet amsl)

Groundwater Elevation Contour

Note: MW-11 not used to determine groundwater gradient.



W.A. Craig, Inc.

6940 Tremont Road Lic. No. 455752  
Dixon, California 95620-9603  
(707) 693-2929 Fax# (707) 693-2922

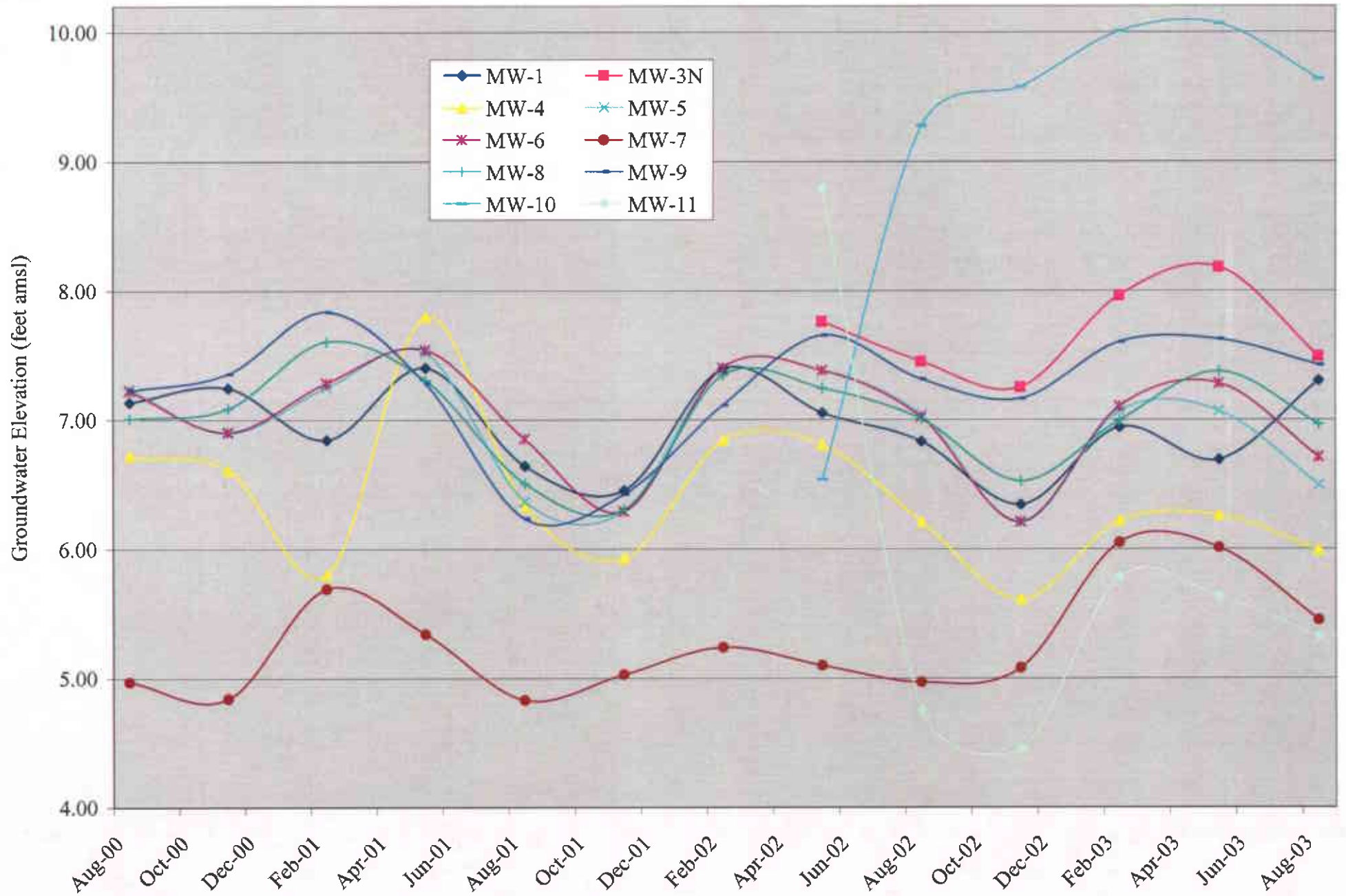
Groundwater Elevations

August 12, 2003  
Oakland Truck Stop  
1107 5th Street  
Oakland, California

Project #: 3628	Figure:
Date: 8/12/2003	2
Scale: 1"=40'	

Central Project Files\3628 Rinehart\Qmrs\8-03\Figure 2.dwg

**Figure 3**  
**Hydrographs**  
**1107 5th Street, Oakland, California**



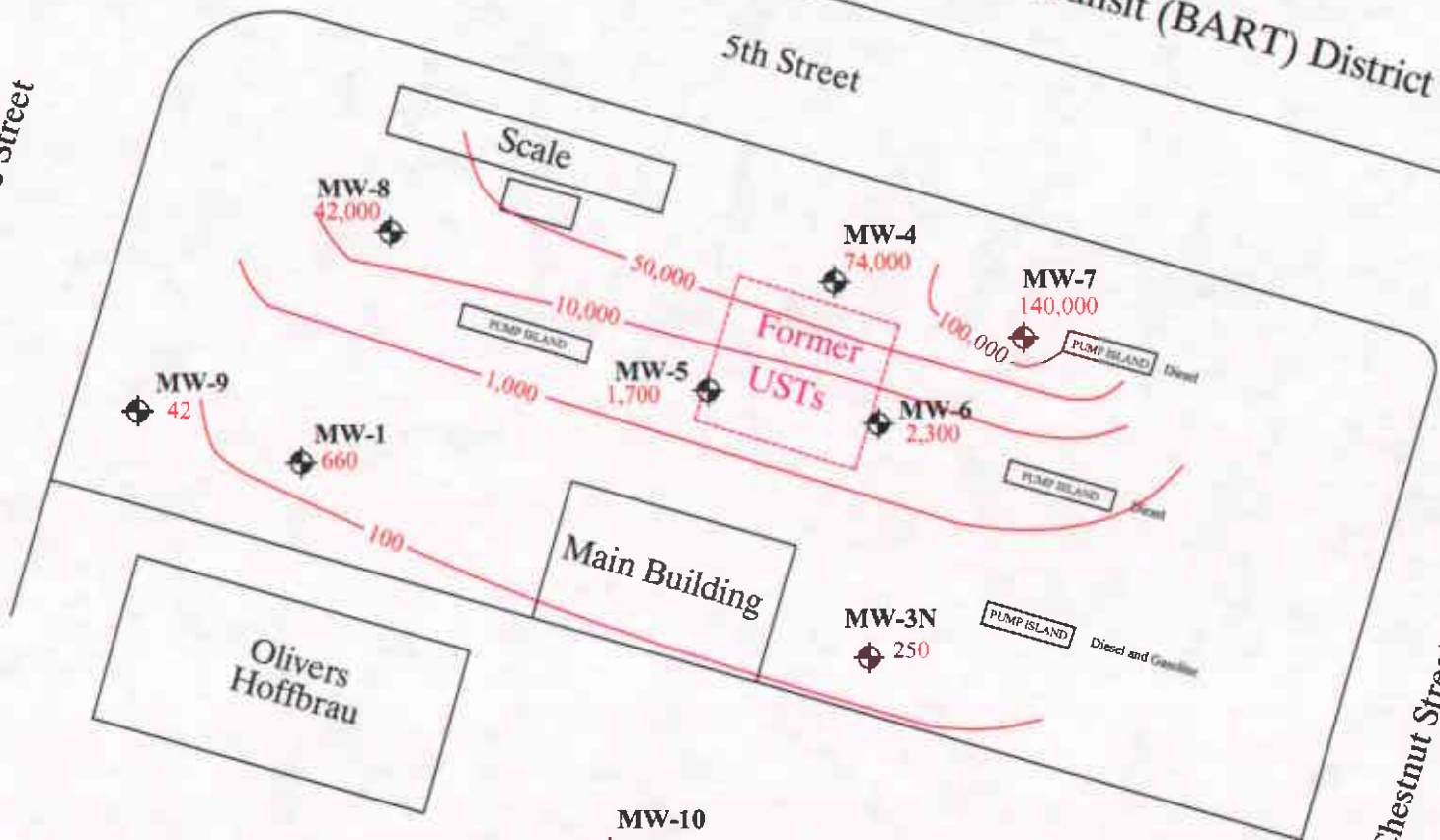


Adeline Street



Bay Area Rapid Transit (BART) District Right-of-Way

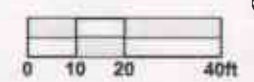
5th Street

Chestnut Street



LEGEND

-  Monitoring Well
- 1,700 MtBE Concentration (8/12/2003)(ug/l)
-  MtBE Concentration Contour



Central Project Files\3628 Rinehart\Qmrs\8-03\Figure 4.dwg

### MtBE Concentrations in Groundwater

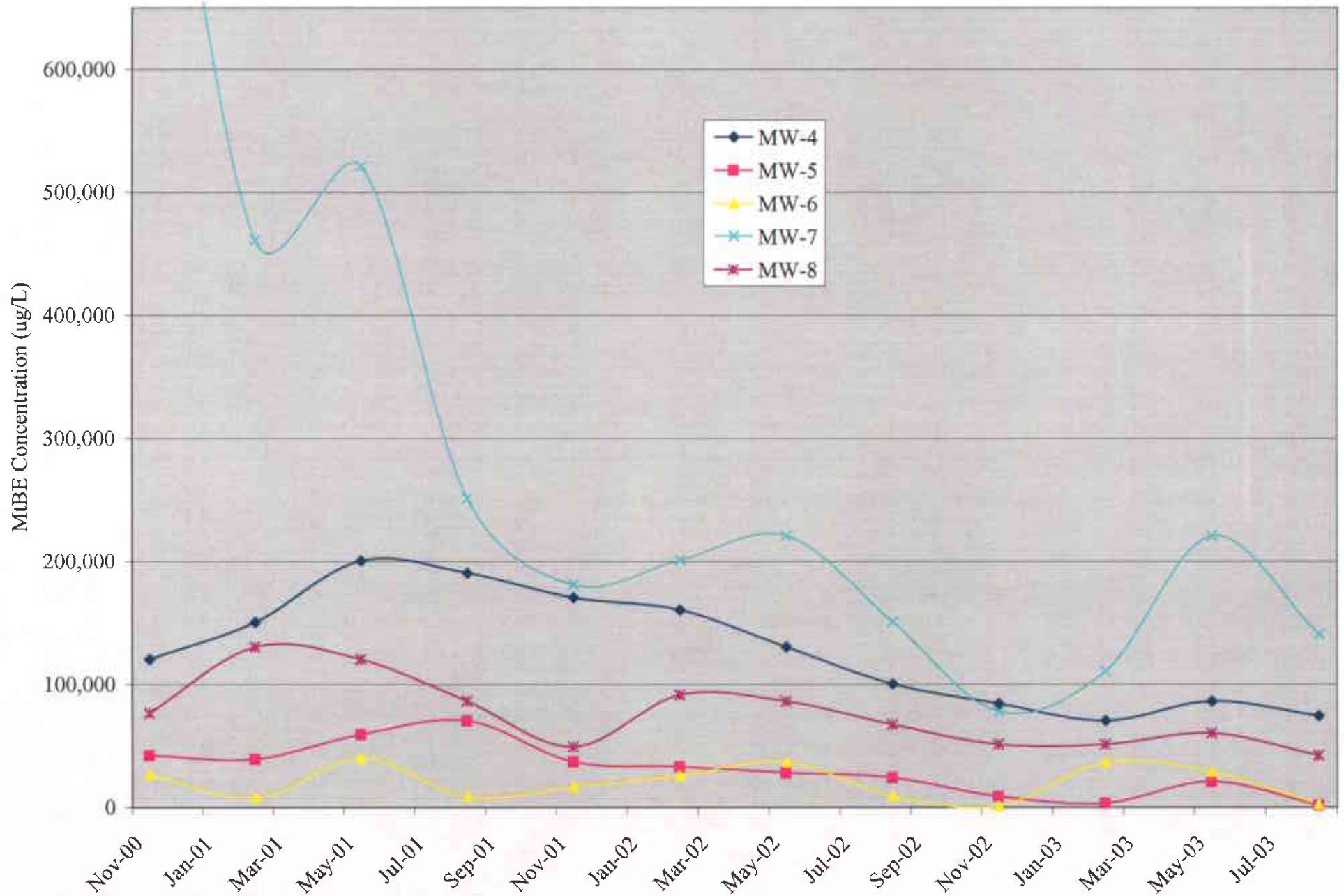
**August 12, 2003**  
**Oakland Truck Stop**  
**1107 5th Street**  
**Oakland, California**



**W.A. Craig, Inc.**  
 6940 Tremont Road Lic. No. 455752  
 Dixon, California 95620-9603  
 (707) 693-2929 Fax# (707) 693-2922

Project #: 3628	Figure:
Date: 8/12/2003	4
Scale: 1"=40'	

**Figure 5**  
**MtBE Concentrations in Selected Wells**  
**1107 5th Street, Oakland, California**



**APPENDIX A**  
**MONITORING WELL SAMPLING LOGS**

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# MONITORING WELL SAMPLING LOG

SITE NAME/LOCATION: Rino

JOB #: 3628

DATE: 8/9/12/03

SAMPLER'S INITIALS: Ca

WELL ID: MW-3N

WELL DIAMETER (in): 2"

WELL DEPTH (ft): \_\_\_\_\_

DEPTH TO WATER (ft): 4118

WATER COLUMN Ht (ft): \_\_\_\_\_

STANDING WATER VOLUME (gal): \_\_\_\_\_

3 VOLUMES (gal): 4

To obtain standing volume in gallons, multiply the water column height by 0.17 for 2-inch well or 0.66 for a 4-inch well.

PURGE METHOD: barler

SAMPLING METHOD: barler

### PURGE MEASUREMENTS

Time	Gallons Purged	Temp (C)	pH	SC (uS)	Turbidity (NTU)	DO (mg/L)	Comments
<del>18:30</del>	1.5	23.4	7.17	527	135.2		
	1.5	25.5	6.46	1526	107.4	0.50240	NOS
	2.5	25.3	6.42	1535	181.4		NOS / slow Recovery
	3.5	25.0	6.41	1549			bailed dry
		23.0				0.31	initial
		24.5				1.30	D.O After Purge and Sample

WELL ID: MW-11

WELL DIAMETER (in): 2"

WELL DEPTH (ft): \_\_\_\_\_

DEPTH TO WATER (ft): 4131

WATER COLUMN Ht (ft): \_\_\_\_\_

STANDING WATER VOLUME (gal): \_\_\_\_\_

3 VOLUMES (gal): 3.82

To obtain standing volume in gallons, multiply the water column height by 0.17 for 2-inch well or 0.66 for a 4-inch well.

PURGE METHOD: barler

SAMPLING METHOD: barler

### PURGE MEASUREMENTS

Time	Gallons Purged	Temp (C)	pH	SC (uS)	Turbidity (NTU)	DO (mg/L)	Comments
12:00	1.5	25	6.7	1351	235.8	1.16023.8	
	2.5	25	6.69	1343	481.3		NOS
	3.5	24.9	6.69	1342	564.1		↓ bailed dry
		22.9				0.25	initial
		23.2				1.70	D.O After Purge and Sample

# MONITORING WELL SAMPLING LOG

SITE NAME/LOCATION: River

JOB #: 3628

DATE: 5/12/03

SAMPLER'S INITIALS: cm

WELL ID: MW-10

WELL DIAMETER (in): 2"

WELL DEPTH (ft): \_\_\_\_\_

DEPTH TO WATER (ft): 1.40

WATER COLUMN Ht (ft): \_\_\_\_\_

STANDING WATER VOLUME (gal): \_\_\_\_\_

3 VOLUMES (gal): 5.25

To obtain standing volume in gallons, multiply the water column height by 0.17 for 2-inch well or 0.66 for a 4-inch well.

PURGE METHOD: boiler

SAMPLING METHOD: boiler

### PURGE MEASUREMENTS

Time	Gallons Purged	Temp (C)	pH	SC (uS)	Turbidity (NTU)	DO (mg/L)	Comments
12:30	<del>2</del>	23.4	7.17	592	135.2	5.72	NOS
	2.5	23.3	6.93	591	429.8		" / good recovery
	3.5	23.0	6.90	589	581.2		"
	4.5	22.9	6.92	592			"
	5.5	22.8	6.91	593	604.7		"
		20.3				2.27	initial
		21.0				2.01	D.O After Purge and Sample

WELL ID: MW-7

WELL DIAMETER (in): 2"

WELL DEPTH (ft): \_\_\_\_\_

DEPTH TO WATER (ft): 6.24

WATER COLUMN Ht (ft): \_\_\_\_\_

STANDING WATER VOLUME (gal): \_\_\_\_\_

3 VOLUMES (gal): 6.25

To obtain standing volume in gallons, multiply the water column height by 0.17 for 2-inch well or 0.66 for a 4-inch well.

PURGE METHOD: boiler

SAMPLING METHOD: boiler

### PURGE MEASUREMENTS

Time	Gallons Purged	Temp (C)	pH	SC (uS)	Turbidity (NTU)	DO (mg/L)	Comments
2:00	2.5	24.7	6.53	1528	165.3	6.60	stray odor / some
	3.5	24.3	6.54	1536	308.7		boiler
	4.5	22.5	6.52	1542	354.0		"
	5.5	22.2	6.53	1548			"
	6.5	22.2	6.52	1554			"
		21.0				6.02	initial
		20.7				6.37	D.O After Purge and Sample

# MONITORING WELL SAMPLING LOG

SITE NAME/LOCATION: Rino

JOB #: 3628

DATE: 8/12/03

SAMPLER'S INITIALS: cm

WELL ID: MW-1 WELL DIAMETER (in): 2"

WELL DEPTH (ft): \_\_\_\_\_ DEPTH TO WATER (ft): 2.04 WATER COLUMN Ht (ft): \_\_\_\_\_

STANDING WATER VOLUME (gal): \_\_\_\_\_ 3 VOLUMES (gal): 8.5  
 To obtain standing volume in gallons, multiply the water column height by 0.17 for 2-inch well or 0.66 for a 4-inch well.

PURGE METHOD: bailler SAMPLING METHOD: bailler

### PURGE MEASUREMENTS

Time	Gallons Purged	Temp (C)	pH	SC (uS/cm)	Turbidity (NTU)	DO (mg/L)	Comments
10:00	1	25.8	6.71	3.01	214.5		NOS ↓ slow Recharge
	3	22.2	6.68	4.47	256.1	1.01 @ 22.2	
	5	21.8	6.69	5.13	284.3		
	7	21.7	6.68	5.55			
	8.5	21.7	6.69	5.59	3535.6		
		21.9				0.93	Initial
		21.8				2.61	D.O After Purge and Sample

WELL ID: MW-9 WELL DIAMETER (in): 2"

WELL DEPTH (ft): \_\_\_\_\_ DEPTH TO WATER (ft): 2.61 WATER COLUMN Ht (ft): \_\_\_\_\_

STANDING WATER VOLUME (gal): \_\_\_\_\_ 3 VOLUMES (gal): 8.7  
 To obtain standing volume in gallons, multiply the water column height by 0.17 for 2-inch well or 0.66 for a 4-inch well.

PURGE METHOD: bailler SAMPLING METHOD: bailler

### PURGE MEASUREMENTS

Time	Gallons Purged	Temp (C)	pH	SC (uS/cm)	Turbidity (NTU)	DO (mg/L)	Comments
10:30	1	25.5	6.60	3.47	268.7		NOS "
	3	23.4	6.49	3.60	304.2	2.2 @ 22.0	
	5	23.8	6.50	3.60	253.8		
	7	22.3	6.53	4.13			
	9	22.1	6.52	4.26	281.4		
		21.3				0.62	Initial
		21.0				1.14	D.O After Purge and Sample

# MONITORING WELL SAMPLING LOG

SITE NAME/LOCATION: Pine JOB #: 3028

DATE: 8/12/03 SAMPLER'S INITIALS: CVI

WELL ID: MW-2 WELL DIAMETER (in): 2"

WELL DEPTH (ft): \_\_\_\_\_ DEPTH TO WATER (ft): 3.10 WATER COLUMN Ht (ft): \_\_\_\_\_

STANDING WATER VOLUME (gal): \_\_\_\_\_ 3 VOLUMES (gal): 8.4

To obtain standing volume in gallons, multiply the water column height by 0.17 for 2-inch well or 0.66 for a 4-inch well.

PURGE METHOD: bailey SAMPLING METHOD: bailey

### PURGE MEASUREMENTS

Time	Gallons Purged	Temp (C)	pH	SC (uS)	Turbidity (NTU)	DO (mg/L)	Comments
11:10	3	26.4	6.67	204	361.8	2.22	
	5	26.0	6.68	209	404.7		Strong odor + S&S
	6	24.5	6.58	224	451.8		
	7	24.5	6.68	225	476.2		
	8.5	24.4	6.69	228	526.4		
		21.5				.53	Black color initial
		23.2				.77	D.O After Purge and Sample

WELL ID: MW-5 WELL DIAMETER (in): 2"

WELL DEPTH (ft): \_\_\_\_\_ DEPTH TO WATER (ft): 3.75 WATER COLUMN Ht (ft): \_\_\_\_\_

STANDING WATER VOLUME (gal): \_\_\_\_\_ 3 VOLUMES (gal): 8

To obtain standing volume in gallons, multiply the water column height by 0.17 for 2-inch well or 0.66 for a 4-inch well.

PURGE METHOD: bailey SAMPLING METHOD: bailey

### PURGE MEASUREMENTS

Time	Gallons Purged	Temp (C)	pH	SC (uS)	Turbidity (NTU)	DO (mg/L)	Comments
11:30	3	26.7	6.52	194	281.7	2.23	
	4	25.7	6.53	157	435.5		
	5	24.1	6.62	202	471.2		
	6	26.1	6.64	199	498.3		
		21.2				.33	initial
		23.6				.92	D.O After Purge and Sample

8 26

# MONITORING WELL SAMPLING LOG

SITE NAME/LOCATION: Rino

JOB #: 3628

DATE: 8/12/03

SAMPLER'S INITIALS: CM

WELL ID: MW-4

WELL DIAMETER (in): 2"

WELL DEPTH (ft): \_\_\_\_\_

DEPTH TO WATER (ft): 4.47

WATER COLUMN Ht (ft): \_\_\_\_\_

STANDING WATER VOLUME (gal): \_\_\_\_\_

3 VOLUMES (gal): 7.73

To obtain standing volume in gallons, multiply the water column height by 0.17 for 2-inch well or 0.66 for a 4-inch well.

PURGE METHOD: bailer

SAMPLING METHOD: bailer

### PURGE MEASUREMENTS

Time	Gallons Purged	Temp (C)	pH	SC (uS)	Turbidity (NTU)	DO (mg/L)	Comments
1:00	<del>1</del> 1	25.8	6.57	2.5	157.4		some odor ↓
	3	24.4	6.58	2.63	203.5	1.32	
	4	24.1	6.57	2.68	238.1		
	5	23.5	6.57	2.89	271.4		
	8	23.1	6.53	2.95	518.3		
		20.9				2.35	initial D.O After Purge and Sample
		10.6				1.78	

WELL ID: MW-6

WELL DIAMETER (in): 2"

WELL DEPTH (ft): \_\_\_\_\_

DEPTH TO WATER (ft): 3.91

WATER COLUMN Ht (ft): \_\_\_\_\_

STANDING WATER VOLUME (gal): \_\_\_\_\_

3 VOLUMES (gal): 8

To obtain standing volume in gallons, multiply the water column height by 0.17 for 2-inch well or 0.66 for a 4-inch well.

PURGE METHOD: bailer

SAMPLING METHOD: bailer

### PURGE MEASUREMENTS

Time	Gallons Purged	Temp (C)	pH	SC (uS)	Turbidity (NTU)	DO (mg/L)	Comments
17:50	3	27.2	6.75	1346	194.7	6.3 @ 25.1	some odor ↓
	5	27.0	6.73	1467			
	6	27.2	6.77	1327			
	7	27.3	6.72	1330			
	8	27.3	6.73	1315			
		21.5				2.24	initial D.O After Purge and Sample
		23.7				2.45	



**APPENDIX B**  
**PRODUCT SKIMMER SERVICE LOG FOR MW-7**

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**OAKLAND TRUCK STOP, WELL MW-7 PASSIVE SKIMMER  
RECORD OF FREE PRODUCT VOLUME REMOVED**

<b>DATE</b>	<b>TIME</b>	<b>PRODUCT REMOVED (Liters)</b>	<b>COMMENTS</b>
1/9/2003	9:45	0.90	15 minutes after emptying skimmer, no new product had entered
1/14/2003	9:27	0.06	
1/21/2003	11:45	0.07	
1/28/2003	9:44	0.12	Depth to water = 5.8'
4/16/2003	10:00	0.08	Well has no cap; water in well box was at top of well casing
5/12/2003	11:00	0.15	
5/27/2003	10:00	0.15	
6/11/2003	10:30	0.04	
6/26/2003	12:00	0.04	
7/16/2003	1:30	0.06	Water in Well Box
8/12/2003	1:30	0.06	Water in Well Box

**1.73 = Cumulative volume (L) removed.**

**APPENDIX C**  
**LABORATORY ANALYTICAL REPORTS**

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McC Campbell Analytical Inc.

110 2nd Avenue South, #D7, Pacheco, CA 94553-5560  
 Telephone : 925-798-1620 Fax : 925-798-1622  
<http://www.mccampbell.com> E-mail: [main@mccampbell.com](mailto:main@mccampbell.com)

W. A. Craig Inc. 6940 Tremont Road Dixon, CA 95620-9603	Client Project ID: #3628; Rinehart	Date Sampled: 08/11/03
		Date Received: 08/12/03
	Client Contact: Tim Cook	Date Reported: 08/19/03
	Client P.O.:	Date Completed: 08/19/03

WorkOrder: 0308179

August 19, 2003

Dear Tim:

Enclosed are:

- 1). the results of 10 analyzed samples from your #3628; Rinehart project,
- 2). a QC report for the above samples
- 3). a copy of the chain of custody, and
- 4). a bill for analytical services.

All analyses were completed satisfactorily and all QC samples were found to be within our control limits. If you have any questions please contact me. McC Campbell Analytical Laboratories strives for excellence in quality, service and cost. Thank you for your business and I look forward to working with you again.

Yours truly,

Angela Rydelius, Lab Manager



**McC Campbell Analytical Inc.**

110 2nd Avenue South, #D7, Pacheco, CA 94553-5560  
 Telephone : 925-798-1620 Fax : 925-798-1622  
 http://www.mccampbell.com E-mail: main@mccampbell.com

W. A. Craig Inc. 6940 Tremont Road Dixon, CA 95620-9603	Client Project ID: #3628; Rinehart	Date Sampled: 08/11/03
	Client Contact: Tim Cook	Date Received: 08/12/03
	Client P.O.:	Date Extracted: 08/14/03-08/18/03
		Date Analyzed: 08/14/03-08/18/03

**Gasoline Range (C6-C12) Volatile Hydrocarbons as Gasoline with BTEX and MTBE\***

Extraction method: SW5030B

Analytical methods: SW8021B/8015Cm

Work Order: 0308179

Lab ID	Client ID	Matrix	TPH(g)	MTBE	Benzene	Toluene	Ethylbenzene	Xylenes	DF	% SS
001A	MW-1	W	ND	740	ND	ND	ND	ND	1	103
002A	MW-3N	W	ND	250	ND	ND	ND	ND	1	103
003A	MW-4	W	ND<2500,j	77,000	ND<25	ND<25	ND<25	ND<25	50	103
004A	MW-5	W	71,a	1500	9.5	ND	ND	ND	1	101
005A	MW-6	W	110,f	2800	6.8	1.1	ND<1.0	ND<1.0	2	108
006A	MW-7	W	90,000,a,h	140,000	15,000	1100	2600	12,000	330	97.5
007A	MW-8	W	ND<2500,j,h	42,000	92	ND<25	ND<25	ND<25	50	103
008A	MW-9	W	ND	36	ND	ND	ND	ND	1	103
009A	MW-10	W	ND	ND	0.93	ND	ND	ND	1	101
010A	MW-11	W	ND,i	ND	ND	0.66	ND	ND	1	105

Reporting Limit for DF =1; ND means not detected at or above the reporting limit	W	50	5.0	0.5	0.5	0.5	0.5	0.5	1	µg/L
	S	NA	NA	NA	NA	NA	NA	NA	1	mg/Kg

\* water and vapor samples and all TCLP & SPLP extracts are reported in ug/L, soil/sludge/solid samples in mg/kg, wipe samples in µg/wipe, product/oil/non-aqueous liquid samples in mg/L.

# cluttered chromatogram; sample peak coelutes with surrogate peak.

+The following descriptions of the TPH chromatogram are cursory in nature and McC Campbell Analytical is not responsible for their interpretation: a) unmodified or weakly modified gasoline is significant; b) heavier gasoline range compounds are significant(aged gasoline?); c) lighter gasoline range compounds (the most mobile fraction) are significant; d) gasoline range compounds having broad chromatographic peaks are significant; biologically altered gasoline?; e) TPH pattern that does not appear to be derived from gasoline (stoddard solvent / mineral spirit?); f) one to a few isolated non-target peaks present; g) strongly aged gasoline or diesel range compounds are significant; h) lighter than water immiscible sheen/product is present; i) liquid sample that contains greater than ~2 vol. % sediment; j) reporting limit raised due to high MTBE content; k) TPH pattern that does not appear to be derived from gasoline (aviation gas). m) no recognizable pattern.

DHS Certification No. 1644

*[Signature]*  
 Angela Rydelius, Lab Manager



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W. A. Craig Inc. 6940 Tremont Road Dixon, CA 95620-9603	Client Project ID: #3628; Rinehart	Date Sampled: 08/11/03
		Date Received: 08/12/03
	Client Contact: Tim Cook	Date Extracted: 08/12/03
	Client P.O.:	Date Analyzed: 08/13/03-08/15/03

**Diesel Range (C10-C23) Extractable Hydrocarbons as Diesel\***

Extraction method: SW3510C

Analytical methods: SW8015C

Work Order: 0308179

Lab ID	Client ID	Matrix	TPH(d)	DF	% SS
0308179-001C	MW-1	W	180,a	1	96.6
0308179-002C	MW-3N	W	720,a	1	98.6
0308179-003C	MW-4	W	66,b	1	95.6
0308179-004C	MW-5	W	2200,a	1	97.7
0308179-005C	MW-6	W	630,a	1	98.4
0308179-006C	MW-7	W	12,000,d,b,h	1	106
0308179-007C	MW-8	W	23,000,a,h	1	104
0308179-008C	MW-9	W	88,a	1	103
0308179-009C	MW-10	W	110,b,g	1	99.9
0308179-010C	MW-11	W	72,b,i	1	111


Reporting Limit for DF =1; ND means not detected at or above the reporting limit	W	50	µg/L
	S	NA	NA

\* water samples are reported in µg/L, wipe samples in µg/wipe, soil/solid/sludge samples in mg/kg, product/oil/non-aqueous liquid samples in mg/L, and all DISTLC / STLC / SPLP / TCLP extracts are reported in µg/L.

# cluttered chromatogram resulting in coeluted surrogate and sample peaks, or; surrogate peak is on elevated baseline, or; surrogate has been diminished by dilution of original extract.

+The following descriptions of the TPH chromatogram are cursory in nature and McC Campbell Analytical is not responsible for their interpretation: a) unmodified or weakly modified diesel is significant; b) diesel range compounds are significant; no recognizable pattern; c) aged diesel? is significant; d) gasoline range compounds are significant; e) unknown medium boiling point pattern that does not appear to be derived from diesel; f) one to a few isolated peaks present; g) oil range compounds are significant; h) lighter than water immiscible sheen/product is present; i) liquid sample that contains greater than ~2 vol. % sediment; k) kerosene/kerosene range; l) bunker oil; m) fuel oil; n) stoddard solvent/mineral spirit.

DHS Certification No. 1644

 Angela Rydelius, Lab Manager



McC Campbell Analytical Inc.

110 2nd Avenue South, #D7, Pacheco, CA 94553-5560  
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 http://www.mcccampbell.com E-mail: main@mcccampbell.com

W. A. Craig Inc. 6940 Tremont Road Dixon, CA 95620-9603	Client Project ID: #3628; Rinehart	Date Sampled: 08/11/03
		Date Received: 08/12/03
	Client Contact: Tim Cook	Date Extracted: 08/14/03-08/15/03
	Client P.O.:	Date Analyzed: 08/14/03-08/15/03

**Oxygenated Volatile Organics by P&T and GC/MS\***

Extraction Method: SW5030B

Analytical Method: SW8260B

Work Order: 0308179

Lab ID	0308179-001B	0308179-002B	0308179-003B	0308179-004B	Reporting Limit for DF =1	
Client ID	MW-1	MW-3N	MW-4	MW-5		
Matrix	W	W	W	W		
DF	25	10	3300	100		

Compound	Concentration				ug/kg	ug/L
	Diisopropyl ether (DIPE)	ND<12	ND<5.0	ND<1700	ND<50	NA
Ethyl tert-butyl ether (ETBE)	ND<12	ND<5.0	ND<1700	ND<50	NA	0.5
Methyl-t-butyl ether (MTBE)	660	280	74,000	1700	NA	0.5
tert-Amyl methyl ether (TAME)	ND<12	ND<5.0	ND<1700	ND<50	NA	0.5
t-Butyl alcohol (TBA)	ND<120	ND<50	ND<17,000	14,000	NA	5.0
Ethanol	ND<1200	ND<500	ND<170,000	ND<5000	NA	50
Methanol	ND<12,000	ND<5000	ND<1,700,000	ND<50,000	NA	500
1,2-Dibromoethane (EDB)	ND<12	ND<5.0	ND<1700	ND<50	NA	0.5
1,2-Dichloroethane (1,2-DCA)	ND<12	ND<5.0	ND<1700	ND<50	NA	0.5

**Surrogate Recoveries (%)**

%SS:	111	108	105	107
Comments				

\* water and vapor samples and all TCLP & SPLP extracts are reported in µg/L, soil/sludge/solid samples in µg/kg, wipe samples in µg/wipe, product/oil/non-aqueous liquid samples in mg/L.

ND means not detected above the reporting limit; N/A means analyte not applicable to this analysis.

# surrogate diluted out of range or surrogate coelutes with another peak.

h) lighter than water immiscible sheen/product is present; i) liquid sample that contains greater than ~2 vol. % sediment; j) sample diluted due to high organic content.



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W. A. Craig Inc. 6940 Tremont Road Dixon, CA 95620-9603	Client Project ID: #3628; Rinehart	Date Sampled: 08/11/03
		Date Received: 08/12/03
	Client Contact: Tim Cook	Date Extracted: 08/14/03-08/15/03
	Client P.O.:	Date Analyzed: 08/14/03-08/15/03

**Oxygenated Volatile Organics by P&T and GC/MS\***

Extraction Method: SW5030B

Analytical Method: SW8260B

Work Order: 0308179

Lab ID	0308179-005B	0308179-006B	0308179-007B	0308179-008B	Reporting Limit for DF=1	
Client ID	MW-6	MW-7	MW-8	MW-9		
Matrix	W	W	W	W		
DF	200	10000	2000	2		
Compound	Concentration				ug/kg	ug/L
Diisopropyl ether (DIPE)	ND<100	ND<5000	ND<1000	ND<1.0	NA	0.5
Ethyl tert-butyl ether (ETBE)	ND<100	ND<5000	ND<1000	ND<1.0	NA	0.5
Methyl-t-butyl ether (MTBE)	2300	140,000	42,000	42	NA	0.5
tert-Amyl methyl ether (TAME)	ND<100	ND<5000	ND<1000	ND<1.0	NA	0.5
t-Butyl alcohol (TBA)	27,000	ND<50,000	ND<10,000	ND<10	NA	5.0
Ethanol	ND<10,000	ND<500,000	ND<100,000	ND<100	NA	50
Methanol	ND<100,000	ND<5,000,000	ND<1,000,000	ND<1000	NA	500
1,2-Dibromoethane (EDB)	ND<100	ND<5000	ND<1000	ND<1.0	NA	0.5
1,2-Dichloroethane (1,2-DCA)	ND<100	ND<5000	ND<1000	ND<1.0	NA	0.5

**Surrogate Recoveries (%)**

%SS:	106	105	104	109
Comments		h	h	

\* water and vapor samples and all TCLP & SPLP extracts are reported in ug/L, soil/sludge/solid samples in ug/kg, wipe samples in ug/wipe, product/oil/non-aqueous liquid samples in mg/L.

ND means not detected above the reporting limit; N/A means analyte not applicable to this analysis.

# surrogate diluted out of range or surrogate coelutes with another peak.

h) lighter than water immiscible sheen/product is present; i) liquid sample that contains greater than ~2 vol. % sediment; j) sample diluted due to high organic content.





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W. A. Craig Inc. 6940 Tremont Road Dixon, CA 95620-9603	Client Project ID: #3628; Rinehart	Date Sampled: 08/11/03
		Date Received: 08/12/03
	Client Contact: Tim Cook	Date Extracted: 08/14/03-08/15/03
	Client P.O.:	Date Analyzed: 08/14/03-08/15/03

**Oxygenated Volatile Organics by P&T and GC/MS\***

Extraction Method: SW5030B

Analytical Method: SW8260B

Work Order: 0308179

Lab ID	0308179-009B	0308179-010B	Reporting Limit for DF=1	
Client ID	MW-10	MW-11		
Matrix	W	W		
DF	1	1		

Compound	Concentration		ug/kg	ug/L
	Diisopropyl ether (DIPE)	ND	ND	NA
Ethyl tert-butyl ether (ETBE)	ND	ND	NA	0.5
Methyl-t-butyl ether (MTBE)	0.73	3.3	NA	0.5
tert-Amyl methyl ether (TAME)	ND	ND	NA	0.5
t-Butyl alcohol (TBA)	ND	ND	NA	5.0
Ethanol	ND	ND	NA	50
Methanol	ND	ND	NA	500
1,2-Dibromoethane (EDB)	ND	ND	NA	0.5
1,2-Dichloroethane (1,2-DCA)	ND	ND	NA	0.5

**Surrogate Recoveries (%)**

%SS:	113	110		
Comments		i		

\* water and vapor samples and all TCLP & SPLP extracts are reported in µg/L, soil/sludge/solid samples in µg/kg, wipe samples in µg/wipe, product/oil/non-aqueous liquid samples in mg/L.

ND means not detected above the reporting limit; N/A means analyte not applicable to this analysis.

# surrogate diluted out of range or surrogate coelutes with another peak.

h) lighter than water immiscible sheen/product is present; i) liquid sample that contains greater than ~2 vol. % sediment; j) sample diluted due to high organic content.



### QC SUMMARY REPORT FOR SW8021B/8015Cm

Matrix: W

WorkOrder: 0308179

EPA Method: SW8021B/8015Cm		Extraction: SW5030B		BatchID: 8160			Spiked Sample ID: 0308182-003A			
	Sample	Spiked	MS*	MSD*	MS-MSD*	LCS	LCSD	LCS-LCSD	Acceptance Criteria (%)	
	µg/L	µg/L	% Rec.	% Rec.	% RPD	% Rec.	% Rec.	% RPD	Low	High
TPH(btex) <sup>£</sup>	ND	60	106	111	4.84	109	107	2.05	70	130
MTBE	ND	10	98.6	108	8.76	106	105	0.871	70	130
Benzene	ND	10	105	109	3.55	112	112	0	70	130
Toluene	ND	10	98.3	101	2.78	102	104	1.61	70	130
Ethylbenzene	ND	10	105	110	4.54	108	110	1.25	70	130
Xylenes	ND	30	96.7	100	3.39	100	100	0	70	130
%SS:	102	100	100	103	2.79	104	104	0	70	130

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions:  
 NONE

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

$\% \text{ Recovery} = 100 * (\text{MS} - \text{Sample}) / (\text{Amount Spiked}); \text{RPD} = 100 * (\text{MS} - \text{MSD}) / (\text{MS} + \text{MSD}) * 2.$

\* MS and / or MSD spike recoveries may not be near 100% or the RPDs near 0% if: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) if that specific sample matrix interferes with spike recovery.

£ TPH(btex) = sum of BTEX areas from the FID.

# cluttered chromatogram; sample peak coelutes with surrogate peak.

N/A = not enough sample to perform matrix spike and matrix spike duplicate.

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.



## QC SUMMARY REPORT FOR SW8021B/8015Cm

Matrix: W

WorkOrder: 0308179

EPA Method: SW8021B/8015Cm		Extraction: SW5030B		BatchID: 8154			Spiked Sample ID: 0308179-009A			
	Sample	Spiked	MS*	MSD*	MS-MSD	LCS	LCSD	LCS-LCSD	Acceptance Criteria (%)	
	µg/L	µg/L	% Rec.	% Rec.	% RPD	% Rec.	% Rec.	% RPD	Low	High
TPH(btex) <sup>£</sup>	ND	60	115	107	6.96	106	117	10.1	70	130
MTBE	ND	10	107	107	0	99.7	112	11.4	70	130
Benzene	0.9341	10	108	106	1.69	103	109	5.65	70	130
Toluene	ND	10	103	102	1.72	96.2	101	4.41	70	130
Ethylbenzene	ND	10	111	110	1.19	105	109	3.92	70	130
Xylenes	ND	30	107	100	6.45	96.3	100	3.74	70	130
%SS:	101	100	103	101	2.37	99.7	102	1.91	70	130

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions:  
NONE

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery =  $100 * (MS - Sample) / (Amount Spiked)$ ; RPD =  $100 * (MS - MSD) / (MS + MSD) * 2$ .

\* MS and / or MSD spike recoveries may not be near 100% or the RPDs near 0% if: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) if that specific sample matrix interferes with spike recovery.

£ TPH(btex) = sum of BTEX areas from the FID.

# cluttered chromatogram; sample peak coelutes with surrogate peak.

N/A = not enough sample to perform matrix spike and matrix spike duplicate.

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.



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### QC SUMMARY REPORT FOR SW8015C

Matrix: W

WorkOrder: 0308179

EPA Method: SW8015C		Extraction: SW3510C			BatchID: 8155			Spiked Sample ID: N/A		
	Sample	Spiked	MS*	MSD*	MS-MSD*	LCS	LCSD	LCS-LCSD	Acceptance Criteria (%)	
	µg/L	µg/L	% Rec.	% Rec.	% RPD	% Rec.	% Rec.	% RPD	Low	High
TPH(d)	N/A	7500	N/A	N/A	N/A	112	112	0	70	130
%SS:	N/A	100	N/A	N/A	N/A	110	110	0	70	130
All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions: NONE										

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

$$\% \text{ Recovery} = 100 * (\text{MS-Sample}) / (\text{Amount Spiked}); \text{RPD} = 100 * (\text{MS} - \text{MSD}) / (\text{MS} + \text{MSD}) * 2.$$

\* MS and / or MSD spike recoveries may not be near 100% or the RPDs near 0% if: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) if that specific sample matrix interferes with spike recovery.

N/A = not enough sample to perform matrix spike and matrix spike duplicate.

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.



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### QC SUMMARY REPORT FOR SW8015C

Matrix: W

WorkOrder: 0308179

EPA Method: SW8015C		Extraction: SW3510C			BatchID: 8161			Spiked Sample ID: N/A		
	Sample	Spiked	MS*	MSD*	MS-MSD*	LCS	LCSD	LCS-LCSD	Acceptance Criteria (%)	
	µg/L	µg/L	% Rec.	% Rec.	% RPD	% Rec.	% Rec.	% RPD	Low	High
TPH(d)	N/A	7500	N/A	N/A	N/A	114	115	1.24	70	130
%SS:	N/A	100	N/A	N/A	N/A	113	113	0	70	130
All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions: NONE										

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery =  $100 * (MS - Sample) / (Amount\ Spiked)$ ; RPD =  $100 * (MS - MSD) / (MS + MSD) * 2$ .

\* MS and / or MSD spike recoveries may not be near 100% or the RPDs near 0% if: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) if that specific sample matrix interferes with spike recovery.

N/A = not enough sample to perform matrix spike and matrix spike duplicate.

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.



**QC SUMMARY REPORT FOR SW8260B**

Matrix: W

WorkOrder: 0308179

EPA Method: SW8260B		Extraction: SW5030B		BatchID: 8153			Spiked Sample ID: 0308179-009B			
	Sample	Spiked	MS*	MSD*	MS-MSD*	LCS	LCSD	LCS-LCSD	Acceptance Criteria (%)	
	µg/L	µg/L	% Rec.	% Rec.	% RPD	% Rec.	% Rec.	% RPD	Low	High
tert-Amyl methyl ether (TAME)	ND	10	98.7	93.1	5.87	81.8	79.9	2.36	70	130
t-Butyl alcohol (TBA)	ND	50	107	91	16.5	75.9	77.8	2.60	70	130
1,2-Dibromoethane (EDB)	ND	10	112	106	5.48	94.9	90.5	4.69	70	130
1,2-Dichloroethane (1,2-DCA)	ND	10	119	112	6.52	97.5	97.2	0.357	70	130
Diisopropyl ether (DIPE)	ND	10	123	116	5.81	103	103	0	70	130
Ethanol	ND	500	103	104	0.889	101	101	0	70	130
Ethyl tert-butyl ether (ETBE)	ND	10	106	98.6	7.12	86.7	85.2	1.68	70	130
Methanol	ND	2500	98.3	102	3.83	93.7	91.2	2.67	70	130
Methyl-t-butyl ether (MTBE)	0.7335	10	107	97.5	8.58	83.9	81.9	2.50	70	130
%SS1:	113	100	114	111	2.75	102	105	2.70	70	130

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions:  
 NONE

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery =  $100 * (MS - Sample) / (Amount Spiked)$ ;  $RPD = 100 * (MS - MSD) / (MS + MSD) * 2$ .

\* MS and / or MSD spike recoveries may not be near 100% or the RPDs near 0% if: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) if that specific sample matrix interferes with spike recovery.

N/A = not enough sample to perform matrix spike and matrix spike duplicate.

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.

Laboratory extraction solvents such as methylene chloride and acetone may occasionally appear in the method blank at low levels.

# McCampbell Analytical Inc.



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 (925) 798-1620

# CHAIN-OF-CUSTODY RECORD

WorkOrder: 0308179

**Client:**

W. A. Craig Inc.  
 6940 Tremont Road  
 Dixon, CA 95620-9603

TEL: (707) 310-1741  
 FAX: (707) 693-2922  
 ProjectNo: #3628; Rinehart  
 PO:

Date Received: 8/12/03

Date Printed: 8/12/03

Sample ID	ClientSampID	Matrix	Collection Date	Hold	Requested Tests			
					<>	SW8015C	N8021B/8015C	SW8260B
0308179-001	MW-1	Water	8/11/03 10:00:00 AM	<input type="checkbox"/>	A	C	A	B
0308179-002	MW-3N	Water	8/11/03	<input type="checkbox"/>		C	A	B
0308179-003	MW-4	Water	8/11/03 11:10:00 AM	<input type="checkbox"/>		C	A	B
0308179-004	MW-5	Water	8/11/03 11:30:00 AM	<input type="checkbox"/>		C	A	B
0308179-005	MW-6	Water	8/11/03 12:50:00 PM	<input type="checkbox"/>		C	A	B
0308179-006	MW-7	Water	8/11/03 2:00:00 PM	<input type="checkbox"/>		C	A	B
0308179-007	MW-8	Water	8/11/03 1:10:00 PM	<input type="checkbox"/>		C	A	B
0308179-008	MW-9	Water	8/11/03 10:30:00 PM	<input type="checkbox"/>		C	A	B
0308179-009	MW-10	Water	8/11/03 12:30:00 PM	<input type="checkbox"/>		C	A	B
0308179-010	MW-11	Water	8/11/03 12:00:00 PM	<input type="checkbox"/>		C	A	B

Prepared by: Melissa Valles

**Comments:**

NOTE: Samples are discarded 60 days after results are reported unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client expense.

0308179

**McCAMPBELL ANALYTICAL INC.**

110 2<sup>nd</sup> AVENUE SOUTH, #D7  
PACHECO, CA 94553-5560

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Fax: (925) 798-1622

**CHAIN OF CUSTODY RECORD**

TURN AROUND TIME

RUSH  24 HR  48 HR  72 HR  5 DAY

EDF Required? **Yes** No

Report To: *Jim Cook* Bill To: W. A. Craig, Inc.  
Company: W. A. Craig, Inc.  
6940 Tremont Rd.  
Dixon, CA 95620 E-Mail: tech@wacraig.com  
Tele: (707) 693-2929 Fax: (707) 693-2922  
Project #: 3628 Project Name: Rinehart  
Project Location: Oakland  
Sampler Signature: *CAW*

Analysis Request

Other

Comments

SAMPLE ID (Field Point Name)	LOCATION	SAMPLING		# Containers	Type Containers	MATRIX					METHOD PRESERVED								
		Date	Time			Water	Soil	Air	Sludge	Other	Ice	HCl	HNO <sub>3</sub>	Other					
MW-1		8-17-03	10:00	5	*	X					X	X							
MW-3N				4	□	X					X	X							
MW-4			11:10	5	X	X					X	X							
MW-5			11:30	5	*	X					X	X							
MW-6			12:50	5	X	X					X	X							
MW-7			2:00	5	X	X					X	X							
MW-8			1:10	5	X	X					X	X							
MW-9			10:30	5	*	X					X	X							
MW-10			12:30	5	*	X					X	X							
MW-11			12:00	4	□	X					X	X							

BTEX & TPH as Gas (602/8020 + 8015)/MTBE																			
TPH as Diesel (8015)																			
Total Petroleum Oil & Grease (5520 EOP/B&F)																			
Total Petroleum Hydrocarbons (418.1)																			
EPA 601 / 8010																			
BTEX ONLY (EPA 602 / 8020)																			
EPA 608 / 8080																			
EPA 608 / 8080 PCB'S ONLY																			
EPA 624 / 8240 <i>8260</i>																			
EPA 625 / 8270																			
PAH's / PNA's by EPA 625 / 8270 / 8310																			
CAM-17 Metals																			
LUFT 5 Metals																			
Lead (7240/7421/239.2/6010)																			
RCI																			

Relinquished By: *Clyde Mcker* Date: 8-17-03 Time: 3:15  
 Relinquished By: *[Signature]* Date: 8-12 Time: 6:20p  
 Relinquished By: *[Signature]* Date: Time: Received By: *[Signature]*

\* 37001-20000 5 101 number 1210015  
 ICE#  PRESERVATION   
 GOOD CONDITION  APPROPRIATE  
 HEAD SPACE ABSENT CONTAINERS   
 DECHLORINATED IN LAB PERSERVED IN LAB