BALAJI ANGLE DBA
BAE GAS MINIMART
2008 FIRST STREET,
LIVERMORE CA 94550
9/12/98

EVA CHU,
AL. CTY. HEALTH CARE SERVICES,
ENVIRONMENTAL HEALTH,
ENVIRONMENTAL PROTECTION,
1131 ~~HARBOR~~ PARKWAY, #250,
ALAMEDA, CA — 94502-6577

REF: — MONITORING REPORT 3rd Qtr 1998

DEAR EVA,

I ENCLOSE FOR YOUR REVIEW AND FILES 3RD QTR 98, GROUND WATER MONITORING RESULTS REPORT, FOR THE ABOVE SITE, AS REQUIRED IN YOUR DIRECTIVE.

THE RESULTS ARE GENERALLY ENCOURAGING AND LEAD TO CONCLUSION THAT PASSIVE BIOREMEDIATION IS TAKING PLACE WITH SPEED AS THE TIME GOES BY. MY DISCUSSIONS WITH CHRIS JONSON WITH REGARD TO FREE PRODUCT CONJECTURE THAT THE FREE PRODUCT WHICH IS OLD NOW SURFACES OWING TO HIGHER ELEVATIONS (TOPOGRAPHY) OF GROUND WATER.

PLEASE LET ME HAVE YOUR CONCLUSIONS.

Sincerely,

B. S. Angle

Dist: 1 copy

SEP 15 '98 8:29

THIRD QUARTER 1998
GROUNDWATER MONITORING RESULTS
B&C Gas Mini Mart
Livermore, California

Prepared by
EINARSON, FOWLER & WATSON
2650 East Bayshore
Palo Alto, California 94303
September 1998

Project BNC103

EINARSON
FOWLER & WATSON
Consultants In Environmental Hydrogeology & Engineering

Rec'd 9/12/98

September 10, 1998
Project No. BNC103

Speak with John on this conjecture that free product at this site was encountered possibly due to prior leaks which have near subsurface

Mr. Balaji Angle
Angle Enterprises
5131 Shattuck Avenue
Oakland, California 94609

Re: Third Quarter 1998 Groundwater Monitoring Results, B&C Gas Mini Mart, 2008 First Street, Livermore, California

during the higher level of groundwater.

9/12

Dear Mr. Angle:

Einarson, Fowler & Watson (EFW) has compiled the third-quarter 1998 groundwater monitoring results for B&C Gas Mini Mart (B&C), 2008 First Street, Livermore, California (Figure 1). A quarterly groundwater monitoring program has been reinstated at the B&C site, as requested in your letter dated June 25, 1998.[1] This report includes third quarter 1998 groundwater elevation data, groundwater sampling methods, and results of groundwater chemical analyses.

SITE INFORMATION

Site Name

B&C Gas Mini Mart
2008 First Street
Livermore, California 94550

Site Contact

Mr. Balaji Angle
Angle Enterprises
5131 Shattuck Avenue
Oakland, California 94609
(510) 654-3461

Site Description

The B&C Gas Mini Mart property is located on the northeast corner of First and South L Streets in Livermore, California, and currently serves as a gasoline station and mini market. From at least 1988 until 1994, Desert Petroleum (DP) owned and operated the

[1] ACEHS Letter to Mr. B. Angle of B&C Gas Mini Mart and Mr. J. Rutherford of Desert Petroleum re "QMR for 2008 First Street, Livermore, California." June 25, 1998.

2650 East Bayshore Road • Palo Alto, California 94303 • Telephone 650.843.3828 • FAX 650.843.3815

site. In January 1994, DP sold the site to the current owner, Mr. Balaji Angle. The following site information has been compiled from reports on file with ACEHS. Site information was also provided by the site owner and ACEHS.

The site is located in the Livermore Valley groundwater basin, an area of sedimentary deposition containing braided channel systems and complex interfingering. Subsurface investigations conducted to the west of the B&C site have found an upper unconfined aquifer consisting primarily of gravels with sand and clay. A low-permeability clay unit is found at depths of approximately 75 to 110 feet below ground surface (bgs). Below the clayey unit, the top of a lower, semi-confined aquifer is found at depths ranging from 110 to 145 feet bgs.[2]

Subsurface work conducted at the B&C site has found the soil to be predominantly sandy clay, silty sand, silty gravel, and sandy gravel to a maximum explored depth of 77 feet.[3] Over the last nine years, static water levels have ranged from 68.7 feet bgs (January 1992) to 17.0 feet bgs (February 1997). The groundwater flow generally ranges from west of north during the summer and fall months to north of west during the winter and spring months. Table 1 presents historical site groundwater elevations.[4]

Previous Work Performed at Site

A preliminary site assessment was conducted in September 1988. Three soil borings were completed, one of which was converted to a monitoring well (MW-1). In March 1994, a 280-gallon waste oil underground storage tank (UST) and 25 cubic yards of soil were removed as part of closing the auto repair shop at the station. Three months later in June, wells MW-2, MW-3, and MW-4 were installed (Figure 2).[5]

In August 1994, free product was encountered in well MW-2, and product removal commenced twice a month. By the end of January 1995, no measurable thickness of product remained, only sheen could be detected.[6] In March 1995, a release was reported to have occurred from the union between a tank subpump and product line. The quantity of the release is unknown.

One gasoline UST at the B&C site failed an integrity test in September 1995. The tank was immediately taken out of commission and ACEHS was notified. In July 1996 further source removal was conducted. Two more gasoline USTs were removed, and new

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[2] H⁺GCL, Inc. *Deep Groundwater Conduit Study, Livermore Arcade Shopping Center, First Street and South P Street, Livermore, California.* December 6, 1993.

[3] Remediation Service Int'l. *Soil & Groundwater Investigation Report for 2008 First Street, Livermore, California.* July 22, 1994.

[4] Groundwater elevation and flow direction data from Remediation Service Int'l quarterly reports.

[5] Remediation Service Int'l. *Soil & Groundwater Investigation Report for 2008 First Street, Livermore, California.* July 22, 1994.

[6] Product thickness information from Remediation Service, Int'l field records, "Free Product Removal Logs."

double-walled fiberglass USTs and fiberglass piping with automated leak detection were installed. Other remedial activities included the removal of two hydraulic lifts and approximately 700 cubic yards of impacted soil. Also, one 1,000-gallon UST discovered during excavation activities was closed in place with approval from ACEHS and the Livermore Fire Department by grouting with a cement sand slurry. In October 1995, two additional monitoring wells (off-site well MW-5 and well MW-6) were installed for the B&C site (Figure 2). Table 2 summarizes all site monitoring well constructions.

Site Groundwater Chemistry

Table 3 presents a summary of historical groundwater monitoring results at B&C Gas Mini Mart. The primary constituents of concern are total petroleum hydrocarbons as gasoline (TPH-G); the aromatic compounds benzene, toluene, ethylbenzene, and xylenes (collectively referred to as BTEX); and methyl tertiary-butyl ether (MTBE). Since 1994, concentrations of TPH-G in groundwater have generally decreased. In 1994, concentrations in groundwater ranged from 810 to 41,000 micrograms per liter (µg/l). By 1997, concentrations in groundwater ranged from non-detectable to 28,000 µg/l. Over the last four years of monitoring at the site, concentrations of benzene have steadily decreased in all site wells.

Analysis of site groundwater samples for MTBE began in June 1995. Since then, concentrations of MTBE have decreased significantly. Initial analysis for MTBE from site wells in June 1995 detected concentrations ranging from 4,200 µg/l in well MW-3 to 47,000 µg/l in well MW-6. By February 1997, site wells contained significantly lower concentrations of MTBE. Well MW-3 contained 900 µg/l and well MW-6 contained 790 µg/l.

GROUNDWATER SAMPLING AND ANALYSIS

Third quarter activities are reviewed below. Groundwater sampling methods and results are presented and a discussion of historical analytical trends for site monitoring wells is included.

Free Product

During the third quarter 1998 sampling event, EFW checked for free product in all site wells. Wells MW-2, MW-5, and MW-6 were reported to contain a product sheen at a barely measurable thickness of approximately 0.01 feet. Wells MW-2 and MW-6 were bailed until the product was no longer visible (less than one casing volume). Groundwater samples were not collected from these two wells. A groundwater sample was collected from well MW-5; the results are provided below.

Off-site well MW-01, located approximately 800 feet downgradient from the B&C site on the Mill Springs Park property (MSP), was also checked for product. MSP well MW-01 was reported to contain approximately 0.02 feet of product. The well was bailed

until the product was no longer visible (less than one casing volume). A groundwater sample was not collected from this well.

Groundwater Elevations

On July 30, 1998, EFW measured the depth to water and product thickness in all groundwater monitoring wells. These were measured to the nearest 0.01 foot using a float-activated product probe, according to EFW's standard measuring protocol (Appendix A) and were recorded on a water level data sheet (Appendix B). Groundwater elevations are calculated by subtracting depth-to-water measurements from the elevations of the top of well casings, for those wells that have been surveyed to mean sea level (MSL). Two wells, MW-5 and MW-6, have not been surveyed. (The surveying of these wells is included in the scope of work for the additional downgradient groundwater investigation that is scheduled to commence this fall.)

Table 1 summarizes available groundwater elevations from August 1990 to July 1998. A comparison of well screen elevations (Table 2) and third quarter water levels shows that the screens in wells MW-1 through MW-4 were submerged at the time of groundwater sampling. A groundwater contour map, based on July 1998 measurements, is shown in Figure 2. Groundwater flow at the site is slightly west of north. Based on third quarter measurements, the hydraulic gradient is approximately 0.02 foot per foot. The flow direction and gradient are in accordance with previous results and reflect the seasonal variation in flow direction that has been observed at the site.

Sampling Methods

EFW sampled monitoring wells (MW-1, MW-3, MW-4, and MW-5) on July 30, 1998, following EFW's standard protocol (Appendix A). Wells were purged using either a submersible pump or a polyvinyl chloride (PVC) bailer. Samples were collected from each well using disposable PVC bailers. Field measurements of temperature, pH, turbidity, and electrical conductivity were taken and recorded on water sample field data sheets (Appendix B). All purge water was contained in 55-gallon drums and will be properly disposed of consistent with analytical results. All samples were properly stored on the day of sampling. Chain-of-custody documentation accompanied the samples through collection and delivery to the analytical laboratory.

Analytical Program

All groundwater analyses were performed by Clayton Laboratory Services (Clayton) of Pleasanton, a state-certified laboratory. All groundwater samples were analyzed for TPH-G by Modified U.S. Environmental Protection Agency (USEPA) Method 8015 and BTEX by USEPA Method 8020. MTBE was analyzed for by USEPA Method 8020; however, the associated calibration standard showed low recovery for MTBE. The MTBE results were then confirmed by GC/MS analysis, but this occurred past the recommended hold time. The results reported here are from the GC/MS confirmation

run. All other laboratory analyses occurred within specified holding times and within laboratory quality control standards. The certified analytical report is located in Appendix B.

Analytical Results

Table 3 presents a historical summary of groundwater analytical results from the B&C site. Third quarter 1998 analytical results for TPH-G, benzene, and MTBE are also presented on Figure 3.

Upgradient Well

Well MW-4 did not contain detectable concentrations of TPH-G or MTBE. Insignificant concentrations of some aromatic compounds were detected (0.60 and 0.80 µg/l toluene and xylenes, respectively). Since June 1995, concentrations have been very low to non-detectable in this well.

Source Area Wells

TPH-G was detected at 1,400 µg/l in well MW-1. BTEX concentrations ranged from 26 to 243 µg/l. MTBE was detected at a concentration of 5 µg/l. Hydrocarbon concentrations in well MW-1 generally have decreased over the last eight years of monitoring.

In well MW-3, TPH-G was detected at a concentration of 25,000 µg/l. Benzene was detected at 330 µg/l and the other aromatic compounds ranged from 490 to 1,860 µg/l. MTBE was detected at a concentration of 300 µg/l, the lowest result to date. No trends are apparent for the other compounds.

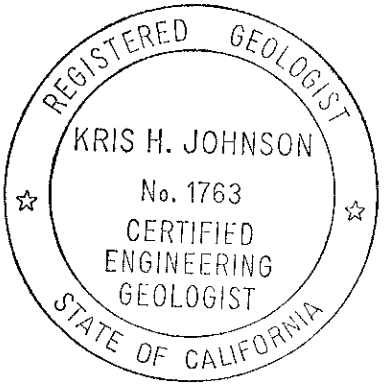
Downgradient Wells

Well MW-5, located 75 feet downgradient of the site, contained a petroleum product sheen, approximately 0.01 feet thick. One-half of a casing volume (5 gallons) was removed from the well, and product sheen was still visible. A groundwater sample was collected from the upper portion of the water column in the well. TPH-G was detected at a concentration of 47,000 µg/l. BTEX compounds ranged from 1,400 to 8,500 µg/l. MTBE was detected at a concentration of 600 µg/l. These third quarter 1998 results are lower than the results from October 1995, when the well was sampled for the first time.

FUTURE MONITORING

Fourth quarter 1998 groundwater monitoring is currently scheduled for November. EFW will measure depth to water in all site wells. All wells without a measurable thickness of product will be sampled for TPH-G, BTEX, and MTBE. Fourth quarter monitoring results will be reported to ACEHS.

If you have any questions regarding this report, please call us at (650) 843-3828.



Sincerely,
Einarson, Fowler & Watson

Kris H. Johnson
Senior Engineering Geologist
C.E.G. 1763

Martha J. Watson
Principal Environmental Engineer

Attachments:

Tables

Table 1 - Summary of Groundwater Elevations
Table 2 - Monitoring Well Constructions
Table 3 - Historical Groundwater Analytical Results

Figures

Figure 1 - Site Location
Figure 2 - Groundwater Elevation Contours (July 1998)
Figure 3 - Petroleum Hydrocarbons in Groundwater (July 1998)

Appendices

Appendix A - Groundwater Sampling and Laboratory Procedures
Appendix B - Water Sample Field Data Sheets and Certified Analytical Reports

cc: Eva Chu, ACEHS
Regional Water Quality Control Board, USTCF

Table 1
Summary of Groundwater Elevations
B & C Gas Mini Mart
Livermore, California

Well No.	Top-of-Casing Elevation (feet, MSL)	Date Measured	Depth to Water (feet)	Groundwater Elevation (feet, MSL)	Depth to Free product (feet)	Product Thickness (feet)
MW-1	487.00	09/22/88	60.50	426.50		
		08/02/90	43.10	443.90		
		10/10/91	66.39	420.61		
		01/08/92	68.72	418.28		
		05/11/93	34.76	452.24		
		09/21/93	38.70	448.30		
		05/22/94	33.57	453.43		
	484.07	06/19/94	37.51	446.56		
		08/25/94	43.27	440.80		
		11/22/94	40.58	443.49		
		03/13/95	28.06	456.01		
		06/01/95	21.76	462.31		
		02/29/96	18.86	465.21		
		Feb-97	NM	NM		
		07/30/98	25.90	458.17		
MW-2	483.86	06/19/94	38.15	445.71		
		08/25/94	44.13	-	43.47	0.66
		11/22/94	40.96	-	40.92	0.04
		03/09/95	29.28	-	28.47	0.81
		03/13/95	28.71	-	28.29	0.42
		06/01/95	22.61	461.25		
		02/29/96	20.05	463.81		
		Feb-97	18.30	465.56		
		07/30/98	25.75	-	25.74	0.01
MW-3	484.24	06/19/94	37.15	447.09		
		08/25/94	42.31	441.93		
		11/22/94	40.07	444.17		
		03/13/95	27.94	456.30		
		06/01/95	21.31	462.93		
		02/29/96	18.78	465.46		
		Feb-97	16.97	467.27		
		07/30/98	24.88	459.36		
MW-4	485.04	06/19/94	37.49	447.55		
		08/25/94	42.25	442.79		
		11/22/94	40.59	444.45		
		03/13/95	28.00	457.04		
		06/01/95	21.51	463.53		
		02/29/96	18.42	466.62		
		Feb-97	17.47	467.57		
		07/30/98	25.47	459.57		
MW-5	NS	02/29/96	19.35			
		Feb-97	18.19			
		07/30/98	25.25		25.24	0.01
MW-6	NS	02/29/96	20.32			
		Feb-97	18.92			
		07/30/98	25.59		25.58	0.01

Notes:
Data prior to 1998 from RSI quarterly reports.
NM - not measured
NS - not surveyed

February 1997 date unknown.

Table 2
Monitoring Well Constructions
B&C Gas Mini Mart
Livermore, California

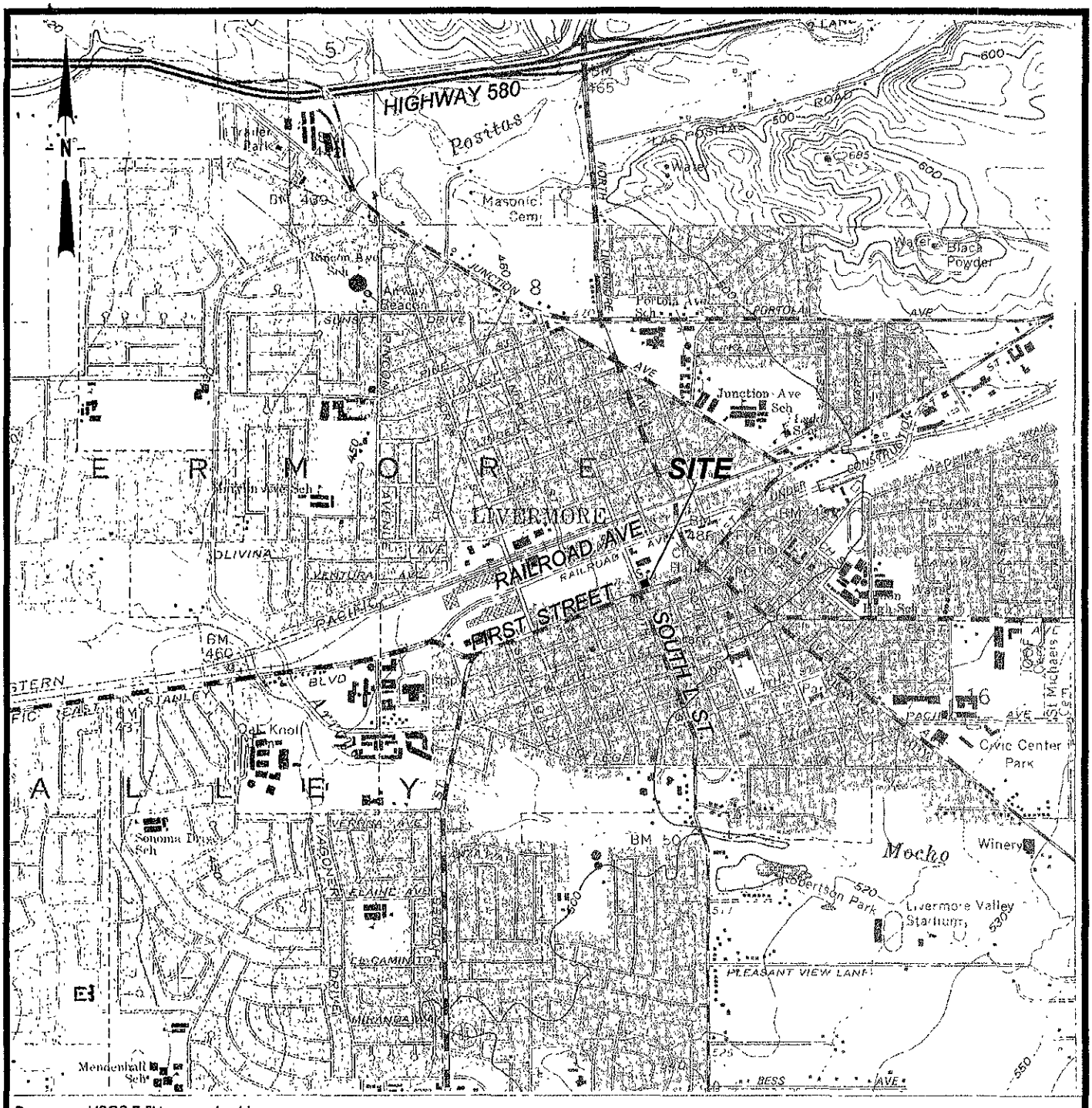
Well No.	Drilling Method	Date Installed	T.D. Boring (ft.-bgs)	T.D. Well (ft.-bgs)	Borehole Diameter (in.)	Casing Material (PVC)	Casing Diameter (in.)	Screen Size (in.)	Sand Pack Material	Screened Interval (ft.-bgs)	Sand Pack Interval (ft.-bgs)
MW-1	HSA	Sep-88	77.0	77.0	8	PVC	2	0.020	#3 sand	27 - 77	25 - 77
MW-2	HSA	Jun-94	60.0	60.0	10	PVC	4	0.020	#2/20 sand	30 - 60	27 - 60
MW-3	HSA	Jun-94	60.0	60.0	10	PVC	4	0.020	#2/20 sand	30 - 60	27 - 60
MW-4	HSA	Jun-94	60.0	60.0	10	PVC	4	0.020	#2/20 sand	30 - 60	27 - 60
MW-5	HSA	Oct-95	42.0	40.0	10	PVC	4	0.020	#2 sand	15 - 40	12 - 40
MW-6	HSA	Oct-95	42.0	40.0	10	PVC	4	0.020	#2 sand	15 - 40	12 - 40

HSA Hollow-Stem Auger
T.D. Total Depth
ft.-bgs feet below ground surface
Well construction information for wells MW-2 through MW-6 collected from Remediation Service Int'l boring logs.

Table 3
Historical Groundwater Analytical Results
B&C Gas Mini Mart
Livermore, California

Well No.	Sample Date	TPH-G (ug/l)	Benzene (ug/l)	Toluene (ug/l)	Ethylbenzene (ug/l)	Xylenes (ug/l)	MTBE (ug/l)
MW-1	Aug-90	24,000	1,300	1,300	400	2,700	NA
	Oct-91	2,000	430	170	100	290	NA
	Jan-92	1,000	200	120	30	150	NA
	May-93	960	66	8	41	90	NA
	Sep-93	1,900	311	118	34	112	NA
	May-94	10,000	690	1,100	340	1,200	NA
	Aug-94	13,000	290	690	120	670	NA
	Nov-94	19,000	400	770	230	130	NA
	Mar-95	6,000	900	100	980	740	NA
	Jun-95	2,400	210	380	53	280	13,000
	Sep-95	7,800	69	1,300	220	1,200	2,000
	Feb-96	120	4.2	1.4	4.7	5.6	14
	Feb-97	NS*	NS*	NS*	NS*	NS*	NS*
	Jul-98	1,400	26	110	57	243	5
MW-2	Jun-94	290,000	18,000	36,000	4,600	26,000	NA
	Aug-94	NS**	NS**	NS**	NS**	NS**	NA
	Nov-94	NS**	NS**	NS**	NS**	NS**	NA
	Mar-95	NS**	NS**	NS**	NS**	NS**	NA
	Jun-95	25,000	2,300	3,400	720	3,100	16,000
	Sep-95	NS**	NS**	NS**	NS**	NS**	NS**
	Feb-96	57,000	2,500	650	3,700	3,100	6,500
	Feb-97	20,000	860	1,500	480	1,000	1,300
	Jul-98	NS**	NS**	NS**	NS**	NS**	NS**
MW-3	Jun-94	11,000	640	580	270	790	NA
	Aug-94	41,000	1,600	2,300	330	1,800	NA
	Nov-94	18,000	8,000	10,000	900	5,000	NA
	Mar-95	44,000	1,600	1,300	5,000	6,600	NA
	Jun-95	15,000	600	1,900	490	2,600	4,200
	Sep-95	8,000	710	1,100	180	870	2,700
	Feb-96	13,000	260	200	200	1,100	1,500
	Feb-97	11,000	260	550	170	600	900
	Jul-98	25,000	330	1,200	490	1,860	300
MW-4	Jun-94	810	12	25	<0.5	22	NA
	Aug-94	850	37	51	9.5	35	NA
	Nov-94	1,700	110	110	5.8	58	NA
	Mar-95	1,300	180	8	52	77	NA
	Jun-95	ND	3	1	ND	1	ND
	Sep-95	<50	0.69	<0.5	<0.5	<0.5	<2.5
	Feb-96	87	<0.5	<0.5	<0.5	<0.5	<0.5
	Feb-97	<50	<0.5	<0.5	<0.5	<0.5	2.9
	Jul-98	<50	<0.4	0.60	<0.3	0.80	<5
MW-5	Oct-95	120,000	16,000	26,000	3,100	15,000	39,000
	Feb-96	47,000	3,400	4,200	860	4,100	20,000
	Feb-97	28,000	1,300	1,500	480	1,000	2,200
	Jul-98	47,000	1,400	4,000	2,000	8,500	600
MW-6	Oct-95	110,000	9,900	22,000	3,200	17,000	47,000
	Feb-96	23,000	2,000	460	2,900	2,600	6,300
	Feb-97	12,000	450	780	200	590	790
	Jul-98	NS**	NS**	NS**	NS**	NS**	NS**

ug/l = micrograms per liter
TPH-G = Total Petroleum Hydrocarbons as Gasoline
MTBE = methyl tertiary-butyl ether
NA= not analyzed
NS= not sampled * = well inaccessible ** = floating hydrocarbon present
ND = not detected above reporting limit, limit not available



Base map: USGS 7.5' topography, Livermore, California (1961; photorevised 1980)

SCALE: 0 2,000 4,000 FEET

I/BNC/103/FIGURES/SITELOC.DSF 9/4/98

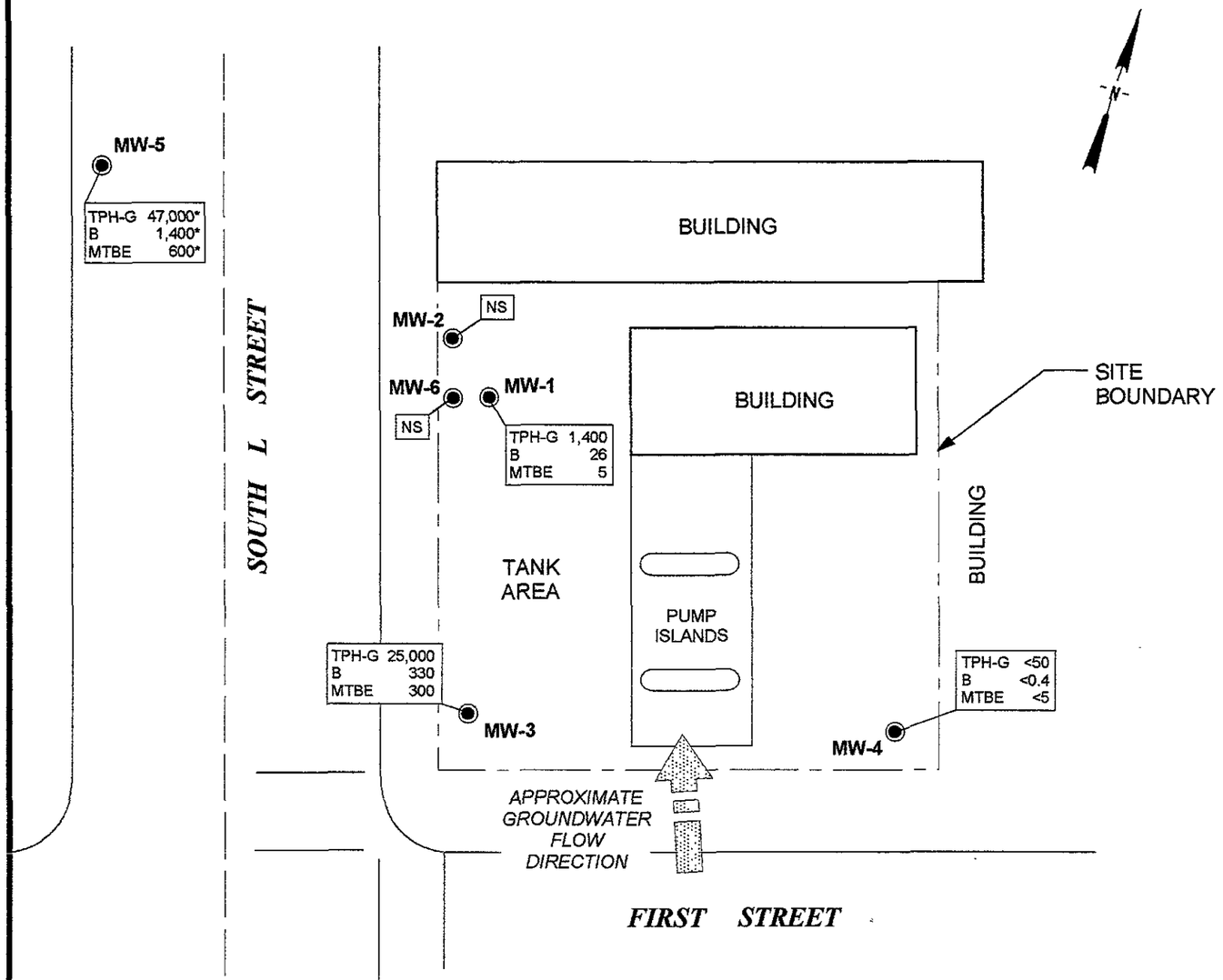
EINARSON FOWLER & WATSON

GROUNDWATER MONITORING
B & C GAS MINI MART
LIVERMORE, CALIFORINA

SITE LOCATION MAP

FIGURE 1

PROJECT NO. BNC103



EXPLANATION

MW-6 ◉ Groundwater monitoring well

TPH-G <50
B <0.4
MTBE <5

Concentration detected
Analytical parameter

All concentrations are reported in micrograms per liter (µg/l); sampling occurred 7/30/98.

* Groundwater sampled after bailing free product from well

ABBREVIATIONS:

TPH-G	Total Petroleum Hydrocarbons Gasoline range
B	Benzene
MTBE	Methyl tertiary-butyl ether
NS	Not sampled, free product present

Base map from Remediation Service, International, First Quarter 1997 Report of Groundwater Sampling and Monitoring

I:\BNC\103\FIGURES\BASE-CHEM DSF 9/9/98

EINARSON FOWLER & WATSON

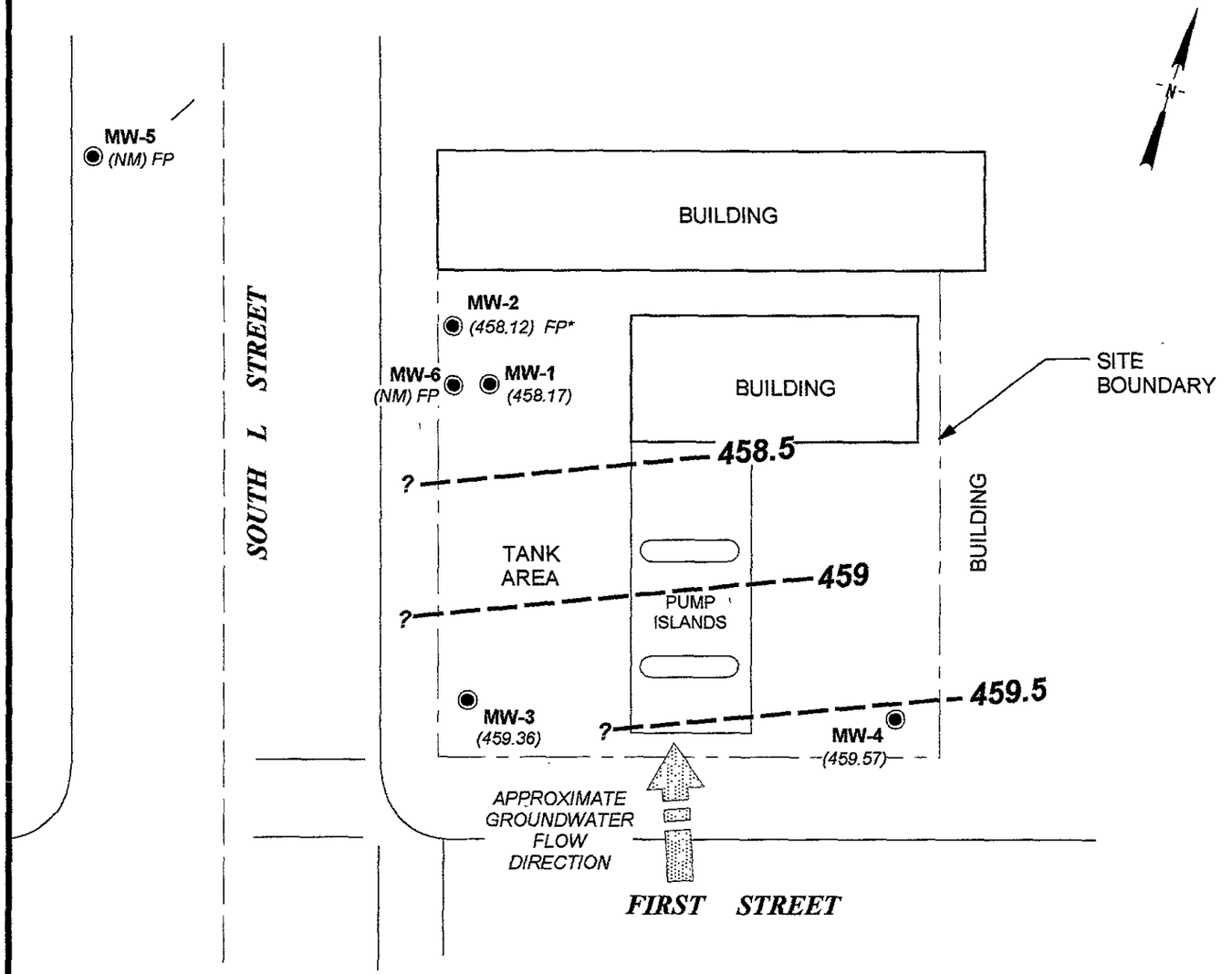
SCALE: 0 25 50 75 FEET
(APPROXIMATE - NOT SURVEYED)

GROUNDWATER MONITORING
B & C GAS MINI MART
LIVERMORE, CALIFORNIA

PETROLEUM HYDROCARBONS IN GROUNDWATER (JULY 1998)

FIGURE 3

PROJECT NO BNC103



EXPLANATION

MW-6 ◉	Groundwater monitoring well
(459.57)	Groundwater elevation (Ft.-MSL), measured 7/30/98
459.5	Groundwater elevation contour (feet, MSL)
FP	Free product; elevation of product surface shown.
*	Not used to contour groundwater elevations
(NM)	Not measured, top of well casing not surveyed

Base map from Remediation Service International First Quarter 1997 Report of Groundwater Sampling and Monitoring

I:\BNC\103\FIGURES\BASE-GW.DSF 9/9/98

EINARSON FOWLER & WATSON

SCALE 0 25 50 75 FEET

(APPROXIMATE - NOT SURVEYED)

GROUNDWATER MONITORING
B & C GAS MINI MART
LIVERMORE, CALIFORNIA

GROUNDWATER ELEVATION CONTOURS (JULY 1998)

FIGURE 2

PROJECT NO BNC103

APPENDIX A

GROUNDWATER SAMPLING
AND LABORATORY PROCEDURES

GROUNDWATER SAMPLING PROCEDURES

The methods and procedures used by Einarson, Fowler & Watson (EFW) for groundwater sampling are described below. These procedures for groundwater sampling are designed to provide consistent and reproducible results and ensure that the overall objectives of the monitoring program are achieved.

The following documents have been used as guidelines for the development of these procedures:

- *Leaking Underground Fuel Tank Field Manual*, State of California Leaking Underground Fuel Tank Task Force, 1989
- *Procedures Manual for Groundwater Monitoring at Solid Waste Disposal Facilities* (EPA-530/SW-611, August 1977)
- *RCRA Groundwater Monitoring Technical Enforcement Guidance Document* (OSWER 9950.1, September 1986)
- *Standard Guide for Sampling Groundwater Monitoring Wells*, (ASTM, D 4448-85a)
- *Standard Practice for Decontamination of Field Equipment Used at Nonradioactive Waste Sites*, (ASTM, D 5088-90)
- *Standard Test Method for Determining Subsurface Liquid Levels in a Borehole or Monitoring Well (Observation Well)*, (ASTM, D 4750-87)
- *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods* (EPA SW-846, 3rd edition, November 1986)

GROUNDWATER ELEVATION, FREE PRODUCT, AND TOTAL DEPTH SURVEY

Prior to the sampling event, the static water level is measured in appropriate monitoring wells and piezometers. The monitoring wells are purged and sampled for chemical constituents after measuring water levels.

The water level in the wells and piezometers is measured with an electric sounder with cable markings stamped at 0.01-foot increments. The water level is measured by lowering the sensor into the monitoring well. A low current circuit is completed when the sensor contacts the water, which serves as an electrolyte. The current is amplified which activates an indicator light and audible buzzer, thus signaling when water has been contacted. A sensitivity control compensates for very saline or conductive water. The electric sounder is decontaminated by rinsing with a detergent solution then distilled water after each use. Depth to water is recorded to the nearest 0.01 foot on a water

sample field data sheet (field data sheet). The groundwater elevation at the monitoring well is calculated by subtracting the measured depth to water from the surveyed elevation of the top of the well casing.

The level and thickness of free hydrocarbon product in a well is measured with either an interface meter or using a clear bailer. The interface meter works on a principal similar to the electric sounder, measuring both conductive and non-conductive liquid within the well. Free product can also be measured using a clear, bottom-filling bailer. The bailer is lowered slowly into the well until the bailer is approximately half submerged. The bailer is then retrieved from the well and the thickness of the free product in the bailer is measured. The thickness of free product is recorded to the nearest 0.01 foot on the field data sheet.

Well total depth is measured in monitoring wells scheduled for sampling by lowering a probe to the bottom of the well and measuring the depth. Well total depth, used to calculate purge volumes and to determine whether the well screen is partially obstructed by silt, is typically recorded to the nearest 0.1 foot on the field data sheet.

SAMPLE COLLECTION

Sample collection procedures include equipment cleaning, well purging, and sampling.

Equipment Cleaning

Before the sampling event, all equipment that is placed in the well or comes in contact with groundwater is disassembled and cleaned thoroughly with detergent water, and then steam cleaned or rinsed with distilled water. Any parts that may absorb contaminants, such as plastic pump valves, bladders, etc., are cleaned or replaced.

For submersible pumps used for purging wells, all external pump surfaces and the discharge tube are steam cleaned prior to lowering the pump into the well casing. An aqueous solution of Liquinox (phosphate-free detergent), followed by distilled water, is then run through the pump and discharge tubing to clean the internal surfaces of the pump and discharge tubing. Water is prevented from draining though the pump by an in-line check valve located immediately above the pump.

Well Purging

Before sampling, standing water in the casing and sand pack is purged from the monitoring well using either a positive displacement PVC hand pump, a submersible pump, or a stainless steel bailer. The amount of water purged before sampling is greater than or equal to three casing volumes. Field measurements for pH, specific conductance, temperature, and turbidity are recorded during purging on field data sheets.

Well Sampling

Groundwater samples are collected using a Teflon bailer or an individually sealed PVC disposable bailer. Wells are sampled in progression from "clean wells" to wells yielding poorer-quality water. The purpose of this procedure is to reduce the potential for cross contamination of wells by purging or sampling equipment.

Clean glass bottles of at least 40 milliliters volume fitted with Teflon-lined septa are used to collect samples for volatile organic analyses. These bottles are completely filled to prevent air from remaining in the bottle. A positive meniscus forms when the bottle is completely full. A convex Teflon septum is placed over the positive meniscus to eliminate air. After capping, the bottles are inverted and tapped to verify that they do not contain air bubbles. The sample containers for other parameters are filled, filtered as required, and capped.

To determine dissolved concentrations of metals, appropriate field filtration techniques are used. The samples are filtered by applying pressure to the bailer with a hand pump fitted to the top of the bailer. A disposable 0.45-micron acrylic copolymer filter is threaded onto the bottom of the bailer at the discharge point and the filtrate is directed into the appropriate containers. Each filter is used once and discarded.

SAMPLE PRESERVATION AND HANDLING

The following section specifies sample containers, preservation methods, and sample handling procedures.

Sample Containers and Preservation

Sample containers and preservatives vary with each type of analytical parameter. Container types and materials are selected to be nonreactive with the particular analytical parameter tested. Sample preservatives used are consistent with regulatory guidelines and specified analytical methods.

Sample Handling

All sample containers are labeled immediately following collection. Samples are kept cool with blue ice until received by the laboratory. At the time of sampling, each sample is logged on a chain-of-custody record which accompanies the samples to the laboratory. Water samples are transported from the site by the sampler.

Upon receipt of the samples by laboratory personnel, the chain-of-custody record is signed and released, and a unique sample identification number is assigned to each sample container. This number is recorded on the chain-of-custody record and is used to identify the sample in all subsequent internal chain-of-custody and analytical records.

The subcontracted laboratory's manager ensures that the holding times for requested analyses are not exceeded.

SAMPLE DOCUMENTATION

The following procedures are used during sampling and analysis to provide chain-of-custody control during sample handling from collection through storage. Sample documentation includes the use of the following:

- Water sample field data sheets to document sampling activities in the field
- Labels to identify individual samples
- Chain-of-custody record sheets for documenting possession and transfer of samples

Water Sample Field Data Sheets

In the field, the sampler records the following information on a water sample field data sheet:

- Location
- Project number
- Client name
- Sample ID
- Name of sampler
- Regulatory agency
- Date and time
- Pertinent well data (e.g., casing diameter, depth to water, well depth)
- Calculated and actual purge volumes
- Purging equipment used
- Sampling equipment used
- Appearance of sample (e.g., color, turbidity, sediment)
- Results of field analyses (temperature, pH, specific conductance)
- Purge water containment
- General remarks, including well accessibility and integrity

The field data sheets are signed by the sampler.

Labels

Sample labels contain the following information:

- Project number
- Sample ID (i.e., well designation)
- Sampler's initials
- Date and time of collection
- Type of preservative used

Sampling and Analysis Chain-of-Custody Record

The sampling and analysis chain-of-custody record, initiated at the time of sampling, contains, but is not limited to, the well number, sample type, analytical request, date of sampling, and the name of the sampler. The record sheet is signed and dated by the sampler when transferring the samples. Custody transfers are recorded for each individual sample. The number of custodians in the chain of possession is kept to a minimum. A copy of the sampling and analysis chain-of-custody record is returned to EFW for inclusion with analytical results.

FIELD QUALITY ASSURANCE PROCEDURES

Field quality assurance procedures are included in each monitoring event. Field quality assurance typically includes documenting field instrument calibration, and collecting and analyzing trip blanks, field blanks, equipment blanks, and duplicate samples.

Trip, field, and equipment blanks, prepared with organic-free water, are used during the sampling events to detect contamination introduced through sampling procedures, external field conditions, sample transportation, container preparation, sample storage, and the analytical process.

Trip blanks are prepared at the same time and location as the sample containers for a particular sampling event. Trip blanks accompany the containers to and from that event, but at no time are they opened or exposed to the atmosphere. Typically, one trip blank for volatile organic parameters will be included per sampling event.

Field blanks are prepared in the field so they are exposed to the ambient atmosphere at a specified monitoring point during sample collection to determine the influence of the external field conditions on sample integrity. Equipment blanks are prepared in the field to ensure that sampling equipment does not cross-contaminate water samples. Organic-free water is run through the Teflon bailer (or appropriate sampling equipment) after proper cleaning, before use at another monitoring well. One field blank or equipment blank for volatile organic parameters will typically be included per sampling event.

Duplicate samples can be collected to assess sampling and analytical precision. For each sampling event including more than six wells, duplicate monitoring well samples will typically be collected at a frequency of 10 percent. Where possible, field duplicates are collected at sampling points known or suspected to contain chemical constituents of interest. Duplicates are packed and shipped to the laboratory for analysis with the samples from that particular event.

LABORATORY PROCEDURES

EFW specifies analytical methods and procedures to ensure that proper analytical methods are applied; analytical results are accurate, precise, and complete; and the overall objectives of the monitoring program are achieved.

Samples are analyzed in accordance with accepted analytical procedures by laboratories certified by the California Department of Toxic Substances Control (DTSC). The following publications are the primary references for analytical procedures:

- *Leaking Underground Fuel Tank Field Manual*, State of California Leaking Underground Fuel Tank Task Force, revised 1989
- *Methods for Chemical Analysis of Water and Wastes*, (EPA 600/4-79-020, Revised March 1983)
- *Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater* (EPA-600/4-82-057, July 1982)
- *Standard Methods for the Examination of Water and Wastewater*, APHA, AWWA, WPCF, 17th edition, 1989
- *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods* (EPA SW-846, 3rd edition, November 1986)

LABORATORY QUALITY ASSURANCE PROCEDURES

Laboratory quality assurance (QA) procedures include those required under the DTSC hazardous waste testing program. Laboratory-specific procedures are included in the laboratory's QA manual, including the use of method blanks, surrogate spikes, matrix spikes and matrix spike duplicates.

Method blanks are analyzed daily to assess the effect of the laboratory environment on the analytical results. Method blanks are performed for each parameter analyzed.

Each sample analyzed for organic parameters contained surrogate spike compounds. The surrogate recovery is used to determine if the analytical instruments are operating within limits. Surrogate recoveries are compared to control limits established and updated by the laboratory based on its historical operation.

Matrix spikes are analyzed at a frequency of approximately 10 percent. Matrix spike results are evaluated to determine whether the sample matrix is interfering with the laboratory analysis and provide a measure of the accuracy of the analytical data. Matrix spike recoveries are compared to control limits established and updated by the laboratory based on its historical operation.

Matrix spike duplicates are analyzed at a frequency of approximately 10 percent. Spike duplicate results are evaluated to determine the reproducibility (precision) of the analytical method. Reproducibility values are compared to control limits established and updated by the laboratory based on its historical operation.

Laboratory quality control (QC) data are included with the analytical results. This QC data includes method blanks, surrogate spike recoveries (for organic parameters only), matrix spike recoveries, and matrix spike duplicates.

APPENDIX B

WATER SAMPLE FIELD DATA SHEETS
AND CERTIFIED ANALYTICAL REPORT

WATER LEVEL DATA SHEET
EINARSON, FOWLER & WATSON

Project: B&C Gas Mini Mart
Project No.: BNC103
Date(s): 7/30/98
Name: Rauk
Weather: partly cloudy Sounder #: KECK

Well	Date	DTFP (TOC)	DTW (TOC)	Total Depth	Meas. By	Comments
MW-1	7/30/98	—	25.90	76.0	MM	replaced lock, 2" LWC
MW-2	↓	25.74	25.75	NM	↓	replaced lock
MW-3		—	24.88	57.8		9"w", replaced lock
MW-4		~~25.47~~ —	25.47	59.9		replaced lock
MW-5		25.24	25.25	NM		15"w", ~~replaced lock~~ MM
MW-6		25.58	25.59	NM		replaced lock, 4" LWC
MS MW01	↓	30.35	30.37	NM	↓	9"w"
						MW-2,3,4,5,6: 1" ϕ PVC
						present in wells.

EINARSON FOWLER & WATSON

WATER SAMPLE FIELD DATA

LOCATION: B&C Gas Mini Mart — SAMPLE ID: MW-1
PROJECT NO: BNC103 — SAMPLED BY: RPark
CLIENT: B&C Gas Mini Mart — REGULATORY AGENCY: ACEHS
SAMPLE TYPE: Groundwater ✓ Surface Water ____ Leachate ____ Treatment Effluent ____ Other ____

CASING DIAMETER (OD-inches):	3/4	1	2 ✓	4	4.5	6	8
GALLONS PER LINEAR FOOT :	(0.02)	(0.04)	(0.17)	(0.66)	(0.83)	(1.5)	(2.6)

Well Total Depth (ft): 76.0 — Volume in Casing (gal): 0.6
Depth to Water (ft): 25.90 — Calculated Purge (volumes / gal.): 25.6
Height of Water Column (ft): 50.10 — Actual Pre-Sampling Purge (gal): 26.0

PURGE:
Device (Depth of Intake from TOC): Submersible Pump 2" (75') ✓ Peristaltic Pump ____ PVC Hand Pump ____
S.S. Bailer ____ Teflon Bailer ____ PVC Bailer ~~✓~~ Disposable Bailer ____ Other ____
Purge Water Containment: drummed
Field QC Samples Collected at this Well (Equipment or Field Blank): EB-___ FB-___ Other ____

Time (2400 Hr)	Volume (gallons)	Temp. (°C)	Specific Conductance Horiba (µmhos/cm)	Specific Conductance QuickCheck (µS)	pH (std. units)	Color (visual)	Turbidity (visual)	Observation
1343	9.0	22.0	1060		7.25	brown	high	
1347	17.5	21.3	1070		7.26	↓	↓	
1351	26.0	21.0	1070		7.26	lt brown	moderate	

Purge Date: 7/30/98

SAMPLE:
Device (Depth of Intake from TOC): Submersible Pump ____ Peristaltic Pump ____ PVC Hand Pump ____
Teflon Bailer ____ PVC Bailer ____ Disposable Bailer ✓ Other ____

Time (2400 Hr)	Temp. (°C)	Specific Conductance Horiba (µmhos/cm)	Specific Conductance QuickCheck (µS)	pH (std. units)	Dissolved Oxygen (mg/l)	Color (visual)	Turbidity (NTU)
1357	21.3	1050		7.28	2.69	brown	7999

Sheen: present — Odor: moderate/strong — Sample Date: 7/30/98

Field Measurement Devices: Horiba ✓ Omega ____ QuickCheck ____ D.O. Test Kit ____

REMARKS: well bent at ~7'. 5'x1.00" PVC bailer will not go past bend.

SIGNATURE: _____ **DATE:** 7/30/98

EINARSON FOWLER & WATSON

WATER SAMPLE FIELD DATA

LOCATION: B&C Gas Mini Mart
SAMPLE ID: MW-2
PROJECT NO: BNC103
SAMPLED BY: RPunk
CLIENT: B&C Gas Mini Mart
REGULATORY AGENCY: ACEH

SAMPLE TYPE: Groundwater X Surface Water ____ Leachate ____ Treatment Effluent ____ Other ____

CASING DIAMETER (OD-inches):	3/4	1	2	4	4.5	6	8
GALLONS PER LINEAR FOOT :	(0.02)	(0.04)	(0.17)	(0.66)	(0.83)	(1.5)	(2.6)

~~Well~~ Total Depth (ft): 25.74 DTPP
Depth to Water (ft): 25.75
Height of ~~Water~~ Product Column (ft): 0.01

Volume in Casing (gal): ____
Calculated Purge (volumes / gal.): ____
Actual Pre-Sampling Purge (gal): ____

PURGE:

Device (Depth of Intake from TOC): Submersible Pump ____ Peristaltic Pump ____ PVC Hand Pump ____
S.S. Bailer ____ Teflon Bailer ____ PVC Bailer ____ Disposable Bailer ____ Other ____
Purge Water Containment: ____
Field QC Samples Collected at this Well (Equipment or Field Blank): EB-___ FB-___ Other ____

Time (2400 Hr)	Volume (gallons)	Temp. (°C)	Specific Conductance Horiba (µmhos/cm)	Specific Conductance QuickCheck (µS)	pH (std. units)	Color (visual)	Turbidity (visual)	Observation

Purge Date: ____

SAMPLE:

Device (Depth of Intake from TOC): Submersible Pump ____ Peristaltic Pump ____ PVC Hand Pump ____
Teflon Bailer ____ PVC Bailer ____ Disposable Bailer ____ Other ____

Time (2400 Hr)	Temp. (°C)	Specific Conductance Horiba (µmhos/cm)	Specific Conductance QuickCheck (µS)	pH (std. units)	Dissolved Oxygen (mg/l)	Color (visual)	Turbidity (NTU)

Sheen: ____ Odor: ____ Sample Date: ____

Field Measurement Devices: Horiba ____ Omega ____ QuickCheck ____ D.O. Test Kit ____

REMARKS: Floating product present, no samples collected. Bailed ~0.75 gallons total fluids from top of water column until product no longer visible in disp. bailer: product lt. yellow.

SIGNATURE: ____ **DATE:** 7/30/98

EINARSON FOWLER & WATSON

WATER SAMPLE FIELD DATA

LOCATION: B&C Gas Mini Mart
SAMPLE ID: MW-3
PROJECT NO: BNC 103
SAMPLED BY: RPark
CLIENT: B&C Gas Mini Mart
REGULATORY AGENCY: ACEHS
SAMPLE TYPE: Groundwater ✓ Surface Water ____ Leachate ____ Treatment Effluent ____ Other ____

CASING DIAMETER (OD-inches):	3/4	1	2	4 ✓	4.5	6	8
GALLONS PER LINEAR FOOT :	(0.02)	(0.04)	(0.17)	(0.66)	(0.83)	(1.5)	(2.6)

Well Total Depth (ft): 57.0
Depth to Water (ft): 24.08
Height of Water Column (ft): 32.92
Volume in Casing (gal): 21.8
Calculated Purge (volumes / gal.): 65.2
Actual Pre-Sampling Purge (gal): 66.0

PURGE:
Device (Depth of Intake from TOC): Submersible Pump 2" (57') Peristaltic Pump ____ PVC Hand Pump ____
S.S. Bailer ____ Teflon Bailer ____ PVC Bailer ____ Disposable Bailer ____ Other ____
Purge Water Containment: drummed
Field QC Samples Collected at this Well (Equipment or Field Blank): EB-___ FB-___ Other ____

Time (2400 Hr)	Volume (gallons)	Temp. (°C)	Specific Conductance Horiba (µmhos/cm)	Specific Conductance QuickCheck (µS)	pH (std. units)	Color (visual)	Turbidity (visual)	Observation
1455	22.0	21.9	1000		7.18	lt brown	high	
1502	44.0	21.2	1030		7.16	↓	moderate	
1509	66.0	21.1	1030		7.14	↓	↓	

Purge Date: 7/30/98

SAMPLE:
Device (Depth of Intake from TOC): Submersible Pump ____ Peristaltic Pump ____ PVC Hand Pump ____
Teflon Bailer ____ PVC Bailer ____ Disposable Bailer ✓ Other ____

Time (2400 Hr)	Temp. (°C)	Specific Conductance Horiba (µmhos/cm)	Specific Conductance QuickCheck (µS)	pH (std. units)	Dissolved Oxygen (mg/l)	Color (visual)	Turbidity (NTU)
1515	21.1	1040	✓	7.14	1.97	lt. brown	227

Sheen: None Odor: Strong Sample Date: 7/30/98

Field Measurement Devices: Horiba ✓ Omega ____ QuickCheck ____ D.O. Test Kit ____

REMARKS: ____

SIGNATURE: ____ **DATE:** 7/30/98

EINARSON FOWLER & WATSON

WATER SAMPLE FIELD DATA

LOCATION: B&C Gas Mini Mart SAMPLE ID: MW-4
PROJECT NO: BNC103 SAMPLED BY: RPunc
CLIENT: B&C Gas Mini Mart REGULATORY AGENCY: ACEHS
SAMPLE TYPE: Groundwater ℓ Surface Water ____ Leachate ____ Treatment Effluent ____ Other ____

CASING DIAMETER (OD-inches):	3/4	1	2	4	4.5	6	8
GALLONS PER LINEAR FOOT :	(0.02)	(0.04)	(0.17)	(0.66)	(0.83)	(1.5)	(2.6)

Well Total Depth (ft): ~~59.9~~ 59.9 Volume in Casing (gal): 22.8
Depth to Water (ft): 25.47 Calculated Purge (volumes / gal.): 68.2
Height of Water Column (ft): 34.43 Actual Pre-Sampling Purge (gal): 69.0

PURGE:
Device (Depth of Intake from TOC): Submersible Pump 2" (59') ____ Peristaltic Pump ____ PVC Hand Pump ____
S.S. Bailer ____ Teflon Bailer ____ PVC Bailer ____ Disposable Bailer ____ Other ____
Purge Water Containment: drummed
Field QC Samples Collected at this Well (Equipment or Field Blank): EB-___ FB-___ Other ____

Time (2400 Hr)	Volume (gallons)	Temp. (°C)	Specific Conductance Horiba (µmhos/cm)	Specific Conductance QuickCheck (µS)	pH (std. units)	Color (visual)	Turbidity (visual)	Observation
1236	23.0	20.7	1040		7.14	lt. brown	moderate	
1243	46.0	20.5	1060	/	7.15	lt. brown tint	low	
1251	69.0	20.5	1060	/	7.18	colorless	trace	

Purge Date: 7/30/98

SAMPLE:
Device (Depth of Intake from TOC): Submersible Pump ____ Peristaltic Pump ____ PVC Hand Pump ____
Teflon Bailer ____ PVC Bailer ____ Disposable Bailer ℓ Other ____

Time (2400 Hr)	Temp. (°C)	Specific Conductance Horiba (µmhos/cm)	Specific Conductance QuickCheck (µS)	pH (std. units)	Dissolved Oxygen (mg/l)	Color (visual)	Turbidity (NTU)
1257	20.4	1070	/	7.17	4.79	colorless	27

Sheen: none Odor: none Sample Date: 7/30/98

Field Measurement Devices: Horiba ℓ Omega ____ QuickCheck ____ D.O. Test Kit ____

REMARKS: ____

Calibrated meter 1220, 7/30/98: pH: 7.00, 10.00; EC: 0.206; turb: 0; DO: auto: T: 23.0°C

SIGNATURE: ____ **DATE:** 7/30/98

EINARSON FOWLER & WATSON

WATER SAMPLE FIELD DATA

LOCATION: B&C Gas Mini Mart — SAMPLE ID: MW-5
PROJECT NO: BNR 103 — SAMPLED BY: RPark
CLIENT: B&C Gas Mini Mart — REGULATORY AGENCY: ACEHS
SAMPLE TYPE: Groundwater ✓ Surface Water ____ Leachate ____ Treatment Effluent ____ Other ____

CASING DIAMETER (OD-inches): 3/4 ____ 1 ____ 2 ____ 4 ✓ 4.5 ____ 6 ____ 8 ____
GALLONS PER LINEAR FOOT : (0.02) (0.04) (0.17) (0.66) (0.83) (1.5) (2.6)

~~Well Total Depth~~ DTPP (ft): 25.24 / 34.7 TD — Volume in Casing (gal): ~~10.9~~ 9.6
Depth to Water (ft): 25.25 — Calculated Purge (volumes / gal.): ~~30.4~~ 28.7
Height of ~~Water~~ Product Column (ft): 0.01 / ~~14.45~~ — Actual Pre-Sampling Purge (gal): ~~15.0~~ 5.0

PURGE:
Device (Depth of Intake from TOC): Submersible Pump ____ Peristaltic Pump ____ PVC Hand Pump ____
S.S. Bailer ____ Teflon Bailer ____ PVC Bailer ✓ Disposable Bailer ____ Other ____
Purge Water Containment: drummed
Field QC Samples Collected at this Well (Equipment or Field Blank): EB-___ FB-___ Other ____

Time (2400 Hr)	Volume (gallons)	Temp. (°C)	Specific Conductance Horiba (µmhos/cm)	Specific Conductance QuickCheck (µS)	pH (std. units)	Color (visual)	Turbidity (visual)	Observation
				/				

Purge Date: 7/30/98

SAMPLE:
Device (Depth of Intake from TOC): Submersible Pump ____ Peristaltic Pump ____ PVC Hand Pump ____
Teflon Bailer ____ PVC Bailer ____ Disposable Bailer ✓ Other ____

Time (2400 Hr)	Temp. (°C)	Specific Conductance Horiba (µmhos/cm)	Specific Conductance QuickCheck (µS)	pH (std. units)	Dissolved Oxygen (mg/l)	Color (visual)	Turbidity (NTU)
1620	21.4	1030	/	7.05	2.21	lt gray brown	186

Sheen: present w/ product globules Odor: strong Sample Date: 7/30/98

Field Measurement Devices: Horiba ✓ Omega ____ QuickCheck ____ D.O. Test Kit ____

REMARKS: Attempted to bail out product. Bailed 5 gal total fluids from top of water column using 3" ϕ bailer. Product globules still present. Collected grab sample from top of water column. 1" ϕ PVC pipe removed from well. Product is colorless.

SIGNATURE: _____ **DATE:** 7/30/98

EINARSON FOWLER & WATSON

WATER SAMPLE FIELD DATA

LOCATION: B&C Gas Mini Mart SAMPLE ID: MW-6
PROJECT NO: BNC 103 SAMPLED BY: RPark
CLIENT: B&C Gas Mini Mart REGULATORY AGENCY: ACEHS
SAMPLE TYPE: Groundwater 4 Surface Water ____ Leachate ____ Treatment Effluent ____ Other ____

CASING DIAMETER (OD-inches):	3/4	1	2	4	4.5	6	8
GALLONS PER LINEAR FOOT :	(0.02)	(0.04)	(0.17)	(0.66)	(0.83)	(1.5)	(2.6)

~~Well Total Depth~~ TOP (ft): 25.24 Volume in Casing (gal): ____
Depth to Water (ft): 25.25 Calculated Purge (volumes / gal): ____
Height of Product Column (ft): 0.01 Actual Pre-Sampling Purge (gal): ____

PURGE:
Device (Depth of Intake from TOC): Submersible Pump ____ Peristaltic Pump ____ PVC Hand Pump ____
S.S. Bailer ____ Teflon Bailer ____ PVC Bailer ____ Disposable Bailer ____ Other ____
Purge Water Containment: ____
Field QC Samples Collected at this Well (Equipment or Field Blank): EB-___ FB-___ Other ____

Time (2400 Hr)	Volume (gallons)	Temp. (°C)	Specific Conductance Horiba (µmhos/cm)	Specific Conductance QuickCheck (µS)	pH (std. units)	Color (visual)	Turbidity (visual)	Observation

Purge Date: ____

SAMPLE:
Device (Depth of Intake from TOC): Submersible Pump ____ Peristaltic Pump ____ PVC Hand Pump ____
Teflon Bailer ____ PVC Bailer ____ Disposable Bailer ____ Other ____

Time (2400 Hr)	Temp. (°C)	Specific Conductance Horiba (µmhos/cm)	Specific Conductance QuickCheck (µS)	pH (std. units)	Dissolved Oxygen (mg/l)	Color (visual)	Turbidity (NTU)

Sheen: ____ Odor: ____ Sample Date: ____

Field Measurement Devices: Horiba ____ Omega ____ QuickCheck ____ D.O. Test Kit ____

REMARKS: Floating Product present; no Samples Collected. Bailed ~1 gallon total fluids from top of water column until no product present in bailer. Used disp. bailer - Light yellow product.

SIGNATURE: ____ **DATE:** 7/30/98

EINARSON FOWLER & WATSON

WATER SAMPLE FIELD DATA

LOCATION: B&C GAS Mini Mart (Mill Spring) SAMPLE ID: MS MW01

PROJECT NO: BNC 103 SAMPLED BY: RPaine

CLIENT: B&C GAS Mini Mart REGULATORY AGENCY: ACEHS

SAMPLE TYPE: Groundwater ✓ Surface Water ____ Leachate ____ Treatment Effluent ____ Other ____

CASING DIAMETER (OD-inches):	3/4	1	2 ✓	4	4.5	6	8
GALLONS PER LINEAR FOOT :	(0.02)	(0.04)	(0.17)	(0.66)	(0.83)	(1.5)	(2.6)

~~Well Total Depth~~ DTB (ft): 30.35 Volume in Casing (gal): ____

Depth to Water (ft): 30.37 Calculated Purge (volumes / gal.): ____

Height of ~~Water~~ Product Column (ft): 0.02 Actual Pre-Sampling Purge (gal): ____

PURGE:

Device (Depth of Intake from TOC): Submersible Pump ____ Peristaltic Pump ____ PVC Hand Pump ____

S.S. Bailer ____ Teflon Bailer ____ PVC Bailer ____ Disposable Bailer ____ Other ____

Purge Water Containment: ____

Field QC Samples Collected at this Well (Equipment or Field Blank): EB-___ FB-___ Other ____

Time (2400 Hr)	Volume (gallons)	Temp. (°C)	Specific Conductance Horiba (µmhos/cm)	Specific Conductance QuickCheck (µS)	pH (std. units)	Color (visual)	Turbidity (visual)	Observation

Purge Date: ____

SAMPLE:

Device (Depth of Intake from TOC): Submersible Pump ____ Peristaltic Pump ____ PVC Hand Pump ____

Teflon Bailer ____ PVC Bailer ____ Disposable Bailer ____ Other ____

Time (2400 Hr)	Temp. (°C)	Specific Conductance Horiba (µmhos/cm)	Specific Conductance QuickCheck (µS)	pH (std. units)	Dissolved Oxygen (mg/l)	Color (visual)	Turbidity (NTU)

Sheen: ____ Odor: ____ Sample Date: ____

Field Measurement Devices: Horiba ____ Omega ____ QuickCheck ____ D.O. Test Kit ____

REMARKS: Floating product present. NO Samples Collected. Bailed ~ 1 gallon total fluids using PVC bailer. Bailed until product no longer visible in bailer. DTW at End: 30.51'. Product is brown.

SIGNATURE: ____ **DATE:** 7/30/98

San Francisco Regional Office

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Clayton
LABORATORY
SERVICES

August 19, 1998

Mr. Kris Johnson
EINARSON, FOWLER & WATSON
2650 East Bayshore Road
Palo Alto, CA 94303

Client Ref.: BNC103
Clayton Project No.: 98073.73

Dear Mr. Johnson:

Attached is our analytical laboratory report for the samples received on July 31, 1998. Please note that the MTBE results come from a GC/MS confirmation run which occurred past recommended holding times. The samples were originally analyzed for MTBE by EPA Method 8020 within recommended holding times but the calibration standard showed low recovery for this analyte. Also enclosed is a copy of the Chain-of-Custody record acknowledging receipt of these samples.

Please note that any unused portion of the samples will be discarded after September 13, 1998, unless you have requested otherwise.

We appreciate the opportunity to assist you. If you have any questions concerning this report, please contact Client Services at (925) 426-2687.

Sincerely,

Karen Dahl

Karen Dahl
Client Services Representative
San Francisco Regional Office

PVF/pvf

Attachments

California DHS ELAP Certification Number 1196

Analytical Results
for
EINARSON, FOWLER & WATSON
Client Reference: BNC103
Clayton Project No. 98073.73

Sample Identification:	MW-1	Date Sampled:	07/30/98
Lab Number:	9807373-01A	Date Received:	07/31/98
Sample Matrix/Media:	WATER	Date Prepared:	08/11/98
Preparation Method:	EPA 5030	Date Analyzed:	08/11/98
Method Reference:	EPA 8015/8020	Analyst:	BDP

Analyte	CAS #	Concentration (ug/L)	Limit of Detection (ug/L)
BTEX/Gasoline			
Benzene	71-43-2	26	0.4
Ethylbenzene	100-41-4	57	0.3
Toluene	108-88-3	110	0.3
o-Xylene	95-47-6	83	0.4
p,m-Xylenes	--	160	0.4
Gasoline	--	1400	50
MTBE	--	5	5
Surrogates		Recovery (%)	QC Limits (%)
a,a,a-Trifluorotoluene	98-08-8	115	50 - 150

ND: Not detected at or above limit of detection
--: Information not available or not applicable

Note: Detection limits increased due to dilution necessary for quantitation.
Note: The MTBE result comes from a GC/MS confirmation run which occurred past recommended holding times.

Analytical Results
for
EINARSON, FOWLER & WATSON
Client Reference: BNC103
Clayton Project No. 98073.73

Sample Identification:	MW-3	Date Sampled:	07/30/98
Lab Number:	9807373-02A	Date Received:	07/31/98
Sample Matrix/Media:	WATER	Date Prepared:	08/12/98
Preparation Method:	EPA 5030	Date Analyzed:	08/12/98
Method Reference:	EPA 8015/8020	Analyst:	BDP

Analyte	CAS #	Concentration (ug/L)	Limit of Detection (ug/L)
BTEX/Gasoline			
Benzene	71-43-2	330	20
Ethylbenzene	100-41-4	490	20
Toluene	108-88-3	1200	20
o-Xylene	95-47-6	560	20
p,m-Xylenes	--	1300	20
Gasoline	--	25000	3000
MTBE	--	300	300
Surrogates		Recovery (%)	QC Limits (%)
a,a,a-Trifluorotoluene	98-08-8	114	50 - 150

ND: Not detected at or above limit of detection
--: Information not available or not applicable

Note: Detection limits increased due to dilution necessary for quantitation.
Note: The MTBE result comes from a GC/MS confirmation run which occurred past recommended holding times.

Analytical Results
for
EINARSON, FOWLER & WATSON
Client Reference: BNC103
Clayton Project No. 98073.73

Sample Identification:	MW-4	Date Sampled:	07/30/98
Lab Number:	9807373-03A	Date Received:	07/31/98
Sample Matrix/Media:	WATER	Date Prepared:	08/12/98
Preparation Method:	EPA 5030	Date Analyzed:	08/12/98
Method Reference:	EPA 8015/8020	Analyst:	BDP

Analyte	CAS #	Concentration (ug/L)	Limit of Detection (ug/L)
BTEX/Gasoline			
Benzene	71-43-2	ND	0.4
Ethylbenzene	100-41-4	ND	0.3
Toluene	108-88-3	0.6	0.3
o-Xylene	95-47-6	ND	0.4
p,m-Xylenes	--	0.8	0.4
Gasoline	--	ND	50
MTBE	--	ND	5
Surrogates		Recovery (%)	QC Limits (%)
a,a,a-Trifluorotoluene	98-08-8	101	50 - 150

ND: Not detected at or above limit of detection
--: Information not available or not applicable

Note: The MTBE result comes from a GC/MS confirmation run which occurred past recommended holding times.

Analytical Results
for
EINARSON, FOWLER & WATSON
Client Reference: BNC103
Clayton Project No. 98073.73

Sample Identification:	MW-5	Date Sampled:	07/30/98
Lab Number:	9807373-04A	Date Received:	07/31/98
Sample Matrix/Media:	WATER	Date Prepared:	08/11/98
Preparation Method:	EPA 5030	Date Analyzed:	08/11/98
Method Reference:	EPA 8015/8020	Analyst:	BDP

Analyte	CAS #	Concentration (ug/L)	Limit of Detection (ug/L)
BTEX/Gasoline			
Benzene	71-43-2	1400	20
Ethylbenzene	100-41-4	2000	20
Toluene	108-88-3	4000	20
o-Xylene	95-47-6	2900	20
p,m-Xylenes	--	5600	20
Gasoline	--	47000	3000
MTBE	--	600	300
Surrogates		Recovery (%)	QC Limits (%)
a,a,a-Trifluorotoluene	98-08-8	129	50 - 150

ND: Not detected at or above limit of detection
--: Information not available or not applicable

Note: Detection limits increased due to dilution necessary for quantitation.
Note: The MTBE result comes from a GC/MS confirmation run which occurred past recommended holding times.

Analytical Results
for
EINARSON, FOWLER & WATSON
Client Reference: BNC103
Clayton Project No. 98073.73

Sample Identification:	METHOD BLANK	Date Sampled:	--
Lab Number:	9807373-05A	Date Received:	--
Sample Matrix/Media:	WATER	Date Prepared:	08/13/98
Preparation Method:	EPA 5030	Date Analyzed:	08/13/98
Method Reference:	EPA 8015/8020	Analyst:	BDP

Analyte	CAS #	Concentration (ug/L)	Limit of Detection (ug/L)
BTEX/Gasoline			
Benzene	71-43-2	ND	0.4
Ethylbenzene	100-41-4	ND	0.3
Toluene	108-88-3	ND	0.3
o-Xylene	95-47-6	ND	0.4
p,m-Xylenes	--	ND	0.4
Gasoline	--	ND	50
MTBE	--	ND	5
Surrogates		Recovery (%)	QC Limits (%)
a,a,a-Trifluorotoluene	98-08-8	93	50 - 150

ND: Not detected at or above limit of detection
--: Information not available or not applicable

EINARSON FOWLER & WATSON

CHAIN OF CUSTODY

9807373

Page 1 of 1

CONTRACT LABORATORY: Clayton Env. TURN-AROUND TIME: Standard PO # _____

Project No.	Site Name
BNC103	B&C Gas Minimart

Sampler(s): (printed) R Lane (signature)

Sample I.D.	Lab I.D.	Collection Date	Collection Time	Matrix	Depth	Container Information Type/Volume	Cnty	Filt	Prsrv	Analyses TPH gas, BTEX, MTBE	Remarks
										VOA 40	Please confirm
			1357							HCl	MTBE detection
MW-1		7/30/98	~~1354~~	water			4	N		4	in any 1 (one)
MW-2		no sample					✓			✓	sample using
MW-3		7/30/98	1515				4			4	EPA 8260.
MW-4		7/30/98	1257				4			4	
MW-5		↓	1420				4			4	MW-5: ~~E~~ analyze
MW-6		no sample					✓			✓	aqueous only
~~MS MW-3P~~ MS											

Relinquished by: (signature)	Received by: (signature)	Date/Time:
Relinquished by: (signature)	Received by: (signature)	Date/Time:
	Ken Wall	7/30/98 19:00
Relinquished by: (signature)	Received by: (signature)	Date/Time:

Send Results To:
Attn: Kris Johnson
EINARSON, FOWLER & WATSON
2650 East Bayshore Road
Palo Alto, CA 94303
Phone (415) 843-3828
Fax (415) 843-3815

white: lab copy yellow: project file