



Brown & Root Environmental

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November 25, 1996

Ms. Madhulla Logan
Alameda County Department of Health Services
1131 Harbor Bay Parkway
Alameda, California 94502

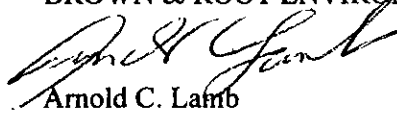
Subject: Transmittal of Third Quarter Groundwater Monitoring Report

Dear Ms. Logan:

Enclosed please find a copy of the third quarter groundwater monitoring report for the former E-Z Serve facility #100877, located at 525 West A Street, Hayward, California.

If you have any comments regarding this correspondence, please feel free to contact me at (954) 570-5885.

Sincerely,
BROWN & ROOT ENVIRONMENTAL



Arnold C. Lamb
California State Manager

enclosure

cc: B. Cobb - E-Z Serve
C. Dalton - BRE DFB



October 16, 1996

Mr. Brian Cobb
Environmental and Construction Manager
E-Z Serve Petroleum Marketing Company of California
P.O. Box 922021
Houston, Texas 77292-2021

**SUBJECT: Third Quarter 1996 Groundwater Monitoring (July through September)
Former E-Z Serve Facility No. 100877
525 West A Street, Hayward, California**

Dear Mr. Cobb:

Brown & Root Environmental (BRE) was contracted by E-Z Serve Petroleum Marketing Company of California (E-Z Serve) to perform groundwater monitoring at the former E-Z Serve Facility No. 100877 (Site). The Site is located at 525 West A Street, Hayward, California. The Site is presently a vacant lot. The underground storage tanks (USTs) were excavated and removed in June 1990. Site features are depicted on Figure 1.

This report summarizes field and analytical data collected during the current quarter (July 1996 through September 1996) for this facility. The activities summarized in this report were completed at the direction of the Alameda County Department of Health Services (ACDHS).

MONITORING RESULTS

On September 23, 1996, BRE personnel completed the third quarter groundwater monitoring event. Depth to groundwater measurements were collected prior to well purging and sampling. Prior to sampling all monitoring wells were checked for free product using an ORS Environmental Equipment Oil/Water Interface Probe. Phase separated product was detected at this Site in MW-1. The field protocol followed by BRE personnel during groundwater well purging and sampling is included as Appendix A. Well purging and sampling documentation logs are included as Appendix B. BRE will forward documentation of purge water disposal will be forwarded to the State agency under a separate cover.

Depth to groundwater beneath the facility during this monitoring event ranged from 12.29 to 16.77 feet below land surface (bls). Depth to groundwater measurements across the study area during this quarter indicate that the groundwater table dropped approximately 1.5 feet from the last monitoring event. Table 1 presents the groundwater elevation data.



Water table elevations and a groundwater contour map for September 17, 1996, are depicted on Figure 1. The data indicate that groundwater flows generally to the southwest. The average hydraulic gradient is approximately 0.0015 feet per foot. The flow direction and gradient are similar to the second quarter monitoring event.

BRE personnel collected groundwater samples from 13 monitoring wells during this field event. A Groundwater sample was not collected from monitoring well MW-1 because of the presence of phase separated product (approximately 0.01 feet in thickness). Groundwater samples were transported to a California certified laboratory, Centrum Analytical Laboratories, Inc., in Redlands California, and analyzed for Total Petroleum Hydrocarbons - Gasoline range organics (TPHg) by EPA Method 8015 (modified) and total volatile organic aromatics (TVOA), including methyl tertiary butyl ether (MTBE), by EPA Method 8020.

Laboratory analysis of the groundwater samples indicates the presence of dissolved phase petroleum hydrocarbons above laboratory method detection limits (MDLs) in all of the monitoring wells. TPHg concentrations ranged from below detection limit (MW-7, MW-12, and MW-14) to 32,000 $\mu\text{g/L}$ (MW-4), and TVOA concentrations ranged 16 $\mu\text{g/L}$ (MW-12) to 12,240 $\mu\text{g/L}$ (MW-4). MTBE concentrations ranged from below detection limit (MW-8, MW-12, and MW-13) to 2,100 $\mu\text{g/L}$ (MW-4). Table 1 presents the analytical testing data. The analytical data is depicted on a site plan as Figure 2. The complete analytical laboratory report including the chain of custody is included as Appendix C.

Quality assurance and quality control (QA/QC) samples were also obtained during this quarterly sampling event. The QA/QC samples consisted of one duplicate sample (obtained from well MW-3), one trip blank, and one equipment blank. Hydrocarbon constituents were not detected in either the trip blank or the equipment blank.

CONCLUSIONS AND RECOMMENDATIONS

A risk assessment was conducted for the Site and was submitted to ACDHS in May 1995. Additional information was provided in response to the ACDHS review letter dated August 1995. More information was provided in March 1996 to respond to the verbal request of ACDHS. Currently, ACDHS has not responded to the latest information submitted to them.

BRE recommends the following:

- Reduce the frequency of monitoring to semi-annual for MW-12, MW-8, and MW-13 because they are upgradient and beyond the extent of contamination.



BRE also recommends that the results of the quarterly sampling event be forwarded to the ACDHS for review and comment. Based upon the monitoring data collected during the third quarter, the monitoring events should continue on a quarterly basis.

If you have any questions or comments pertaining to this correspondence, please contact the undersigned at (904) 730-6777.

Sincerely,
BROWN & ROOT ENVIRONMENTAL

Noel Manarang
Site Manager

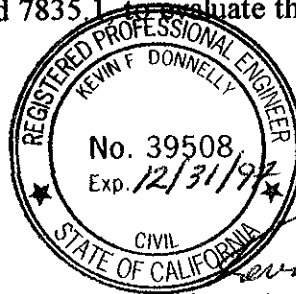
Distribution: (1) Ms. Madhulla Logan
Alameda County Department of Health Services
1131 Harbor Bay Parkway
Alameda, CA 94502



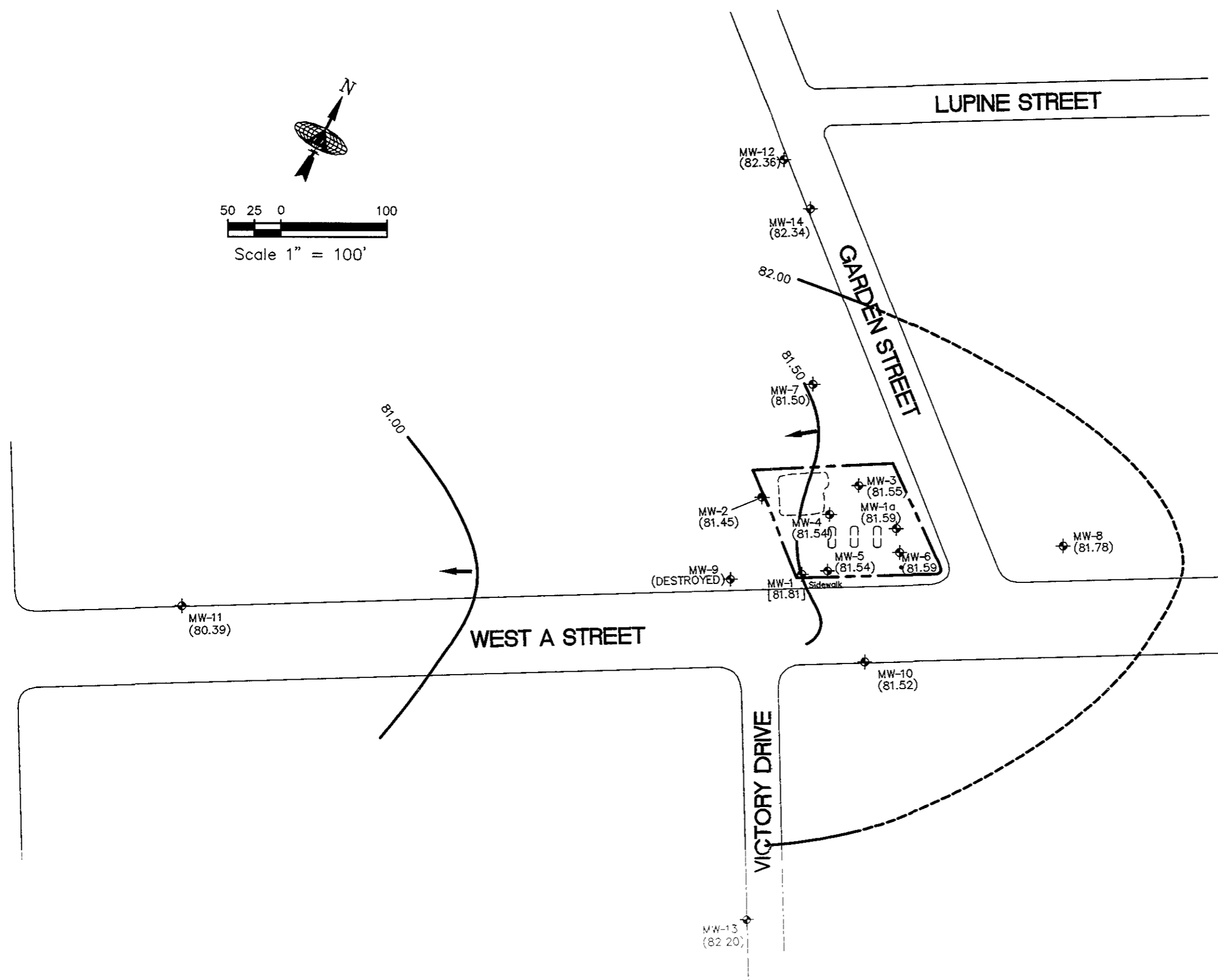
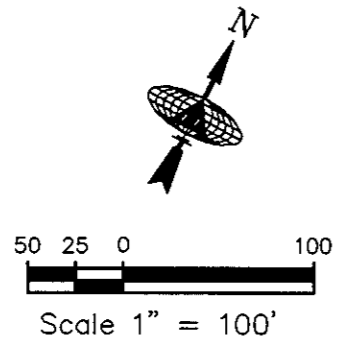
PROFESSIONAL CERTIFICATION

Third Quarter 1996 Groundwater Monitoring
Former E-Z Serve #100877
525 West A Street
Hayward, California

This quarterly groundwater monitoring report was prepared under my responsible supervision in conformance with standard engineering practices and principles, and California Business and Professions Code Section 6735, 7835, and 7835.1 to evaluate the groundwater conditions at this site.



Kevin F. Donnelly
Kevin F. Donnelly, P.E.
California Registration No. 39508



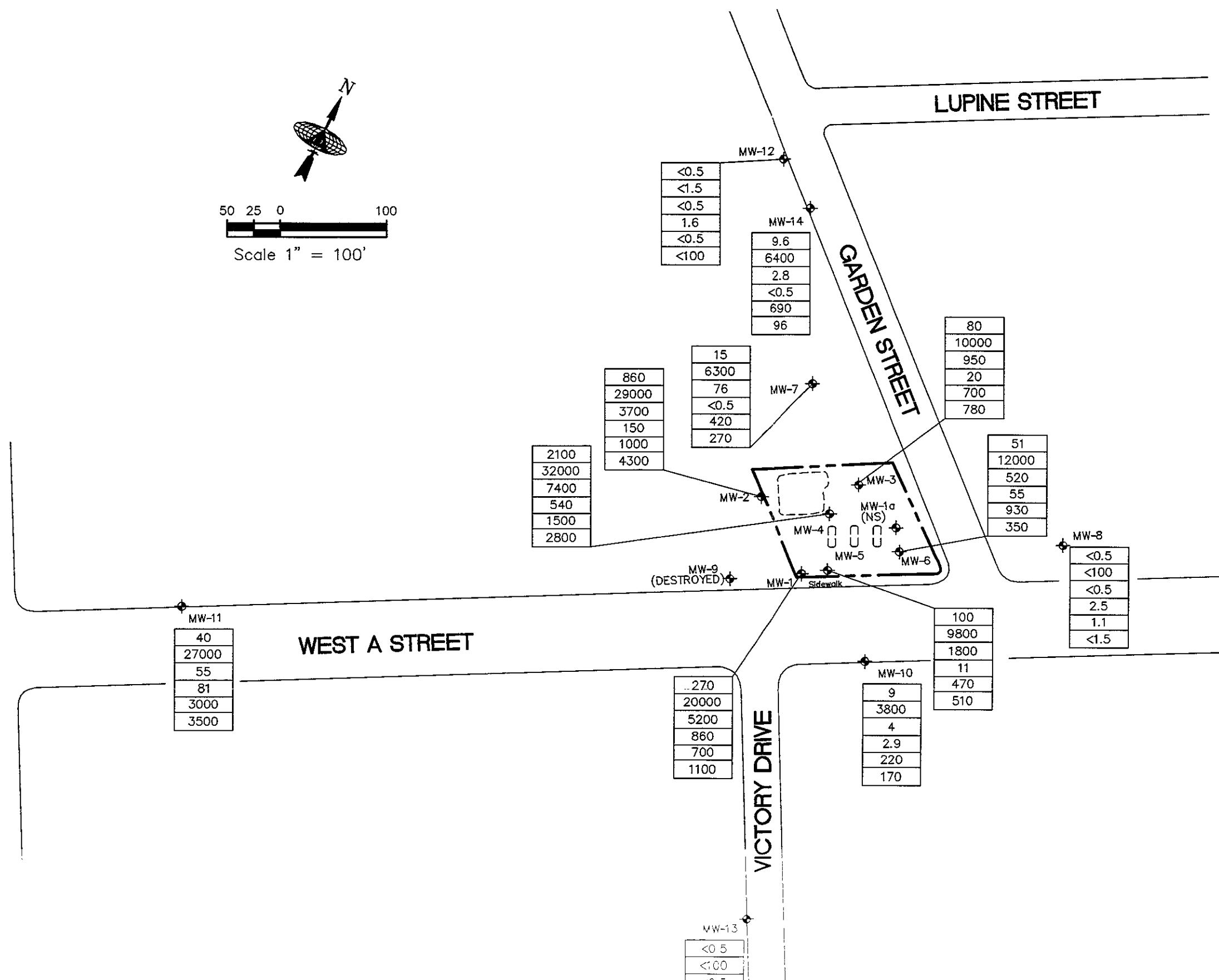
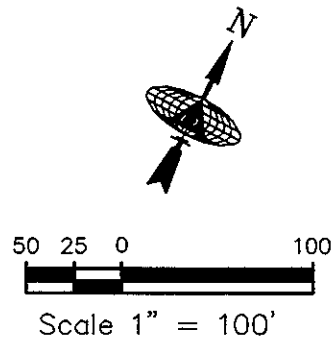
LEGEND

- ◆ MW-1 MONITORING WELL
- ↖ GROUNDWATER FLOW DIRECTION
- 81.00 GROUNDWATER CONTOUR
- (81.45) GROUNDWATER ELEVATION
- [81.81] DATA NOT USED TO DETERMINE CONTOURS

SITE MANAGER NVM	CHECKED BY CD
DRAWN BY TCB	DRAWING DATE 10/18/96
SURVEYED BY	SURVEY DATE
SCALE 1" = 100'	
CAD DWG NO MY40RSIT	PROJ NO MY40

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FIGURE 1
GROUNDWATER ELEVATION CONTOUR MAP
 SEPTEMBER 23, 1996
 EZ-SERVE NO 100877, 525 WEST A STREET
 HAYWARD, CALIFORNIA



LEGEND

- ◆ MW-1 MONITORING WELL
- (83.99) GROUNDWATER ELEVATION
- <1.0 MTBE CONCENTRATION IN $\mu\text{g/L}$
- <500 TPHg CONCENTRATION IN $\mu\text{g/L}$
- <0.6 BENZENE CONCENTRATION IN $\mu\text{g/L}$
- <2.0 TOLUENE CONCENTRATION IN $\mu\text{g/L}$
- <1.0 ETHYLBENZENE CONCENTRATION IN $\mu\text{g/L}$
- <6.0 XYLENE CONCENTRATION IN $\mu\text{g/L}$
- (NS) NOT SAMPLED

SITE MANAGER NYW	CHECKED BY CD
DRAWN BY TCB	DRAWING DATE 10/18/96
SURVEYED BY	SURVEY DATE
SCALE 1" = 100'	
CAD DWG NO MY4ORSIT	PROJ NO MY40

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FIGURE 2
GROUNDWATER ANALYTICAL RESULTS
 SEPTEMBER 23, 1996
 EZ-SERVE NO. 100877, 525 WEST A STREET
 HAYWARD, CALIFORNIA

Table 1
Summary of Groundwater Elevation Data and Analytical Results
Former E-Z Serve Facility #100877
525 West A Street, Hayward, California

Well ID	Date Sampled	Well Elevation (feet)	Depth to Water (feet)	Groundwater Elevation (feet)	MTBE (ug/l)	Benzene (ug/l)	Toluene (ug/l)	Ethylbenzene (ug/l)	Xylenes (ug/l)	TPHg (ug/l)
MW-1 (screened interval 14.5 - 28.5 ft bls)	2/5/92	99.91	20.82	79.09	NA	76,000	23,000	2,400	6,500	46,000
	9/11/92		20.08	79.83	NA	9,000	1,200	1,800	4,600	48,000
	12/22/92		19.79	80.12	NA	22,000	1,600	4,800	17,000	84,000
	3/3/93		16.23	83.68	NA	16,000	1,600	1,900	4,300	54,000
	6/23/93	96.73	16.86	79.87	NA	18,000	1,100	1,400	3,700	30,000
	9/30/93		18.04	78.69	NA	10,000	440	940	1,700	33,000
	2/6/94		18.15	78.58	NA	18,000	1,600	4,700	12,000	64,000
	5/2/94		17.26	79.47	NA	2,100	29	490	520	7,200
	7/1/94		17.60	79.13	NA	3,700	150	550	12,000	13,000
	9/20/94		20.59	76.14	NA	3,100	75	440	870	10,000
	12/5/94		17.83	78.90	NA	3,700	87	520	950	87,000
	3/15/95		14.43	82.30	NA	56	2	12	47	290
	6/16/95		14.56	82.17	NA	530	12	90	160	2,000
	9/22/95		16.05	80.68	NA	1,400	9	75	110	1,600
	12/11/95		16.74	79.99	NA	1,700	<25	183	270	6,330
	2/13/96		13.38	83.35	NA	8	3	<1	10.6	140
6/14/96		13.41	83.32	240	6,900	150	960	1,500	24,000	
9/23/96		14.92	81.81	270	5,200	860	700	1,100	20,000	
MW-1A (screened interval not avail.)	6/23/93	97.59	17.80	80.00	NA - 0.21 ft of free product					
	2/6/94		18.89	78.70	NA	1,700	42	1000	400	8,900.00
	5/2/94		18.35	79.24	NA	NA - 0.09 ft of free product				
	7/1/94		18.45	79.14	NA	1,100	<1	920	1,100	12,000
	9/20/94		21.72	75.87	NA - 0.22 ft of free product					
	12/5/94		18.87	78.72	NA - 0.07 ft of free product					
	3/14/95		15.55	82.04	NA - 0.05 ft of free product					
	6/15/95		15.63	81.96	NA - 0.03 ft of free product					
	9/22/95		17.05	80.54	NA	180	9.2	130	310	2,000
	12/11/95		15.72	81.87	NA	310	26	350	850	10,100
	2/13/96		14.35	83.24	NA	830	70	730	2,300	20,700

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	6/14/96		14.28	83.31	NA					
	9/23/96		16.00	81.59	NA - 0.01 ft of free product					
MW-2 (screened interval 15 - 29 ft bls)	2/5/92	101.45	22.35	79.10	NA	13,000	4,700	820	1,300	67,000
	9/11/92		21.67	79.78	NA	9,000	1,400	1,200	8,400	57,000
	12/22/92		21.39	80.06	NA	9,900	350	2,000	4,100	31,000
	3/3/93		17.75	83.70	NA	5,100	1,300	720	1,900	17,000
	6/23/93	98.06	18.42	79.64	NA	23,000	1,500	4,500	17,000	60,000
	9/30/93		19.63	78.43	NA	12,000	780	1,500	6,500	38,000
	2/6/94		19.61	78.45	NA	8,900	450	2,000	5,500	34,000
	5/2/94		19.84	78.22	NA	3,800	260	1,100	3,500	18,000
	7/1/94		19.18	78.88	NA	3,700	510	870	2,600	18,000
	9/20/94		22.17	75.89	NA	4,500	300	1,200	4,000	19,000
	12/5/94		19.37	78.69	NA	4,700	340	1,400	4,500	22,000
	3/15/95		16.89	81.17	NA	5,600	350	1,900	6,300	29,000
	6/16/95		16.79	81.27	NA	4,400	270	1,600	4,700	27,000
	9/22/95		17.54	80.52	NA	6,700	390	1,800	6,400	3,700
	12/11/95		17.33	80.73	NA	3,500	190	1,500	3,700	35,400
	2/13/96		14.89	83.17	NA	4,800	190	1,100	3,500	30,500
6/14/96		15.04	83.02	430	3,300	120	1,500	3,600	23,000	
9/23/96		16.61	81.45	860	3,700	150	1,000	4,300	29,000	

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Well ID	Date Sampled	Well Elevation (feet)	Depth to Water (feet)	Groundwater Elevation (feet)	MTBE (ug/l)	Benzene (ug/l)	Toluene (ug/l)	Ethylbenzene (ug/l)	Xylenes (ug/l)	TPHg (ug/l)
MW-4 (screened interval 15 - 29 ft bls)	2/5/92	100.50	21.31	79.19	NA	2,700	410	<1	3,400	16,000
	9/11/92		20.62	79.88	NA	7,600	1,600	1,400	4,100	43,000
	12/22/92		20.37	80.13	NA	8,800	1,200	1,500	3,700	29,000
	3/3/93		16.78	83.72	NA	5,000	1,500	680	1,700	17,000
	6/23/93	97.10	17.45	79.65	NA	3,000	120	560	790	5,700
	9/30/93		18.64	78.46	NA	7,000	2,100	970	2,600	21,000
	2/6/94		18.59	78.51	NA	7,200	1,600	990	3,200	24,000
	5/2/94		17.81	79.29	NA	2,200	440	470	1,200	10,000
	7/1/94		18.13	78.97	NA	2,000	370	350	930	8,200
	9/20/94		21.13	75.97	NA	2,000	360	380	1,000	7,200
	12/6/94		18.36	78.74	NA	2,300	400	440	1,100	9,000
	3/15/95		14.89	82.21	NA	4,400	600	770	2,660	15,000
	6/16/95		14.68	82.42	NA	5,600	490	890	2,300	19,000
	9/22/95		16.60	80.50	NA	9,300	1,000	1,200	3,600	3,600
	12/11/95		17.27	79.83	NA	1,600	57	390	510	6,720
	2/13/96		13.88	83.22	NA	7,200	500	650	2,000	11,700
6/14/96		13.92	83.18	720	4,100	720	690	1,800	17,000	
9/23/96		15.56	81.54	2,100	7,400	540	1,500	2,800	32,000	

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Well ID	Date Sampled	Well Elevation (feet)	Depth to Water (feet)	Groundwater Elevation (feet)	MTBE (ug/l)	Benzene (ug/l)	Toluene (ug/l)	Ethylbenzene (ug/l)	Xylenes (ug/l)	TPHg (ug/l)
MW-6 (screened interval 15 - 29 ft bls)	2/5/92	100.97	21.29	79.68	NA	5,400	3,500	3,600	10,000	51,000
	9/11/92		20.56	80.41	NA	2,500	830	1,400	2,300	24,000
	12/22/92		20.31	80.66	NA	5,100	630	2,000	3,100	23,000
	3/3/93		16.83	84.14	NA	4,400	820	1,400	2,400	18,000
	6/23/93	97.09	17.30	79.79	NA	4,600	850	2,700	3,400	18,000
	9/30/93		19.05	78.04	NA - 0.03 ft of free product					
	2/6/94		18.55	78.54	NA	4,600	690	2,100	2,500	20,000
	5/2/94		17.74	79.35	NA	930	54	610	240	5,300
	7/1/94		18.09	79.00	NA	1,500	160	850	690	10,000
	9/20/94		21.05	76.04	NA	2,000	140	1,200	760	11,000
	12/5/94		18.33	78.76	NA	1,300	87	980	610	8,600
	3/15/95		14.91	82.18	NA	1,600	110	1,000	1,000	9,800
	6/16/95		15.11	81.98	NA	1,100	78	1,000	550	9,200
	9/22/95		16.44	80.65	NA	1,700	110	1,200	760	3,000
	12/11/95		17.20	79.89	NA	990	110	1,000	520	13,200
	2/13/96		13.89	83.20	NA	1,100	48	750	560	12,500
	6/14/96		13.80	83.29	61	800	99	1,500	730	14,000
9/23/96		15.50	81.59	51	520	55	930	350	12,000	

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Well ID	Date Sampled	Well Elevation (feet)	Depth to Water (feet)	Groundwater Elevation (feet)	MTBE (ug/l)	Benzene (ug/l)	Toluene (ug/l)	Ethylbenzene (ug/l)	Xylenes (ug/l)	TPH (ug/l)
MW-7 (screened interval 10 - 29 ft bls)	6/23/93	97.44	17.87	79.57	NA	4,200	71	4,400	5,600	29,000
	9/30/93		18.94	78.50	NA	3,200	71	2,800	3,400	30,000
	2/6/94		19.11	78.33	NA - 0.06 ft of free product					
	5/2/94		18.11	79.33	NA	630	13	660	400	5,700
	7/1/94		18.72	78.72	NA	180	99	160	520	3,100
	9/20/94		21.41	76.03	NA	540	6	750	730	6,100
	12/5/94		18.66	78.78	NA	280	<10	430	350	3,700
	3/14/95		15.23	82.21	NA	290	4	26	296	1,900
	6/16/95		15.17	82.27	NA	380	5	360	540	5,800
	9/21/95		16.83	80.61	NA	110	<1	220	220	4,020
	12/11/95		17.61	79.83	NA	120	31	400	330	3,750
	2/14/96		14.07	83.37	NA	190	<5	190	280	4,500
	6/14/96		14.26	83.18	11	85	<2	470	200	4,400
	9/23/96		15.94	81.50	15	76	<0.5	420	270	6,300
MW-8 (screened interval 10 - 29 ft bls)	6/23/93	97.61	17.64	79.97	NA	43	9	35	67	350
	9/30/93		18.85	78.76	NA	190	340	170	720	2,700
	2/6/94		18.91	78.70	NA	<1	1	1	2	<100
	5/2/94		18.11	79.50	NA	<1	3	<1	7	<100
	7/1/94		18.43	79.18	NA	18	48	19	37	300
	9/20/94		21.43	76.18	NA	<1	<1	<1	<1	<100
	12/5/94		18.72	78.89	NA	<0.5	<0.5	<0.5	<0.5	<50
	3/14/95		14.83	82.78	NA	<0.5	<0.5	<0.5	1	<50
	6/16/95		14.92	82.69	NA	<0.5	<0.5	<0.5	<0.5	<50
	9/21/95		16.52	81.09	NA	2.3	1.3	2.7	9	<100
	12/11/95		17.52	80.09	NA	1.3	<1	<1	<3	<100
	2/14/96		14.27	83.34	NA	<1	<1	<1	<3	<100
	6/14/96		14.06	83.55	<1	<0.6	<2	4	<6	<500
9/23/96		15.83	81.78	<0.5	<0.5	2.5	1.1	<1.5	<100	

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Former E-Z Serve Facility #100877
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Well ID	Date Sampled	Well Elevation (feet)	Depth to Water (feet)	Groundwater Elevation (feet)	MTBE (ug/l)	Benzene (ug/l)	Toluene (ug/l)	Ethylbenzene (ug/l)	Xylenes (ug/l)	TPHg (ug/l)
MW-9 (screened interval 10 - 29 ft bls)	6/23/93	95.41	15.94	79.47	NA	14,000	1,200	2,800	12,000	12,000
	9/30/93		17.05	78.36	NA	22,000	1,100	3,300	15,000	15,000
	2/6/94		17.07	78.34	NA	10,000	460	2,100	7,500	7,500
	5/2/94		16.24	79.17	NA	5,400	270	1,300	4,700	4,700
	7/1/94		16.59	78.82	NA	2,100	120	450	1,300	1,300
	9/20/94		19.61	75.80	NA	2,200	97	400	1,200	1,200
	12/5/94		16.85	78.56	NA	2,700	130	530	1,600	1,600
	3/14/95		14.18	81.23	NA	5,900	270	1,200	3,680	3,680
	6/15/95		14.09	81.32	NA	2,500	130	670	1,800	1,800
	9/21/95			95.41	NA - no access					
	12/11/95		15.58	79.83	NA	2,100	140	550	1,600	12,200
	2/14/96			95.41	NA - no access					
	6/14/96			95.41	Destroyed					
	9/23/96			95.41	Destroyed					
MW-10 (screened interval 10 - 29 ft bls)	6/23/93	97.11	17.39	79.72	NA	980	640	3,500	12,000	35,000
	9/30/93		18.58	78.53	NA	230	12	100	680	4,000
	2/6/94		18.61	78.50	NA	69	12	220	120	2,000
	5/2/94		17.83	79.28	NA	16	6	85	62	710
	7/1/94		18.17	78.94	NA	52	43	120	210	2,000
	9/20/94		21.15	75.96	NA	34	16	270	560	2,800
	12/5/94		18.43	78.68	NA	30	13	260	430	2,700
	3/14/95		15.93	81.18	NA	18	6	200	239	1,400
	6/15/95		15.97	81.14	NA	14	4	140	98	1,600
	9/21/95		16.48	80.63	NA	37	17	240	380	4,680
	12/11/95		17.30	79.81	NA	2.8	1.3	36	19	670
	2/14/96		14.02	83.09	NA	<5	<5	330	350	5,200
	6/14/96		13.89	83.22	<1	<0.6	<2	120	<6	1,700
	9/23/96		15.59	81.52	9	4	2.9	220	170	3,800

Table 1
Summary of Groundwater Elevation Data and Analytical Results
Former E-Z Serve Facility #100877
525 West A Street, Hayward, California

Well ID	Date Sampled	Well Elevation (feet)	Depth to Water (feet)	Groundwater Elevation (feet)	MTBE (ug/l)	Benzene (ug/l)	Toluene (ug/l)	Ethylbenzene (ug/l)	Xylenes (ug/l)	TPHg (ug/l)
MW-11 (screened interval 5 - 25 ft bls)	2/10/95	92.68	11.80	80.88	NA	140	22	600	1,000	7,000
	3/14/95		13.96	78.72	NA	200	17	750	1,276	6,000
	6/15/95		13.84	78.84	NA	450	63	1,600	2,200	13,000
	9/21/95		13.13	79.55	NA	340	27	440	640	7,000
	12/11/95		13.73	78.95	NA	770	89	1,800	2,500	12,600
	2/14/96		10.42	82.26	NA	440	42	1,000	1,800	8,300
	6/14/96		10.61	82.07	36	570	99	3,000	3500	21,000
	9/23/96		12.29	80.39	40	55	81	3,000	3500	27,000
MW-12 (screened interval 10 - 30 ft bls)	2/10/95	99.03	16.30	82.73	NA	<0.5	<0.5	<0.5	<0.5	<50
	3/14/95		15.69	83.34	NA	<0.5	<0.5	<0.5	<0.5	<50
	6/15/95		15.55	83.48	NA	<0.5	<0.5	<0.5	<0.5	<50
	9/21/95		17.58	81.45	NA	<1	<1	<1	<3	<100
	12/11/95		18.36	80.67	NA	<1	1	1	1.5	<100
	2/14/96		14.78	84.25	NA	<1	<1	<1	<3	<100
	6/14/96		14.99	84.04	<1	<0.6	<2	<1	<6	<500
	9/23/96		16.67	82.36	<0.5	<0.5	1.6	<0.5	<1.5	<100
MW-13 (screened interval 10 - 30 ft bls)	2/10/95	96.80	14.45	82.35	NA	<0.5	<0.5	<0.5	<0.5	<50
	3/14/95		15.81	80.99	NA	<0.5	<0.5	<0.5	<0.5	<50
	6/15/95		15.79	81.01	NA	<0.5	<0.5	<0.5	<0.5	<50
	9/21/95		15.50	81.30	NA	2.6	2.2	<1	9.4	<100
	12/11/95		16.60	80.20	NA	<1	<1	1	<3	<100
	2/14/96		12.92	83.88	NA	<1	<1	<1	7.3	<100
	6/14/96		12.91	83.89	<1	<0.6	<2	<1	<6	<500
	9/23/96		14.60	82.20	<0.5	<0.5	0.8	1	<1.5	<100

Table 1
Summary of Groundwater Elevation Data and Analytical Results
Former E-Z Serve Facility #100877
525 West A Street, Hayward, California

Well ID	Date Sampled	Well Elevation (feet)	Depth to Water (feet)	Groundwater Elevation (feet)	MTBE (ug/l)	Benzene (ug/l)	Toluene (ug/l)	Ethylbenzene (ug/l)	Xylenes (ug/l)	TPHg (ug/l)
MW-14 (screened interval 10 - 30 ft bls)	2/10/95	99.01	16.28	82.73	NA	42	8	740	2100.0	12,000
	3/14/95		14.87	84.14	NA	6	2	36	298.0	1,400
	6/15/95		14.72	84.29	NA	8	<0.5	6	26.0	660
	9/21/95		17.61	81.40	NA	25	15	280	310.0	4,430
	12/11/95		18.30	80.71	NA	6.8	1	120	150.0	1,330
	2/14/96		14.87	84.14	NA	<1	<1	3.1	3.3	<100
	6/14/96		14.90	84.11	3	19	8	240	80	1,900
	9/23/96		16.67	82.34	9.6	2.8	<0.5	690	96	6,400

NOTE:

TPHg = Total Petroleum Hydrocarbons as gasoline

MTBE = Methyl Tertiary Butyl Ether

NA = Not Analyzed for this constituent

APPENDIX A

BRE STANDARD OPERATING PROCEDURES FOR WELL PURGING AND SAMPLING

**BROWN & ROOT ENVIRONMENTAL
CALIFORNIA**

**STANDARD OPERATING PROCEDURE
for
GROUNDWATER SAMPLING**

OBJECTIVE :

The purpose of this SOP is to provide a concise guideline for the proper collection of groundwater samples. Implementation of the sampling procedures has a significant effect on the quality of the analytical data.

Sampling of existing monitoring wells and newly installed monitoring wells will consist of the following seven activities :

- Measurement of depth to water level and total depth of the well (to calculate well volume), if the total depth is not provided;
- Decontamination of sampling equipment;
- Evacuation of static water (purging);
- Measurement and recording of groundwater temperature, pH, and specific conductance;
- Collection of the sample;
- Sample preservation and;
- Sample handling and transportation to the laboratory.

DECONTAMINATION :

All sampling devices and monitoring equipment must be properly decontaminated prior to use. Equipment decontamination must be documented in the logbook. The decontamination process will consist of the following activities:

- Alconox and tap water wash;
- Tap water rinse;

- Reagent Grade Methanol rinse (the equipment shall be thoroughly wetted with Methanol);
- Analyte-free water rinse;
- Air dry.

WATER LEVEL MEASUREMENTS :

A complete round of water level measurements must be collected prior to any purging or sampling activities. Water level measurements, using an electronic water level indicator, should be taken to the nearest 0.01 foot. Where possible water level measurements shall be taken on the North Side of the monitoring well at the top of the casing, unless a measurement point has been previously established.

PURGING STATIC WATER :

- All information concerning the purging of static water including calculations must be recorded for each well. The type of equipment used to purge the well must be described in the logbook. If a pump is utilized information concerning the pump type and flow-rate must be included in the logbook.
- When a bailer is used for purging and/or sampling activities it must be lowered gently into the well such that the formation waters are disturbed as little as possible. It is very important that the turbidity of the sample not be increased by improper purging and/or sampling techniques.
- A minimum of three well volumes of the standing water column will be purged from the well prior to the collection of samples. Monitoring well purging will continue until groundwater temperature, pH, and specific conductance has stabilized for three measurements each following the removal of one well volume. If five well are removed then, only one set of water quality measurements is required on final purge volume. No more than five wells volumes shall be removed during purging activities. Over purging the well may result in the collection of non-representative groundwater samples.
- If the well does not recover quickly enough to permit the removal of three well volumes, the well will be pumped or bailed dry and sampled immediately following sufficient recovery. Generally, bailing the well dry once is adequate. Purging will be performed utilizing a properly decontaminated stainless steel or Teflon bailer or the appropriate pump. Utilization of a submersible pump is the preferable method of purging as repeatedly lowering the bailer into the monitoring well may oxygenate the formation waters and change the chemistry of the groundwater.

LANYARDS :

- Lanyards may be disposable (braided or monofilament nylon) or reusable (stainless steel Teflon coated).
- A disposable lanyard must be changed for each monitor well. But the same lanyard may used for purging and sampling operations without decontamination between purging sampling activities.
- Reusable lanyards shall be decontaminated between monitoring wells but do not require between purging and sampling operations.
- Lanyards must never come in contact with the ground or other surface which may contaminate the lanyard.

SAMPLE COLLECTION ORDER :

Samples shall be collected from the least to the most contaminated sampling locations within a site. This information can be obtained from historical data, the Site Manager, or OVA readings at the site.

Unless field conditions justify other sampling regimens, samples shall be collected in the following order :

- a. Volatile Organic Contaminants (VOCs)
- b. Extractable Organics [includes Total Recoverable Petroleum Hydrocarbons (TRPH), & Grease, Pesticides and Herbicides];
- c. Total Metals;
- d. Dissolved Metals;
- e. Microbiological;
- f. Inorganics (including Nutrients, Demands and Physical Properties); and
- g. Radionuclides.

SAMPLE PRESERVATION :

Samples must be preserved with the appropriate preservative and maintained on ice. A laboratory certified to perform hazardous waste testing by the State of California Department of Health Services (DOHS) will dispatch prepreserved sample containers for collection of samples. It is essential that the samples be maintained at 4 degrees centigrade until delivery to the laboratory facility. A notation must be made on the Chain of Custody form (COC) as well as in the logbook concerning sample preservation.

SAMPLE HANDLING :

It is critical that proper custody procedures be followed throughout all phases of sample collection and handling. Some specific points of concern are as follows: The samples from a particular site must never be commingled with samples from another site. Samples from several sites must never be combined in the same sample cooler. Each sample group must also be under separate documentation (i.e., A COC must be generated for each site and for each sampling event). The Site Manager as well as the individual who releases the samples to the transporter must follow up to see if the samples were received at the laboratory facility.

QUALITY ASSURANCE QUALITY CONTROL :

- Trip Blanks will be utilized to verify that handling and transportation activities of the empty sample containers and collected samples has not contaminated the groundwater samples. Trip blanks will be prepared and dispatched by the analyzing Laboratory. Trip blanks will accompany the empty sample containers through sampling and return shipment of samples to the Laboratory.
- Equipment Blanks will be collected, in field, to assess the completeness of decontamination procedures for precleaned equipment and field cleaned equipment. Equipment blanks will consist of pouring analyte-free water over decontaminated sampling equipment and collecting the rinsate into the appropriate prepreserved containers.
- Duplicates will be collected to assess the representativeness and variability inherent in the sampling process. They shall be obtained by DUPLICATING (simultaneously or in rapid succession) the entire sample acquisition technique that was used to obtain the first sample.

DOCUMENTATION :

Documentation is an essential part of sample collection therefore field logbook, field forms, sample labels, and COC records must be complete and accurate. At a minimum, the following information must be included in the logbook :

- Equipment used to purge the well; include pump type and flow-rate if applicable.
- Volume of water purged from the well.
- Complete description of the decontamination procedures used to clean the sampling equipment. If the equipment was pre-cleaned at the warehouse or laboratory the lot associated with this cleaning must be recorded in the logbook.

- The source of the analyte free water utilized on site. Include any lot numbers or batch numbers in the logbook.
- Note which well was sampled using the equipment blank bailer.
- Any observable physical characteristics of the groundwater (e.g., color, sheen, odor,) as it is being sampled.
- Sample temperature, pH, and specific conductance will be recorded for each sample.
- Weather conditions (e.g., air temperature, wind conditions, recent heavy rainfall, conditions) at the time of sampling will be recorded.
- The exact time of sample collection and the person who collected the sample.
- If any field forms are utilized the forms must be referenced in the logbook. For example following should be written in the logbook to reference a form : Refer to the water quality sheets for information concerning.....

SAMPLE IDENTIFICATION :

Sample nomenclature must be unique and must always include the date of sample collection. All samples must be identified utilizing the following format :

project #/ sample id/ date (e.g. MJ50/MW-3/122094, MJ53/INF/122094, etc.)

For example, a sample collected for project site MJ50 for monitoring well MW-3 on December 20, 1994 would have the following sample id : **MJ50-MW-3-122094.**

CONTAINMENT AND DISPOSAL OF PURGE WATER :

Purge water will be collected into DOT 17-H 55 gallon drums. The drums will be transported to an appropriate treatment facility and properly disposed of. Drum removal and disposal practices shall be thoroughly documented.

APPENDIX B

**WELL PURGING AND SAMPLING
DOCUMENTATION LOGS**

BROWN & ROOT ENVIRONMENTAL

GROUNDWATER SAMPLE COLLECTION RECORD

Site Name: E-Z Serve #100877
 Location: 525 West A Street, Hayward, CA
 Samplers: R. Roberts, V. Millar
 Weather: Overcast, misty, 60 deg F

Job #: MY40
 Date: 9/23/96
 Well ID: MW-1

WATER COLUMN INFORMATION (ft.) [1]:

a. Depth to Water: 14.92
 b. Total Well Depth: 32.10
 c. Height of water column: 17.18
 d. Well Casing Volume (gals): 11
 e. Well Screen Length: 20
 f. TOTAL WELL VOLUME: _____

TOC Elevation: 96.73
 Water Table Elevation: 81.81
 Well Diameter: 4"

[1] All datum are relative to a measurement point located on the TOC.

WELL PURGING DATA:

a. Purge Method: 2" Grundfos Redi-Flow submersible pump
 b. Purge Vol. (@ _____ gal. per well vol.): 33.5 gal. (3x well volume)
 c. Field Water Quality Monitoring Equipment: Accumet 1002 pH, Hanna HI8733 cond. meters
 d. Pump Flow Rate: 3.3 gpm
 e. Method of Purge Water Disposal: 17-H - 55 gallon drums

Volume Removed (gal.)	Time	T°C	pH	Specific Conductance	Description	Odor	Comments
8	1551	19.2	7.07	1.31	clear	slt fuel-like	
18	1554	19.0	7.20	1.30	clear	slt fuel-like	
25	1557	19.0	7.12	1.31	clear	slt fuel-like	
34	1559	19.3	7.12	1.31	clear	slt fuel-like	
Sample	1610						

SAMPLE COLLECTION METHOD:

Method: Disposable Teflon Bailer
 Sample Containers: 40 ml VOA vials
 Sample Preservation: HCL and ICE to 4 degrees centigrade
 Analyses: EPA Method 8020 + MTBE, EPA Method 8015 mod. - TPHg
 Laboratory: Centrum Analytical Laboratories, Inc. located in Redlands, CA

COMMENTS:

BROWN & ROOT ENVIRONMENTAL

GROUNDWATER SAMPLE COLLECTION RECORD

Site Name: E-Z Serve #100877
 Location: 525 West A Street, Hayward, CA
 Samplers: R. Roberts, V. Millar
 Weather: Overcast, misty, 60 deg F

Job #: MY40
 Date: 9/23/96
 Well ID: MW-2

WATER COLUMN INFORMATION (ft.) [1]:

a. Depth to Water: 16.61
 b. Total Well Depth: 32.30
 c. Height of water column: 15.69
 d. Well Casing Volume (gals): 10
 e. Well Screen Length: 14
 f. TOTAL WELL VOLUME: _____

TOC Elevation: 98.06
 Water Table Elevation: 81.45
 Well Diameter: 4"

[1] All datum are relative to a measurement point located on the TOC.

WELL PURGING DATA:

a. Purge Method: 2" Grundfos Redi-Flow submersible pump
 b. Purge Vol. (@ _____ gal. per well vol.): 31 gal. (3x well volume)
 c. Field Water Quality Monitoring Equipment: Accumet 1002 pH, Hanna HI8733 cond. meters
 d. Pump Flow Rate (gpm): 2.4
 e. Method of Purge Water Disposal: 17-H - 55 gallon drums

Volume Removed (gal.)	Time	T°c	pH	Specific Conductance	Description	Odor	Comments
2	1706	19.0	6.88	1.46	lt gray	fuel-like	
18	1709	18.8	6.92	1.42	lt gray	fuel-like	
24	1714	18.3	6.92	1.42	lt gray	fuel-like	
36	1718	18.1	6.97	1.43	lt gray	fuel-like	
Sample	1734						

SAMPLE COLLECTION METHOD:

Method: Disposable Teflon Bailer
 Sample Containers: 40 ml VOA vials
 Sample Preservation: HCL and ICE to 4 degrees centigrade
 Analyses: EPA Method 8020 + MTBE, EPA Method 8015 mod. - TPHg
 Laboratory: Centrum Analytical Laboratories, Inc. located in Redlands, CA

COMMENTS:

BROWN & ROOT ENVIRONMENTAL

GROUNDWATER SAMPLE COLLECTION RECORD

Site Name: E-Z Serve #100877
 Location: 525 West A Street, Hayward, CA
 Samplers: R. Roberts, V. Millar
 Weather: Overcast, misty, 60 deg F

Job #: MY40
 Date: 9/23/96
 Well ID: MW-3

WATER COLUMN INFORMATION (ft.) [1]:

a. Depth to Water: 16.11
 b. Total Well Depth: 32.10
 c. Height of water column: 15.99
 d. Well Casing Volume (gals): 10
 e. Well Screen Length: 14
 f. TOTAL WELL VOLUME: _____

TOC Elevation: 97.66
 Water Table Elevation: 81.55
 Well Diameter: 4"

[1] All datum are relative to a measurement point located on the TOC.

WELL PURGING DATA:

a. Purge Method: 2" Grundfos Redi-Flow submersible pump
 b. Purge Vol. (@ ____ gal. per well vol.): 31 gal. (3x well volume)
 c. Field Water Quality Monitoring Equipment: Accumet 1002 pH, Hanna HI8733 cond. meters
 d. Pump Flow Rate (gpm): 2.5
 e. Method of Purge Water Disposal: 17-H - 55 gallon drums

Volume Removed (gal.)	Time	T°c	pH	Specific Conductance	Description	Odor	Comments
5	1404	20.5	6.97	1.26	lt gray	fuel-like	
14	1405	19.7	6.97	1.25	clear	fuel-like	
16	1406	19.4	6.94	1.25	clear	fuel-like	
27	1411	19.2	6.94	1.25	clear	fuel-like	
29	1412	19.2	6.87	1.25	clear	fuel-like	
35	1416	19.2	6.89	1.26	clear	fuel-like	
Sample	1448						

SAMPLE COLLECTION METHOD:

Method: Disposable Teflon Bailer
 Sample Containers: 40 ml VOA vials
 Sample Preservation: HCL and ICE to 4 degrees centigrade
 Analyses: EPA Method 8020 + MTBE, EPA Method 8015 mod. - TPHg
 Laboratory: Centrum Analytical Laboratories, Inc. located in Redlands, CA

COMMENTS:

BROWN & ROOT ENVIRONMENTAL

GROUNDWATER SAMPLE COLLECTION RECORD

Site Name: E-Z Serve #100877
 Location: 525 West A Street, Hayward, CA
 Samplers: R. Roberts, V. Millar
 Weather: Overcast, misty, 60 deg F

Job #: MY40
 Date: 9/23/96
 Well ID: MW-4

WATER COLUMN INFORMATION (ft.) [1]:

a. Depth to Water: 15.56
 b. Total Well Depth: 32.11
 c. Height of water column: 16.55
 d. Well Casing Volume (gals): 11
 e. Well Screen Length: 14
 f. TOTAL WELL VOLUME: _____

TOC Elevation: 97.10
 Water Table Elevation: 81.54
 Well Diameter: 4"

[1] All datum are relative to a measurement point located on the TOC.

WELL PURGING DATA:

a. Purge Method: 2" Grundfos Redi-Flow submersible pump
 b. Purge Vol. (@ _____ gal. per well vol.): 32 gal. (3x well volume)
 c. Field Water Quality Monitoring Equipment: Accumet 1002 pH, Hanna HI8733 cond. meters
 d. Pump Flow Rate: 3.2 gpm
 e. Method of Purge Water Disposal: 17-H - 55 gallon drums

Volume Removed (gal.)	Time	T°c	pH	Specific Conductance	Description	Odor	Comments
7	1619	19.0	6.86	1.39	clear	fuel-like	
11	1621	18.7	7.10	1.38	clear	fuel-like	
15	1640	21.8	7.06	1.47	clear	fuel-like	
18	1642	20.4	7.12	1.34	clear	fuel-like	
37	1648	19.0	6.89	1.38	clear	fuel-like	
Sample	1648						

SAMPLE COLLECTION METHOD:

Method: Disposable Teflon Bailer
 Sample Containers: 40 ml VOA vials
 Sample Preservation: HCL and ICE to 4 degrees centigrade
 Analyses: EPA Method 8020 + MTBE, EPA Method 8015 mod. - TPHg
 Laboratory: Centrum Analytical Laboratories, Inc. located in Redlands, CA

COMMENTS: refilled generator with gasoline during purging from 1621 to 1640

BROWN & ROOT ENVIRONMENTAL

GROUNDWATER SAMPLE COLLECTION RECORD

Site Name: E-Z Serve #100877
 Location: 525 West A Street, Hayward, CA
 Samplers: R. Roberts, V. Millar
 Weather: Overcast, misty, 60 deg F

Job #: MY40
 Date: 9/23/96
 Well ID: MW-4

WATER COLUMN INFORMATION (ft.) [1]:

a. Depth to Water: 15.56
 b. Total Well Depth: 32.11
 c. Height of water column: 16.55
 d. Well Casing Volume (gals): 11
 e. Well Screen Length: 14
 f. TOTAL WELL VOLUME: _____

TOC Elevation: 97.10
 Water Table Elevation: 81.54
 Well Diameter: 4"

[1] All datum are relative to a measurement point located on the TOC.

WELL PURGING DATA:

a. Purge Method: 2" Grundfos Redi-Flow submersible pump
 b. Purge Vol. (@ _____ gal. per well vol.): 32 gal. (3x well volume)
 c. Field Water Quality Monitoring Equipment: Accumet 1002 pH, Hanna HI8733 cond. meters
 d. Pump Flow Rate: 3.2 gpm
 e. Method of Purge Water Disposal: 17-H - 55 gallon drums

Volume Removed (gal.)	Time	T°C	pH	Specific Conductance	Description	Odor	Comments
7	1619	19.0	6.86	1.39	clear	fuel-like	
11	1621	18.7	7.10	1.38	clear	fuel-like	
15	1640	21.8	7.06	1.47	clear	fuel-like	
18	1642	20.4	7.12	1.34	clear	fuel-like	
37	1648	19.0	6.89	1.38	clear	fuel-like	
Sample	1648						

SAMPLE COLLECTION METHOD:

Method: Disposable Teflon Bailer
 Sample Containers: 40 ml VOA vials
 Sample Preservation: HCL and ICE to 4 degrees centigrade
 Analyses: EPA Method 8020 + MTBE, EPA Method 8015 mod. - TPHg
 Laboratory: Centrum Analytical Laboratories, Inc. located in Redlands, CA

COMMENTS: refilled generator with gasoline during purging from 1621 to 1640

BROWN & ROOT ENVIRONMENTAL

GROUNDWATER SAMPLE COLLECTION RECORD

Site Name: E-Z Serve #100877
 Location: 525 West A Street, Hayward, CA
 Samplers: R. Roberts, V. Millar
 Weather: Overcast, misty, 60 deg F

Job #: MY40
 Date: 9/23/96
 Well ID: MW-5

WATER COLUMN INFORMATION (ft.) [1]:

a. Depth to Water: 15.19
 b. Total Well Depth: 32.48
 c. Height of water column: 17.29
 d. Well Casing Volume (gals): 11
 e. Well Screen Length: 14
 f. TOTAL WELL VOLUME: _____

TOC Elevation: 96.73
 Water Table Elevation: 81.54
 Well Diameter: 4"

[1] All datum are relative to a measurement point located on the TOC.

WELL PURGING DATA:

a. Purge Method: 2" Grundfos Redi-Flow submersible pump
 b. Purge Vol. (@ _____ gal. per well vol.): 34 gal. (3x well volume)
 c. Field Water Quality Monitoring Equipment: Accumet 1002 pH, Hanna HI8733 cond. meters
 d. Pump Flow Rate: 3.9 gpm
 e. Method of Purge Water Disposal: 17-H - 55 gallon drums

Volume Removed (gal.)	Time	T ^o c	pH	Specific Conductance	Description	Odor	Comments
5	1526	21.8	6.65	1.32	sit cloudy	sit fuel-like	
15	1527	19.8	6.72	1.29	sit cloudy	sit fuel-like	
19	1529	19.8	6.71	1.31	clear	sit fuel-like	
36	1534	19.8	6.67	1.31	clear	sit fuel-like	
Sample	1540						

SAMPLE COLLECTION METHOD:

Method: Disposable Teflon Bailer
 Sample Containers: 40 ml VOA vials
 Sample Preservation: HCL and ICE to 4 degrees centigrade
 Analyses: EPA Method 8020 + MTBE, EPA Method 8015 mod. - TPHg
 Laboratory: Centrum Analytical Laboratories, Inc. located in Redlands, CA

COMMENTS:

BROWN & ROOT ENVIRONMENTAL

GROUNDWATER SAMPLE COLLECTION RECORD

Site Name: E-Z Serve #100877
 Location: 525 West A Street, Hayward, CA
 Samplers: R. Roberts, V. Millar
 Weather: Overcast, misty, 60 deg F

Job #: MY40
 Date: 9/23/96
 Well ID: MW-6

WATER COLUMN INFORMATION (ft.) [1]:

a. Depth to Water: 15.50
 b. Total Well Depth: 32.10
 c. Height of water column: 16.60
 d. Well Casing Volume (gals): 11
 e. Well Screen Length: 14
 f. TOTAL WELL VOLUME: _____

TOC Elevation: 97.09
 Water Table Elevation: 81.59
 Well Diameter: 4"

[1] All datum are relative to a measurement point located on the TOC.

WELL PURGING DATA:

a. Purge Method: 2" Grundfos Redi-Flow submersible pump
 b. Purge Vol. (@ _____ gal. per well vol.): 32 gal. (3x well volume)
 c. Field Water Quality Monitoring Equipment: Accumet 1002 pH, Hanna HI8733 cond. meters
 d. Pump Flow Rate: 3 gpm
 e. Method of Purge Water Disposal: 17-H - 55 gallon drums

Volume Removed (gal.)	Time	T°c	pH	Specific Conductance	Description	Odor	Comments
5	1457	20.5	7.31	1.33	clear	slt fuel-like	
7	1458	20.0	7.03	1.31	clear	slt fuel-like	
15	1500	20.4	6.73	1.31	clear	slt fuel-like	
20	1503	20.1	6.83	1.31	clear	slt fuel-like	
30	1504	19.9	6.91	1.31	clear	slt fuel-like	
35	1507	19.9	6.88	1.31	clear	slt fuel-like	
Sample	1515						

SAMPLE COLLECTION METHOD:

Method: Disposable Teflon Bailer
 Sample Containers: 40 ml VOA vials
 Sample Preservation: HCL and ICE to 4 degrees centigrade
 Analyses: EPA Method 8020 + MTBE, EPA Method 8015 mod. - TPHg
 Laboratory: Centrum Analytical Laboratories, Inc. located in Redlands, CA

COMMENTS:

BROWN & ROOT ENVIRONMENTAL

GROUNDWATER SAMPLE COLLECTION RECORD

Site Name: E-Z Serve #100877
 Location: 525 West A Street, Hayward, CA
 Samplers: R. Roberts, V. Millar
 Weather: Overcast, misty, 60 deg F

Job #: MY40
 Date: 9/23/96
 Well ID: MW-7

WATER COLUMN INFORMATION (ft.) [1]:

a. Depth to Water: 15.94
 b. Total Well Depth: 30.06
 c. Height of water column: 14.12
 d. Well Casing Volume (gals): 2
 e. Well Screen Length: 14
 f. TOTAL WELL VOLUME: _____

TOC Elevation: 97.44
 Water Table Elevation: 81.50
 Well Diameter: 2"

[1] All datum are relative to a measurement point located on the TOC.

WELL PURGING DATA:

a. Purge Method: 2" Grundfos Redi-Flow submersible pump
 b. Purge Vol. (@ _____ gal. per well vol.): 7 gal. (3x well volume)
 c. Field Water Quality Monitoring Equipment: Accumet 1002 pH, Hanna HI8733 cond. meters
 d. Pump Flow Rate: 0.8 gpm
 e. Method of Purge Water Disposal: 17-H - 55 gallon drums

Volume Removed (gal.)	Time	T°c	pH	Specific Conductance	Description	Odor	Comments
3	1251	22.9	7.74	1.28	dk gray	sit fuel-like	
5	1253	21.0	7.19	1.27	sit cloudy	sit fuel-like	
8	1257	19.9	6.98	1.30	sit cloudy	sit fuel-like	
Sample	1309						

SAMPLE COLLECTION METHOD:

Method: Disposable Teflon Bailer
 Sample Containers: 40 ml VOA vials
 Sample Preservation: HCL and ICE to 4 degrees centigrade
 Analyses: EPA Method 8020 + MTBE, EPA Method 8015 mod. - TPHg
 Laboratory: Centrum Analytical Laboratories, Inc. located in Redlands, CA

COMMENTS:

BROWN & ROOT ENVIRONMENTAL

GROUNDWATER SAMPLE COLLECTION RECORD

Site Name: E-Z Serve #100877
 Location: 525 West A Street, Hayward, CA
 Samplers: R. Roberts, V. Millar
 Weather: Overcast, misty, 60 deg F

Job #: MY40
 Date: 9/23/96
 Well ID: MW-8

WATER COLUMN INFORMATION (ft.) [1]:

a. Depth to Water: 15.83
 b. Total Well Depth: 32.15
 c. Height of water column: 16.32
 d. Well Casing Volume (gals): 3
 e. Well Screen Length: 19
 f. TOTAL WELL VOLUME: _____

TOC Elevation: 97.61
 Water Table Elevation: 81.78
 Well Diameter: 2"

[1] All datum are relative to a measurement point located on the TOC.

WELL PURGING DATA:

a. Purge Method: 2" Grundfos Redi-Flow submersible pump
 b. Purge Vol. (@ _____ gal. per well vol.): 8 gal. (3x well volume)
 c. Field Water Quality Monitoring Equipment: Accumet 1002 pH, Hanna HI8733 cond. meters
 d. Pump Flow Rate: 3.3 gpm
 e. Method of Purge Water Disposal: 17-H - 55 gallon drums

Volume Removed (gal.)	Time	T ^c	pH	Specific Conductance	Description	Odor	Comments
3	1331	22.5	7.21	1.40	cloudy bwn	sit fuel-like	
7	1332	21.3	7.10	1.38	cloudy bwn	sit fuel-like	
9.5	1333	20.9	7.12	1.39	cloudy bwn	sit fuel-like	
Sample	1333						

SAMPLE COLLECTION METHOD:

Method: Disposable Teflon Bailer
 Sample Containers: 40 ml VOA vials
 Sample Preservation: HCL and ICE to 4 degrees centigrade
 Analyses: EPA Method 8020 + MTBE, EPA Method 8015 mod. - TPHg
 Laboratory: Centrum Analytical Laboratories, Inc. located in Redlands, CA

COMMENTS:

BROWN & ROOT ENVIRONMENTAL

GROUNDWATER SAMPLE COLLECTION RECORD

Site Name: E-Z Serve #100877
 Location: 525 West A Street, Hayward, CA
 Samplers: R. Roberts, V. Millar
 Weather: Overcast, misty, 60 deg F

Job #: MY40
 Date: 9/23/96
 Well ID: MW-10

WATER COLUMN INFORMATION (ft.) [1]:

a. Depth to Water: 15.59
 b. Total Well Depth: 31.80
 c. Height of water column: 16.21
 d. Well Casing Volume (gals): 3
 e. Well Screen Length: 19
 f. TOTAL WELL VOLUME: _____

TOC Elevation: 97.11
 Water Table Elevation: 81.52
 Well Diameter: 2"

[1] All datum are relative to a measurement point located on the TOC.

WELL PURGING DATA:

a. Purge Method: 2" Grundfos Redi-Flow submersible pump
 b. Purge Vol. (@ ____ gal. per well vol.): 8 gal. (3x well volume)
 c. Field Water Quality Monitoring Equipment: Accumet 1002 pH, Hanna HI8733 cond. meters
 d. Pump Flow Rate: 3 gpm
 e. Method of Purge Water Disposal: 17-H - 55 gallon drums

Volume Removed (gal.)	Time	T ^o c	pH	Specific Conductance	Description	Odor	Comments
2	1059	19.4	7.19	1.03	cloudy gray	fuel-like	
6	1100	19.7	7.21	1.01	cloudy gray	fuel-like	
8	1101	19.7	7.10	1.01	cloudy gray	fuel-like	
Sample	1111						

SAMPLE COLLECTION METHOD:

Method: Disposable Teflon Bailor
 Sample Containers: 40 ml VOA vials
 Sample Preservation: HCL and ICE to 4 degrees centigrade
 Analyses: EPA Method 8020 + MTBE, EPA Method 8015 mod. - TPHg
 Laboratory: Centrum Analytical Laboratories, Inc. located in Redlands, CA

COMMENTS:

BROWN & ROOT ENVIRONMENTAL

GROUNDWATER SAMPLE COLLECTION RECORD

Site Name: E-Z Serve #100877
 Location: 525 West A Street, Hayward, CA
 Samplers: R. Roberts, V. Millar
 Weather: Overcast, misty, 60 deg F

Job #: MY40
 Date: 9/23/96
 Well ID: MW-12

WATER COLUMN INFORMATION (ft.) [1]:

a. Depth to Water: 16.77
 b. Total Well Depth: 30.00
 c. Height of water column: 13.23
 d. Well Casing Volume (gals): 2
 e. Well Screen Length: 20
 f. TOTAL WELL VOLUME: _____

TOC Elevation: 99.03
 Water Table Elevation: 82.26
 Well Diameter: 2"

[1] All datum are relative to a measurement point located on the TOC.

WELL PURGING DATA:

a. Purge Method: 2" Grundfros Redi-Flow submersible pump
 b. Purge Vol. (@ _____ gal. per well vol.): 6 gal. (3x well volume)
 c. Field Water Quality Monitoring Equipment: Accumet 1002 pH, Hanna HI8733 cond. meters
 d. Pump Flow Rate: 2.5 gpm
 e. Method of Purge Water Disposal: 17-H - 55 gallon drums

Volume Removed (gal.)	Time	T ^c	pH	Specific Conductance	Description	Odor	Comments
3	1140	21.7	8.01	0.87	cloudy tan	no	
5	1141	20.3	7.30	0.85	cloudy tan	no	
8	1142	19.8	7.16	0.87	cloudy tan	no	
Sample	1156						

SAMPLE COLLECTION METHOD:

Method: Disposable Teflon Bailer
 Sample Containers: 40 ml VOA vials
 Sample Preservation: HCL and ICE to 4 degrees centigrade
 Analyses: EPA Method 8020 + MTBE, EPA Method 8015 mod. - TPHg
 Laboratory: Centrum Analytical Laboratories, Inc. located in Redlands, CA

COMMENTS:

BROWN & ROOT ENVIRONMENTAL

GROUNDWATER SAMPLE COLLECTION RECORD

Site Name: E-Z Serve #100877
 Location: 525 West A Street, Hayward, CA
 Samplers: R. Roberts, V. Millar
 Weather: Overcast, misty, 60 deg F

Job #: MY40
 Date: 9/23/96
 Well ID: MW-11

WATER COLUMN INFORMATION (ft.) [1]:

a. Depth to Water: 12.29
 b. Total Well Depth: 25.00
 c. Height of water column: 12.71
 d. Well Casing Volume (gals): 2
 e. Well Screen Length: 20
 f. TOTAL WELL VOLUME: _____

TOC Elevation: 92.68
 Water Table Elevation: 80.39
 Well Diameter: 2"

[1] All datum are relative to a measurement point located on the TOC.

WELL PURGING DATA:

a. Purge Method: 2" Grundfos Redi-Flow submersible pump
 b. Purge Vol. (@ _____ gal. per well vol.): 6 gal. (3x well volume)
 c. Field Water Quality Monitoring Equipment: Accumet 1002 pH, Hanna HI8733 cond. meters
 d. Pump Flow Rate: 3 gpm
 e. Method of Purge Water Disposal: 17-H - 55 gallon drums

Volume Removed (gal.)	Time	T°c	pH	Specific Conductance	Description	Odor	Comments
2	0930	20.0	6.54	1.23	gray-brown	fuel-like	
6	0932	20.3	6.63	1.29	gray-brown	fuel-like	
9	0932	20.6	6.60	1.29	gray-brown	fuel-like	
Sample	0944						

SAMPLE COLLECTION METHOD:

Method: Disposable Teflon Bailer
 Sample Containers: 40 ml VOA vials
 Sample Preservation: HCL and ICE to 4 degrees centigrade
 Analyses: EPA Method 8020 + MTBE, EPA Method 8015 mod. - TPHg
 Laboratory: Centrum Analytical Laboratories, Inc. located in Redlands, CA

COMMENTS:

BROWN & ROOT ENVIRONMENTAL

GROUNDWATER SAMPLE COLLECTION RECORD

Site Name: E-Z Serve #100877
 Location: 525 West A Street, Hayward, CA
 Samplers: R. Roberts, V. Millar
 Weather: Overcast, misty, 60 deg F

Job #: MY40
 Date: 9/23/96
 Well ID: MW-13

WATER COLUMN INFORMATION (ft.) [1]:

a. Depth to Water: 14.80
 b. Total Well Depth: 30.00
 c. Height of water column: 15.40
 d. Well Casing Volume (gals): 2
 e. Well Screen Length: 20
 f. TOTAL WELL VOLUME: _____

TOC Elevation: 96.80
 Water Table Elevation: 82.20
 Well Diameter: 2"

[1] All datum are relative to a measurement point located on the TOC.

WELL PURGING DATA:

a. Purge Method: 2" Grundfos Redi-Flow submersible pump
 b. Purge Vol. (@ ___ gal. per well vol.): 7.4 gal. (3x well volume)
 c. Field Water Quality Monitoring Equipment: Accumet 1002 pH, Hanna HI8733 cond. meters
 d. Pump Flow Rate: 1.7 gpm
 e. Method of Purge Water Disposal: 17-H - 55 gallon drums

Volume Removed (gal.)	Time	T°c	pH	Specific Conductance	Description	Odor	Comments
3	1018	19.2	7.28	1.20	cloudy gray	no	
5	1019	19.5	7.10	1.20	cloudy gray	no	
7	1020	19.6	7.04	1.19	cloudy tan	no	
8	1021	19.6	7.16	1.20	cloudy tan	no	
Sample	1032						

SAMPLE COLLECTION METHOD:

Method: Disposable Teflon Bailer
 Sample Containers: 40 ml VOA vials
 Sample Preservation: HCL and ICE to 4 degrees centigrade
 Analyses: EPA Method 8020 + MTBE, EPA Method 8015 mod. - TPHg
 Laboratory: Centrum Analytical Laboratories, Inc. located in Redlands, CA

COMMENTS:

BROWN & ROOT ENVIRONMENTAL

GROUNDWATER SAMPLE COLLECTION RECORD

Site Name: E-Z Serve #100877
 Location: 525 West A Street, Hayward, CA
 Samplers: R. Roberts, V. Millar
 Weather: Overcast, misty, 60 deg F

Job #: MY40
 Date: 9/23/96
 Well ID: MW-14

WATER COLUMN INFORMATION (ft.) [1]:

a. Depth to Water: 16.67
 b. Total Well Depth: 30.00
 c. Height of water column: 13.33
 d. Well Casing Volume (gals): 2
 e. Well Screen Length: 20
 f. TOTAL WELL VOLUME: _____

TOC Elevation: 99.01
 Water Table Elevation: 82.34
 Well Diameter: 2"

[1] All datum are relative to a measurement point located on the TOC.

WELL PURGING DATA:

a. Purge Method: 2" Grundfos Redi-Flow submersible pump
 b. Purge Vol. (@ _____ gal. per well vol.): 6.4 gal. (3x well volume)
 c. Field Water Quality Monitoring Equipment: Accumet 1002 pH, Hanna HI8733 cond. meters
 d. Pump Flow Rate: 3 gpm
 e. Method of Purge Water Disposal: 17-H - 55 gallon drums

Volume Removed (gal.)	Time	T ^o c	pH	Specific Conductance	Description	Odor	Comments
3	1216	21.5	7.77	1.15	dk gry bwn	fuel like	
5	1217	20.2	7.24	1.12	dk gry bwn	fuel like	
9	1218	19.9	7.11	1.13	lt bwn	fuel like	
Sample	1231						

SAMPLE COLLECTION METHOD:

Method: Disposable Teflon Bailer
 Sample Containers: 40 ml VOA vials
 Sample Preservation: HCL and ICE to 4 degrees centigrade
 Analyses: EPA Method 8020 + MTBE, EPA Method 8015 mod. - TPHg
 Laboratory: Centrum Analytical Laboratories, Inc. located in Redlands, CA

COMMENTS:

APPENDIX C

LABORATORY ANALYTICAL REPORT AND CHAIN OF CUSTODY



Centrum Analytical Laboratories, Inc.

CERTIFIED HAZARDOUS WASTE TESTING LABORATORY • CHEMICAL AND BIOLOGICAL ANALYSES

Client: Brown & Root
455 Fairway Dr., Ste. 200
Deerfield Beach, FL 33441

Date Sampled: 09/23/96
Date Received: 09/25/96
Job Number: 10843

Project: EZ Serve #100877

CASE NARRATIVE

The following information applies to samples which were received on 09/25/96 :

The samples were received at the laboratory chilled and sample containers were intact.

Unless otherwise noted below, the Quality Control acceptance criteria were met for all samples for every analysis requested.

Report approved by:

Robert R. Clark, Ph.D.
Laboratory Director

ELAP # 1184

DL : Detection Limit – The lowest level at which the compound can reliably be detected under normal laboratory conditions.
ND : Not Detected – The compound was analyzed for but was not found to be present at or above the detection limit.
NA : Not Analyzed – Per client request, this analyte was not on the list of compounds to be analyzed for.

Modified 8015 - Total Volatile Hydrocarbons as Gasoline

Client: Brown & Root
 Project: EZ Serve #100877
 Job No.: 10843
 Matrix: Water
 Analyst: JLW

Date Sampled: 09/23/96
 Date Received: 09/25/96
 Date Analyzed: 09/28/96
 Batch Number: 015GW1016

Sample ID	Detection Limit mg/L	Petroleum Hydrocarbons as Gasoline mg/L
Method Blank	0.10	ND
877-EQUIP BLANK	0.10	ND
877-MW-11	0.10	27
877-MW13	0.10	ND
877-MW10	0.10	3.8
877-MW12	0.10	ND
877-MW14	0.10	6.4
877-MW7	0.10	6.3
877-MW8	0.10	ND
877-MW3	0.10	10
877-MW6	0.10	12
877-MW5	0.10	9.8
877-MW1	0.10	20
877-MW4	0.10	32
877-MW2	0.10	29
877-DUPE	0.10	11
TRIP BLANK	0.10	ND

QC Sample Report - EPA 8015M Gasoline

Matrix: Water
Batch #: 8015GW1016

Batch Accuracy Results

Sample ID: Laboratory Control Sample

Analyte	Spike Concentration mg/L	% Recovery LCS	Acceptance Limits % Recovery	Pass/Fail
Gasoline	5.0	91	70 - 130	Pass

Analytical Notes:

Batch Precision Results

MS/MSD Sample ID: 877-MW1

Analyte	Spike Sample Recovery mg/L	Spike Duplicate Recovery mg/L	Relative Percent Difference (RPD)	Upper Control Limit RPD	Pass/Fail
Gasoline	100	96.9	3%	25%	Pass

Analytical Notes:

MS: Matrix Spike Sample
MSD: Matrix Spike Duplicate

EPA 8020 - BTEX and MtBE

Client:	Brown & Root	Date Sampled:	09/23/96
Project:	EZ Serve #100877	Date Received:	09/25/96
Job No.:	10843	Date Analyzed:	09/28/96
Matrix:	Water	Batch Number:	8020W1184
Analyst:	JLW		

	Methyl-tert Butyl Ether	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Surrogate (BFB)
Detection Limit:	0.0005	0.0005	0.0005	0.0005	0.0015	Limit: >50%
Sample ID	mg/L	mg/L	mg/L	mg/L	mg/L	
Method Blank	ND	ND	ND	ND	ND	89 %
877-EQUIP BLANK	ND	ND	ND	ND	ND	91 %
877-MW-11	0.040	0.055	0.081	3.0	3.5	95 %
877-MW13	ND	ND	0.0008	0.0010	ND	88 %
877-MW10	0.0090	0.0040	0.0029	0.22	0.17	92 %
877-MW12	ND	ND	0.0016	ND	ND	87 %
877-MW14	0.0096	0.0028	ND	0.69	0.096	101 %
877-MW7	0.015	0.076	ND	0.42	0.27	96 %
877-MW8	ND	ND	0.0025	0.0011	ND	86 %
877-MW3	0.080	0.95	0.020	0.70	0.78	96 %
877-MW6	0.051	0.52	0.055	0.93	0.35	97 %
877-MW5	0.10	1.8	0.011	0.47	0.51	93 %
877-MW1	0.27	5.2	0.086	0.70	1.1	92 %
877-MW4	2.1	7.4	0.54	1.5	2.8	87 %
877-MW2	0.86	3.7	0.15	1.6	4.3	91 %
877-DUPE	0.0076	1.0	0.029	0.83	0.96	83 %
TRIP BLANK	ND	ND	ND	ND	ND	88 %

QC Sample Report - EPA 8020

Matrix: Soil
Batch #: 8020W1184

Batch Accuracy Results

Sample ID: Laboratory Control Sample

Analyte	Spike Concentration mg/L	% Recovery LCS	Acceptance Limits % Recovery	Pass/Fail
Benzene	0.10	93	70 - 130	Pass
Toluene	0.10	92	70 - 130	Pass
Ethyl Benzene	0.10	94	70 - 130	Pass
m-, p-Xylene	0.20	96	70 - 130	Pass
o-Xylene	0.10	93	70 - 130	Pass

Analytical Notes:

Batch Precision Results

MS/MSD Sample ID: Laboratory Control Sample

Analyte	Spike Sample Recovery mg/L	Spike Duplicate Recovery mg/L	Relative Percent Difference (RPD)	Upper Control Limit RPD	Pass/Fail
Benzene	0.093	0.100	7%	25%	Pass
Toluene	0.092	0.093	1%	25%	Pass
Ethyl Benzene	0.094	0.096	2%	25%	Pass
m-, p-Xylene	0.191	0.191	0%	25%	Pass
o-Xylene	0.093	0.093	0%	25%	Pass

Analytical Notes:

MS: Matrix Spike Sample
MSD: Matrix Spike Duplicate



290 TENNESSEE STREET
REDLANDS, CA 92373

(909) 798-9336 • (800) 798-9336
FAX (909) 793-1559

Chain of Custody Record

Project No.: M440		Project Name: EZ SERVE # 100877					Analyses Requested										Turn-around time				
Project Manager: Arnold Lamb		Phone: (954) 570-5885		Fax: (954) 570-5974			GCMS: 8260 8240 8010 824.2	8080: Pesticides PCBs Pest/PCB	8015M: Diesel Fuel Screen	8015M: Gasoline 8020 Gas/BTEX	418.1 (TRPH)	Semi-volatiles: 8270 825	Metals: TL(CAM) PP RCRA	Lead Only	PH TDS TSS Conductivity COD	Flashpoint Fluoride Hex Chrome	<input type="checkbox"/> 24 Hr. RUSH* <input type="checkbox"/> 48 Hr. RUSH* <input checked="" type="checkbox"/> Normal TAT <small>* Requires prior approval, additional charges apply</small>				
Client Name: Brownt Root Environmental		Address: 455 Fairway Drive St. 200, Deerfield Beach, FL															3341 Containers: # and type		Remarks/ Special Instructions		
Centrum ID (Lab use only)	Sample ID (As it should appear on report)	Date sampled	Time sampled	Sample matrix	Site location																
1	877-EQUIP BLANK	9/23/02	0937	WATER	EZ SERVE # 100877	1-40ml			X									Include			
2	877-MW11		0941			3-40ml			X									MTBE in			
3	877-MW13		1032						X									ANALYSIS			
4	877-MW10		1111						X												
5	877-MW12		1156						X												
6	877-MW14		1231						X												
7	877-MW7		1309						X												
8	877-MW8		1314						X												
9	877-MW3		1448						X												
10	877-MW6		1515						X												
Relinquished by: (Sampler's Signature) Virginia J. Mullan		Date 9/25/02	Time 1000	Relinquished by: L		Date	Time	To be completed by laboratory personnel:										Sample Disposal			
Received by:		Date	Time	Received by:		Date	Time	Samples chilled? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Custody seals? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No All sample containers intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Courier <input checked="" type="checkbox"/> UPS/Fed Ex <input type="checkbox"/> Hand carried										<input type="checkbox"/> Client will pick up <input type="checkbox"/> Return to client <input checked="" type="checkbox"/> Lab disposal fee \$5			
The delivery of samples and the signature on this chain of custody form constitutes authorization to perform the analyses specified above under the Terms and Conditions set forth on the back hereof.						Relinquished by:		Date	Time												
						Received for Laboratory by: Josh Eastwood		Date 9/25/02	Time 1000												
Laboratory Notes:																Sample Locator No A-5					



Project No.: <u>M440</u>		Project Name: <u>EZ SERVE # 100877</u>		Analyses Requested												Turn-around time					
Project Manager: <u>Arnold Lamb</u>		Phone: <u>(954) 570-5885</u>		Fax: <u>(954) 570-5974</u>														<input type="checkbox"/> 24 Hr. RUSH* <input type="checkbox"/> 48 Hr. RUSH* <input checked="" type="checkbox"/> Normal TAT <small>* Requires prior approval, additional charges apply</small>			
Client Name: <u>Brown + Root Environmental</u>		Address: <u>455 Fairway Drive Ste 200, Deerfield Beach, FL</u>														Remarks/ Special Instructions					
Centrum ID (Lab use only)	Sample ID (As it should appear on report)	Date sampled	Time sampled	Sample matrix	Site location	33441 Containers: # and type	GC/MS: 8280 8240 8210 824.2	8090: Pesticides PCBs Pest/PCB	8015M: Diesel Fuel Screen	8015M: Gasoline 8020 Gas/BTEX	418.1 (TRPH)	Semivolatiles: 8270 825	Metals: TLC(CAM) PP RCRA	Lead Only	pH TDS TSS Conductivity COD	Flashpoint Fluoride Hex Chrome					
11	877-MW5	9/23/02	1540		EZ SERVE # 100877	3-40ml				X								Include MTBE in 8020 Analysis			
12	877-MW1	9/23/02	1610		↓	↓				X											
13	877-MW4	↓	1657		↓	↓				X											
14	877-MW2	↓	1734		↓	↓				X											
15	877-DUPE	↓	0000		↓	↓				X											
16	TRIP BLANK	—	—		LAB	1-40ml				X											
17	FIELD BLANK	—	—		LAB	1-40ml	— DO NOT ANALYZE —														
Relinquished by (Sampler's Signature): <u>Victoria J. Miller</u>		Date: <u>9/24/02</u>	Time: <u>1000</u>	Relinquished by:		Date:	Time:	To be completed by laboratory personnel:										Sample Disposal			
Received by:		Date:	Time:	Received by:		Date:	Time:	Samples chilled? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Custody seals? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No All sample containers intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Courier <input checked="" type="checkbox"/> UPS/Fed Ex <input type="checkbox"/> Hand carried										<input type="checkbox"/> Client will pick up <input type="checkbox"/> Return to client <input checked="" type="checkbox"/> Lab disposal fee \$5			
The delivery of samples and the signature on this chain of custody form constitutes authorization to perform the analyses specified above under the Terms and Conditions set forth on the back hereof.						Relinquished by:		Date:	Time:												
						Received for Laboratory by: <u>J Eastwood</u>		Date: <u>9/25/02</u>	Time: <u>10-</u>												
Laboratory Notes:																Sample Locator No. <u>A5</u>					