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March 27, 1991

Mr. Larry Seto  
Division of Hazardous Materials  
Department of Environmental Health  
80 Swan Way, Room 200  
Oakland, California 94621

Dear Mr. Seto:

**QUARTERLY GROUNDWATER MONITORING REPORT, EMERY BAY  
MARKETPLACE, EMERYVILLE, CALIFORNIA**

Attached is the letter report "Quarterly Groundwater Monitoring Report, Emery Bay Marketplace, Emeryville, California," March 5, 1991. The report summarizes the quarterly groundwater monitoring activities performed at the Emery Bay Marketplace property during the months of November and December 1990 and January 1991 in accordance with the "Work Plan for Groundwater Monitoring and Free Product Removal at the Marketplace Site, Emeryville, California," July 6, 1990 (Work Plan). The Work Plan was submitted to address recommendations made in the report "Groundwater Characterization, Emery Bay Marketplace," June 19, 1990.

If you have any questions, please call me.

Sincerely,

*Julie S. Menack*

Julie S. Menack, RG #4440  
Senior Hydrogeologist

cc: Lynn Tolin

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QUARTERLY GROUNDWATER  
MONITORING REPORT  
EMERY BAY MARKETPLACE  
EMERYVILLE, CALIFORNIA

MARCH 5, 1991





March 5, 1991

Ms. Lynn Tolin  
Christie Avenue Partners-JS  
6475 Christie Avenue, Suite 500  
Emeryville, California 94608

Dear Ms. Tolin:

**QUARTERLY GROUNDWATER MONITORING REPORT, EMERY BAY  
MARKETPLACE, EMERYVILLE, CALIFORNIA**

This letter report documents the results of the quarterly monitoring activities conducted at the Emery Bay Marketplace property during the months of November and December 1990 and January 1991. This is the third quarterly report submitted in accordance with the "Work Plan for Groundwater Monitoring and Free Product Removal at the Marketplace Site, Emeryville, California," July 6, 1990 (Work Plan) (McLaren, 1990b). The Work Plan was submitted to address recommendations made in the report "Groundwater Characterization, Emery Bay Marketplace," June 19, 1990 (Groundwater Characterization Report) (McLaren, 1990a).

The following activities were proposed in the Work Plan:

- Obtain groundwater elevation measurements at all monitoring wells on a quarterly basis (July and October 1990; January and April 1991) and prepare groundwater elevation maps;
- Sample groundwater from six downgradient wells (Wells W-7, W-13, W-14, W-19, W-20, and W-24) on a quarterly basis (July and October 1990; January and April 1991) to verify that petroleum hydrocarbons in groundwater are confined to the Marketplace property and have not migrated off-site. Analyze samples for total petroleum hydrocarbons as diesel (TPH/D) and motor oil (TPH/MO) by modified EPA Method 8015;
- Remove free product from Well W-5 on a bi-weekly basis for four months and on a monthly basis for eight months; and
- Abandon Well W-10 which cannot be used for sampling.

Ms. Lynn Tolin  
March 5, 1991  
Page 2

This letter presents the results of the depth to groundwater measurements and the groundwater quality sampling and analyses performed during the month of January 1991. The activities associated with the free product removal from Well W-5 are summarized. Well W-10 was abandoned on October 1, 1990 and the abandonment activities were described in the last Quarterly Report dated November 28, 1990 (McLaren/Hart, 1990b).

### GROUNDWATER ELEVATIONS

Depths to groundwater in all existing wells at the Emery Bay Marketplace property were measured with a Solinst electronic water level indicator on January 3, 1991. A Marine Moisture Control Company oil-water interface probe was used to measure depth to oil and depth to groundwater in wells where free product occurs (Wells W-5 and W-16). Hydrologic data sheets are provided in Attachment A. A summary of historical depth to groundwater measurements, monitoring well surface casing elevations, and calculated groundwater surface elevations is presented in Table 1.

The January 3, 1991 groundwater surface elevation contours for the artificial fill are presented in Figure 1. Groundwater elevations from wells completed only in the native material which underlies the artificial fill (Wells W-15, W-16, and W-22), were not used to construct the map because it was determined in the Groundwater Characterization Report (McLaren, 1990a) that confined or semi-confined conditions may exist in the native material. The groundwater elevations observed in January for wells completed in the native material are consistent with previous measurements and support this conclusion (Table 1). The groundwater elevation for Well W-5 was not used because the product which occurs in the well may affect the groundwater elevation.

The groundwater flow map for the artificial fill (Figure 1) is consistent with previously presented groundwater flow maps (McLaren, 1990a; McLaren/Hart, 1990a, 1990b) and indicates that groundwater flow is toward the west-southwest. As suggested in the Groundwater Characterization Report (McLaren, 1990a) local variations in groundwater flow near Wells W-4 and W-8 may be caused by a slurry wall installed to a depth of 35 feet on the adjacent upgradient property.



The groundwater samples were analyzed for TPH/D and TPH/MO by Modified EPA Method 8015. Groundwater samples were sent under chain-of-custody to McLaren/Hart Analytical Laboratory (MAL) in Rancho Cordova, California. One travel blank was sent on each day of sampling as a Quality Assurance (QA) sample. The analytical laboratory data sheets, QA laboratory results, chain-of-custody records, and sampling data sheets are included in Appendix B. The analytical results are summarized and presented with the historical analytical data in Table 2.

The analyses of the groundwater samples show the following results:

- TPH/D was detected in groundwater from Well W-7 at 4000 parts per billion (ppb) and TPH/MO was detected at 12,000 ppb. TPH/D previously has been detected at similar concentrations and TPH/MO previously has been detected at concentrations ranging from 2000 to 7500 ppb. It is unlikely that the higher concentration of TPH/MO detected at Well W-7 in January 1991, is indicative of a change in groundwater conditions.
- TPH/D and TPH/MO were not detected in groundwater from Well W-19. However, smears of dark brown product were observed on the bailer when the well was sampled both this quarter and last quarter. TPH/D previously has not been detected, or has been detected at very low concentrations. TPH/MO analyses have only been performed on two previous occasions and TPH/MO was detected at 8000 ppb on July 27, 1990 and 3000 ppb on October 3, 1990. Future sampling of Well W-19 will establish whether TPH/MO concentrations in groundwater are decreasing or whether the different concentrations detected are the result of sampling variability.
- TPH/D and TPH/MO were not detected in groundwater samples from Wells W-13, W-14, W-20 and W-24. These constituents previously have not been detected in groundwater from these four wells. The results from the January 1991 sampling event confirm that petroleum hydrocarbons do not occur downgradient of Wells W-7 and W-19.

## FREE PRODUCT REMOVAL FROM WELL W-5

Free product has been removed from Well W-5 on a biweekly basis from July through October 1990 and on a monthly basis since October 1990. It was recommended in the Work Plan that free product be removed from Well W-5 on a biweekly basis for a period of four months and on a monthly basis thereafter for a period of eight months. Free product will continue to be removed from Well W-5 on a monthly basis through June 1991.

The free product thickness is measured with an oil-water interface probe prior to removal. Product is then removed with a disposable bailer or a peristaltic pump. The product thickness, both before and after product removal, and an estimate of the volume of fluid removed, is recorded in Table 3. It should be noted that the volume of fluid removed includes an undetermined amount of water.

During this quarter, product has been removed from Well W-5 on a monthly basis. Product thickness was 1.30 feet, 0.71 feet and 0.99 feet prior to removal in November and December 1990, and January 1991, respectively (Table 3). The product thickness measured during this quarter when product has been removed on a monthly basis, is similar to the product thickness measured previously when product was removed on a biweekly basis from August 8 through October 31, 1990 (1.04 to 1.24 feet). Product was thicker in Well W-5 (2.12 feet) when it was initially removed on July 25, 1990.

## CONCLUSIONS

In summary, the results from the November 1990 through January 1991 quarterly monitoring activities conducted at the Emery Bay Marketplace property are as follows:


- The January 1991 groundwater flow map for the artificial fill (Figure 1) is consistent with previous groundwater flow maps ( McLaren, 1990a; McLaren/Hart, 1990a, 1990b), and shows that groundwater flow is toward the west-southwest.
- The January 1991 groundwater sampling event confirms the conclusion from the Groundwater Characterization Report that petroleum hydrocarbons do not occur downgradient of Wells W-7 and W-19.

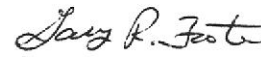
Ms. Lynn Tolin  
March 5, 1991  
Page 6

Free product has been removed from Well W-5 on a biweekly basis from July through October 1990 and on a monthly basis since October 1990. The average product thickness prior to removal has decreased from 2.12 feet the first time product was removed to 0.79 to 1.30 feet on all subsequent occasions. The product thickness does not appear to have changed significantly since product has been removed on a monthly basis rather than a biweekly basis.

If you have any questions regarding this report, please do not hesitate to call.

Sincerely,

  
Julie S. Menack, RG #4440  
Senior Hydrogeologist

  
Gary R. Foote  
Senior Geologist

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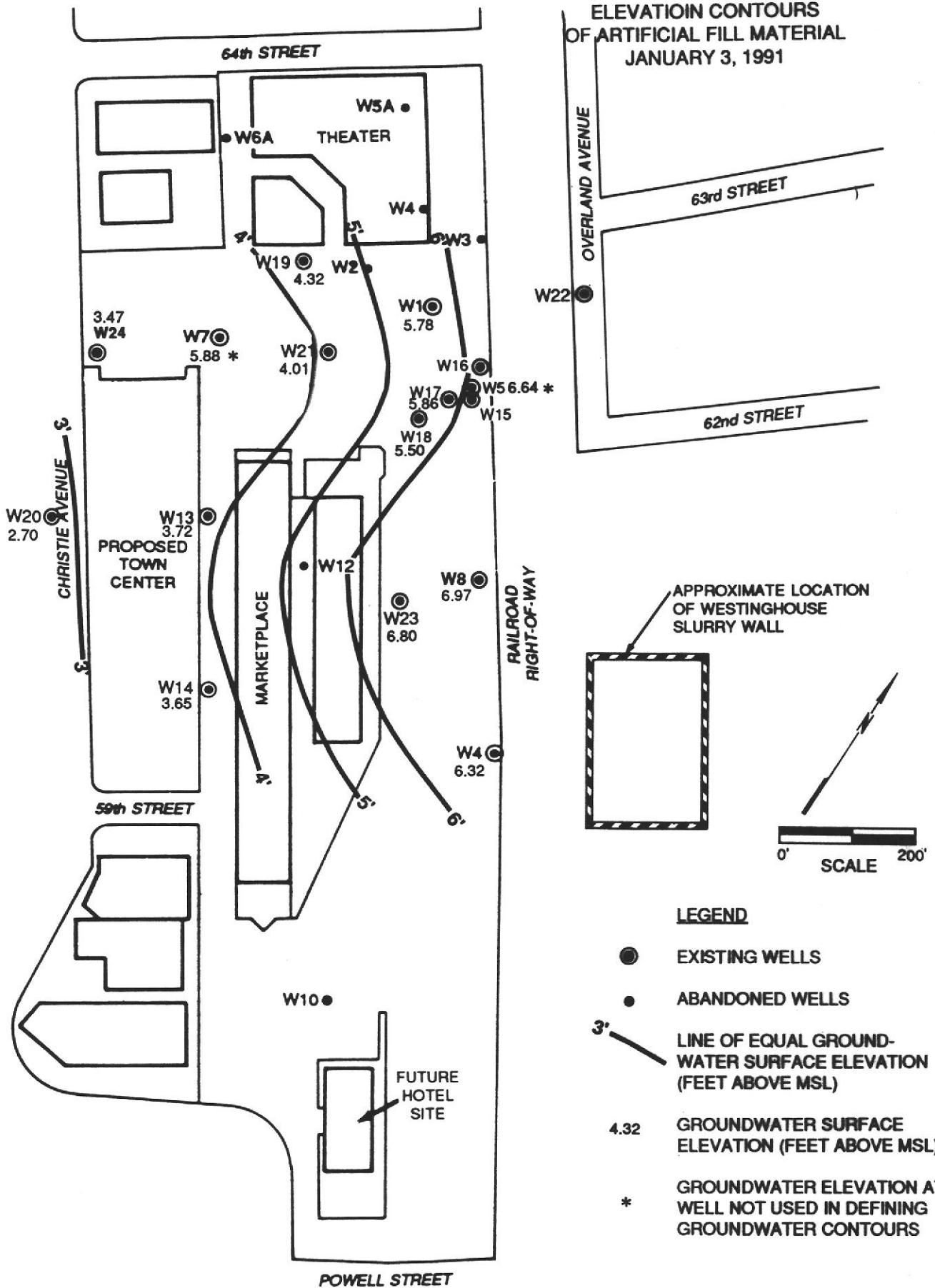


## REFERENCES

- McLaren. (1989) Free Product Subsurface Investigation, Marketplace Site, Emeryville, California, October 19, 1989.
- McLaren. (1990a) Groundwater Characterization, Emery Bay Marketplace, June 19, 1990.
- McLaren. (1990b) Work Plan for Groundwater Monitoring and Free Product Removal at the Marketplace Site, Emeryville, California, July 6, 1990.
- McLaren/Hart. (1990a) Quarterly Groundwater Monitoring Report, Emery Bay Marketplace, Emeryville, California, October 3, 1990.
- McLaren/Hart. (1990b) Quarterly Groundwater Monitoring Report, Emery Bay Marketplace, Emeryville, California, November 28, 1990.



FIGURE 1  
GROUNDWATER SURFACE  
ELEVATION CONTOURS  
OF ARTIFICIAL FILL MATERIAL  
JANUARY 3, 1991



**LEGEND**

- EXISTING WELLS
- ABANDONED WELLS
- 3' — LINE OF EQUAL GROUND-WATER SURFACE ELEVATION (FEET ABOVE MSL)
- 4.32 — GROUNDWATER SURFACE ELEVATION (FEET ABOVE MSL)
- \* — GROUNDWATER ELEVATION AT WELL NOT USED IN DEFINING GROUNDWATER CONTOURS

TABLE 1  
GROUNDWATER DEPTHS AND ELEVATIONS  
EMERY BAY MARKETPLACE SITE

Well Number	Top of Casing (Feet)	Date	Depth to Groundwater (Feet)	Groundwater Elevation (Feet)	Product Thickness (Feet)
W-1 <sup>a</sup>	11.47	8-7-81	4.30	6.20 <sup>b</sup>	
		9-10-81	4.40	6.10 <sup>b</sup>	
		5-6-87	6	6.08 <sup>b</sup>	
		8-20-89	5.60	5.87	
		10-11-89	5.63	5.84	
		2-22-90	4.92	6.55	
		2-28-90	5.02	6.45	
		4-9-90	5.44	6.03	
		6-7-90	5.37	6.10	
		7-25-90	5.26	6.21	
		10-3-90	5.43	6.04	
		1-3-91	5.69	5.78	
		W-4	9.96	8-7-81	4.30
9-10-81	4.40			6.10 <sup>b</sup>	
1-18-82	2.50			8.00 <sup>b</sup>	
3-27/28-85	c			8.65	
8-20-89	3.95			6.01	
10-11-89	3.87			6.09	
2-22-90	2.0			7.96	
2-28-90	2.39			7.57	
4-9-90	3.17			6.79	
6-7-90	2.73			7.23	
7-25-90	3.71			6.25	
10-3-90	4.18			5.78	
1-3-91	3.64			6.32	
W-5	11.41	8-7-81	4.70	7.50 <sup>b</sup>	c
		9-10-81	4.90	7.30 <sup>b</sup>	c
		1-18-82	2.50	9.60 <sup>b</sup>	c
		3-27/28-85	c	9.28	c
		10-11-89	4.43	6.98	0.71
		2-22-90	3.80	7.61	0.88
		2-28-90	4.43	6.98	1.65
		4-9-90	4.73	6.68	1.82
		6-7-90	4.30	7.11	1.80
		7-25-90	5.10	6.31	2.12
		10-3-90	4.90	6.51	1.11
		1-3-91	4.77	6.64	0.85
		W-7 <sup>a</sup>	9.05	5-6-87	3
8-20-89	3.59			5.46	
10-11-89	3.08			5.97	
2-22-90	1.75			7.30	
2-28-90	1.31			7.74	
4-9-90	2.42			6.63	
6-7-90	1.21			7.84	
7-25-90	2.76			6.29	
10-3-90	3.22			5.83	
1-3-91	3.17			5.88	
W-8	10.43	5-6-87	5.5	6.88 <sup>b</sup>	
		8-20-89	3.59	6.84	
		2-22-90	1.5	8.93	
		2-28-90	1.78	8.65	
		4-9-90	3.12	7.31	
		6-7-90	2.90	7.53	
		7-27-90 <sup>d</sup>	3.33	7.10	
		10-3-90	3.65	6.78	
1-3-91	3.46	6.97			
W-13	8.15	8-20-89	4.64	3.51	
		10-11-89	4.60	3.55	
		2-22-90	3.85	4.30	
		2-28-90	4.18	3.97	
		4-9-90	4.31	3.84	
		6-7-90	3.93	4.22	
		7-25-90	4.40	3.75	
		10-3-90	4.67	3.48	
1-3-91	4.43	3.72			

TABLE 1  
GROUNDWATER DEPTHS AND ELEVATIONS  
EMERY BAY MARKETPLACE SITE  
(Continued)

Well Number	Top of Casing (Feet)	Date	Depth to Groundwater (Feet)	Groundwater Elevation (Feet)	Product Thickness (Feet)
W-14	7.97	8-20-90	5.02	2.95	
		2-22-90	4.19	3.78	
		2-28-90	4.46	3.51	
		4-9-90	4.36	3.61	
		6-7-90	5.29	2.68	
		7-25-90	4.83	3.14	
		10-3-90	5.09	2.88	
		1-3-91	4.32	3.65	
W-15	11.53	8-20-89	3.43	8.10	
		10-11-89	4.26	7.27	
		2-22-90	2.58	8.95	
		2-28-90	2.53	9.00	
		4-9-90	2.48	9.05	
		6-7-90	4.54	6.99	
		7-25-90	4.00	7.53	
		10-3-90	3.46	8.07	
1-3-91	2.97	8.56			
W-16	10.94	10-11-89	4.81	6.13	0.07
		2-22-90	3.92	7.02	NM <sup>e</sup>
		2-28-90	3.88	7.06	NM
		4-9-90	7.81	3.13	NM
		6-7-90	6.19	4.75	NM
		7-27-90 <sup>f</sup>	4.44	6.50	NM
		10-3-90	4.38	6.56	0.02
		1-3-91	4.67	6.27	0.02
W-17	12.14	10-11-89	9.12	3.02	
		2-22-90	5.42	6.72	
		2-28-90	5.35	6.79	
		4-9-90	5.72	6.42	
		6-7-90	---	---	
		7-26-90	5.59	6.55	
		10-3-90	5.72	6.42	
		1-3-91	6.28	5.86	
W-18	11.34	10-11-89	5.52	5.82	
		2-22-90	4.42	6.92	
		2-28-90	4.77	6.57	
		4-9-90	5.24	6.10	
		6-7-90	4.28	7.06	
		7-25-90	4.98	6.36	
		10-3-90	5.44	5.90	
		1-3-91	5.84	5.50	
W-19	10.27	4-9-90	5.11	5.16	
		6-7-90	4.77	5.50	
		7-25-90	4.93	5.34	
		10-3-90	4.95	5.32	
		1-3-91	5.95	4.32	
W-20	6.82	4-9-90	4.08	2.74	
		6-7-90	3.79	3.03	
		7-25-90	4.00	2.82	
		10-3-90	4.03	2.79	
		1-3-91	4.12	2.70	
W-21	9.48	4-9-90	5.21	4.27	
		6-7-90	4.84	4.64	
		7-25-90	5.05	4.43	
		10-3-90	5.18	4.30	
		1-3-91	5.47	4.01	
W-22	11.67	4-9-90	7.50	4.17	
		6-7-90	7.36	4.31	
		7-25-90	7.49	4.18	
		10-3-90	7.68	3.99	
		1-3-91	7.88	3.79	

TABLE 1  
GROUNDWATER DEPTHS AND ELEVATIONS  
EMERY BAY MARKETPLACE SITE  
(Continued)

Well Number	Top of Casing (Feet)	Date	Depth to Groundwater (Feet)	Groundwater Elevation (Feet)	Product Thickness (Feet)
W-23	9.16	4-9-90	1.51	7.65	
		6-7-90	1.78	7.38	
		7-27-90 <sup>f</sup>	2.63	6.53	
		10-3-90	3.20	5.96	
		1-3-91	2.36	6.80	
W-24	8.72	6-7-90	4.75	3.97	
		7-25-90	5.02	3.70	
		10-3-90	5.00	3.72	
		1-3-91	5.25	3.47	

- <sup>a</sup> Nielson Property  
<sup>b</sup> Groundwater elevation taken from earlier reports; may not agree with calculated elevation using current top of casing.  
<sup>c</sup> Data not available.  
<sup>d</sup> Well W-8 was not accessible on 7-25-90 and 7-26-90. It was sounded on 7-27-90.  
<sup>e</sup> NM indicates product thickness not measurable.  
<sup>f</sup> Wells W-16 and W-23 were under pressure when sounded in 7-25-90. The wells were allowed to equilibrate and were resounded on 7-27-90.  
<sup>g</sup> Well W-17 not accessible on 6-7-90.

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TABLE 2  
HYDROCARBONS IN GROUNDWATER  
EMERY BAY MARKETPLACE SITE

Number Well	Sample Date	TPH/D Concentration (ppb)	TPH/MO Concentration (ppb)
W-1	4-14-87	<5,000 <sup>a,b</sup>	--- <sup>c</sup>
	2-28-90	<500	---
	4-11-90	<100	570
W-2 <sup>d</sup>	4-15-87	<1,000 <sup>b</sup>	---
W-3 <sup>d</sup>		---	---
W-4 <sup>d</sup>	4-14-87	<5,000 <sup>b</sup>	---
W-4	3-01-90	<500	---
	4-10-90	<100	<250
W-5 <sup>e</sup>	9-27-89	20,000	---
B-5 <sup>d</sup>		---	---
W-5A <sup>d</sup>	4-16-87	<1,000 <sup>f</sup>	<1000 <sup>f</sup>
W-6 <sup>d</sup>	4-16-87	<1,000 <sup>f</sup>	<1000 <sup>f</sup>
W-7	9-26-89	1,100	---
	2-28-90	<500 <sup>g</sup>	---
	4-11-90	5,600	7,500
	7-30-90	2,600	2,000
	10-4-90	5,000	6,000
	1-4-91	4,000	12,000
W-8	4-17-87	10,000 <sup>h</sup>	---
	9-26-89	7,100	---
	3-01-90	4,500	---
	4-18-90	5,300	---
W-13	2-28-90	<500	---
	4-12-90	<500	---
	7-27-90	<500	<1,000
	10-4-90	<500	<1,000
	1-3-91	<500	<1,000
W-14	2-28-90	<500	---
	4-11-90	<100	<250
	7-30-90	<600	<1,000
	10-4-90	<500	<1,000
	1-4-91	<500	<1,000
W-15	9-25-89	1,200	---
	4-13-90	1,500	---
W-16	9-27-89	4,700	---
	2-28-90	22,000	---
	4-13-90	9,000	---
W-17	9-25-89	700	---
	4-13-90	1,600	---
W-18	9-26-89	3,100	---
	4-13-90	5,100	---
W-19	4-12-90	1,100	---
	4-16-90	<500 <sup>i</sup>	---
	7-27-90	<1,000	8,000
	10-3-90	<500 <sup>j</sup>	3,000
	1-3-91	<500	<1,000

TABLE 2  
(Continued)

HYDROCARBONS IN GROUNDWATER  
EMERY BAY MARKETPLACE SITE

Number Well	Sample Date	TPH/D Concentration (ppb)	TPH/MO Concentration (ppb)
W-20	4-12-90	<500	---
	4-16-90	<500	---
	7-30-90	<500	<1,000
	10-3-90	<500	<1,000
	1-4-91	<500	<1,000
W-21	4-12-90	1,400	---
	4-18-90	1,700	---
W-22	4-12-90	<500	---
	4-18-90	<500	---
W-23	4-12-90	2,000	---
	4-18-90	3,600	---
W-24	6-7-90	<500	---
	7-27-90	<500	<1,000
	10-3-90	<500	<1,000
	1-3-91	<500	<1,000

a  
b  
c  
d  
e  
f  
g  
h  
i  
j

< indicates constituent not detected above this level.  
Oil and grease also not detected above 5000 ppb in Wells W-1, W-2 and W-4 (Nielson)  
--- indicates no analysis made for constituent.  
Abandoned well on Nielson property.  
Free product in Well W-5.  
Indicates total gasoline, diesel, and motor oil also not detected above 1000 ppb in wells W-5A and W-6.  
Review of gas chromatograph indicated TPH/D present at 300 ppb in Well W-7 on 2-28-90.  
Semiquantified results include gasoline, diesel, and some oil and grease in well W-8.  
Review of gas chromatograph indicated TPH/D present at 400 ppb in Well W-19 on 4-16-90.  
Review of gas chromatograph indicated TPH/D present at 300 ppb in Well W-19 on 10-3-90.

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TABLE 3  
 PRODUCT THICKNESS DATA FOR WELL W-5  
 EMERY BAY MARKETPLACE SITE

Date	Before Product Removal			After Product Removal			Volume Removed (Gal.)
	Depth to Oil	Depth to Water	Product Thickness	Depth to Oil	Depth to Water	Product Thickness	
<b>Biweekly Product Removal</b>							
7/25/90	2.98	5.10	2.12	*	*	*	0.72**
8/8/90	3.56	4.72	1.16	4.43	4.47	0.04	0.96**
8/24/90	3.56	4.80	1.24	4.94	4.94	0.00	0.50
9/7/90	3.62	4.83	1.21	4.58	4.79	0.21	0.33**
9/21/90	3.72	4.93	1.21	4.44	4.54	0.10	0.40**
10/4/90	3.84	4.94	1.10	3.24	3.96	0.72	0.33
10/17/90	3.92	4.96	1.04	3.94	3.96	0.02	0.22
10/31/90	4.06	5.24	1.18	4.65	4.72	0.07	0.40
<b>Monthly Product Removal</b>							
11/29/90	4.34	5.64	1.30	5.64	5.65	0.01	1.50
12/28/90	3.97	4.68	0.71	5.46	5.48	0.02	2.00
1/31/91	3.65	4.64	0.99	5.22	5.25	0.03	2.00

\*Product thickness not measured after product was removed on 7/25/90.

\*\*Product removed with a bailer.

MKT-PROD.XLS

**ATTACHMENT A**  
**HYDROLOGIC DATA SHEETS**



PROJECT: Marketplace EVENT: Sounding SAMPLER: OMS

NO.	WELL OR LOCATION	DATE		TIME		MEASUREMENT	CODE	COMMENTS
		MO	DAYR	HR	MIN			
1	W1	1	3	8	30	5.69	SWL	Flooded
2	W4			7	30	3.04	SWL	
3	W5			8	20	3.92	OIL	4.77 OWI
4	W7			9	00	<del>3.17</del>	SWL	
5	W8			7	35	3.46	SWL	
6	W10							abandoned
X 7	W13			9	20	4.43	SWL	4.44 flooded
X 8	W14			9	15	4.32	SWL	4.42
X 9	W15			7	45	2.97	SWL	3.33
10	W16			7	40	4.65	OIL	4.67 OWI
⇒ 11	W17			7	50	6.28	SWL	6.30
12	W18			7	55	5.84	SWL	bentonite
13	W19			9	10	5.95	SWL	
X 14	W20			9	25	4.12	SWL	4.10
X 15	W21			9	00	5.47	SWL	5.42 flooded
X 16	W22			8	15	7.88	SWL	7.07
X 17	W23			8	35	2.36	SWL	2.38
X 18	W24			9	30	5.25	SWL	bentonite 5.25
19								
20								

**CODES:**

\*SWL - Static Water Level (Feet)  
 \*IWL - Instant Water Level; Non-Static (Feet)  
 \*OIL - Oil Level (Feet)  
 \*OWI - Oil/Water Interface (Feet)  
 \*MTD - Measured Total Depth (Feet)  
 FLO - Flow Rate (Gallons/Minute)  
 CUM - Cumulative (Gallons)

HRS - Total (Hours)  
 PSI - Pressure (psi)<sup>2</sup>  
 pH - 1 to 14  
 Ec - Conductivity (µm HOS)  
 TMP - Temperature (°C)  
 TRB - Turbidity (NTU)  
 \_\_\_\_\_ (Additional Code)

\*All levels are depth from inner casing - describe any other reference points in comments column; when in doubt, describe reference point.

Note in comments column if well is not: properly labeled, locked, or able to be locked. Describe corrective action. Note flooding of vault box, odor, access problems.

\*Negative pressure (Vacuum) psi = approx. -(1/2 x mmHg)

**ATTACHMENT B**

**LABORATORY ANALYTICAL DATA SHEETS,  
QA LABORATORY RESULTS,  
CHAIN-OF-CUSTODY FORMS, AND  
SAMPLING DATA SHEETS**



RECEIVED  
JAN 21 1991  
McLAREN/HART

Date: January 18, 1991  
LP #: 3955

Julie Menack  
McLaren/Hart  
1135 Atlantic Avenue  
Alameda, CA 94501

Dear Ms. Menack:

Enclosed are the laboratory results for the four samples submitted by you to the McLaren Analytical Laboratory on January 4, 1991, for the project *Marketplace*.

The analysis you requested is:

Mod. EPA 8015 (4 - Water)

The report consists of the following sections:

1. A copy of the chain of custody
2. Quality Control Report
3. Comments
4. Analytical results
5. Copy of final billing submitted to accounting.

Unless otherwise instructed by you, samples will be disposed of two weeks from the date of this letter.

Thank you for choosing McLaren Analytical Laboratory. We are looking forward to serving you in the future. Should you have any questions concerning this analytical report or the analytical methods employed, please do not hesitate to call.

Sincerely,

A handwritten signature in cursive script that reads 'Anthony S. Wong'.

Anthony S. Wong, Ph.D.  
Director, Laboratory/Managing Principal



## QUALITY CONTROL REPORT

**METHOD BLANK RESULTS:** A method blank (MB) is a laboratory generated sample free of any contamination. The method blank assesses the degree to which the laboratory operations and procedures cause false-positive analytical results for your samples. The method blank results associated with your samples are attached.

### LABORATORY CONTROL SPIKES

The LCS Program:

The laboratory control spike is a well characterized matrix (organic pure type II water for water samples and contamination free sand for soil samples) which is spiked with certain target parameters and analyzed in duplicate at approximately 10% of the sample load in order to assure the accuracy and precision of the analytical method. The results of the laboratory control spike associated with your samples are attached.

Accuracy is measured using percent recovery, i.e.:

$$\text{Percent Recovery} = \frac{(\text{measured concentration})}{(\text{actual concentration})} \times 100$$

Precision is measured using the relative percent difference (RPD) from duplicate tests, i.e.:

$$\text{RPD} = \frac{\% \text{ Recovery of Spike}_{(1)} - \% \text{ Recovery of Spike}_{(2)}}{(\% \text{ Recovery of Spike}_{(1)} + \% \text{ Recovery of Spike}_{(2)})/2} \times 100$$

Control limits for accuracy and precision are different for different methods. They may also vary with the different sample matrices. They are based on laboratory average historical data and EPA limits which are approved by the Quality Assurance Department. McLaren Analytical Laboratory reanalyzes samples if the precision or accuracy is out of acceptance control limits.

(DC3-CN3955)



# QUALITY CONTROL REPORT

Method: Mod. EPA 8015  
Units: ug/ml (ppm)

Date Analyzed: 01/15/91  
Date Extracted: 01/04/91  
Batch Number: 910104-0303

## METHOD BLANK

<u>Compounds</u>	<u>Reporting Limits</u>	<u>Results of the MB</u>
Gasoline Range	0.5	BRL
Jet Fuel/Kerosene Range	0.5	BRL
Diesel Range	0.5	BRL
Motor Oil Range	1.	BRL

## LABORATORY CONTROL SPIKE

<u>Compounds</u>	<u>Concentration</u>		<u>Accuracy % Recovery</u>	<u>Precision RPD</u>	<u>Acceptance Limits<sup>a</sup></u>	
	<u>Spiked</u>	<u>Measured</u>			<u>% Recovery</u>	<u>RPD</u>
Diesel Range	2.5	1.8	72	20	43 - 152	<25

<sup>a</sup> Acceptance limits were obtained statistically from McLaren quality control data.



(DC3-CN3955)

## ABBREVIATIONS USED IN THIS REPORT

---

BRL	Below Reporting Limit
MB	Method Blank
MS	Matrix Spike
MSD	Matrix Spike Duplicate
LCS	Laboratory Control Spike
LCSD	Laboratory Control Spike Duplicate
RPD	Relative Percent Difference

## COMMENTS

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Test methods may include minor modifications of published EPA methods (e.g., reporting limits or parameter lists). Reporting limits are adjusted to reflect dilution of the sample when appropriate. Solids and waste are analyzed with no correction made for moisture content. Blank results are reported in the Case Narrative.

Values for total petroleum hydrocarbons were calculated based only on detected peaks.

Gasoline and diesel standard obtained from local Chevron station. Gasoline is sold commercially as unleaded gasoline and diesel as diesel fuel #2.

Kerosene standard obtained from Post Jeff Chevron/Mobil Products. It is sold commercially as jet fuel and kerosene. Other jet fuel sources may produce different instrument responses and contain different hydrocarbon chains. The kerosene standard contains the same hydrocarbon chain as commercial jet fuel.

Motor oil standard obtained from local automotive store. Manufacturer and motor oil type are Pennzoil SAE 10W-40.

Results are reported on the attached data sheets.



(DC3-CN3955)

TOTAL PETROLEUM HYDROCARBONS

Analytical Method: Modified EPA 8015 {a}  
Preparation Method: EPA 3510

Project Name: Marketplace

Project Number: 59804

Sample Description: Trip Blank

Lab Project-ID Number: 3955-001

Sample Number: 149463

Date Sampled: 01/03/91

Date Received: 01/04/91

Date Extracted: 01/04/91

Date Analyzed: 01/14/91

Batch Number: 910104-0303

<u>PETROLEUM HYDROCARBONS</u>	<u>CONCENTRATION</u> ug/ml (ppm)	<u>REPORTING LIMIT</u> ug/ml (ppm)
Gasoline Range	BRL	0.5
Jet Fuel/Kerosene Range	BRL	0.5
Diesel Range	BRL	0.5
Motor Oil Range	BRL	1.
Total Petroleum Hydrocarbons	BRL	1.0

Dilution: None

Comments: {a} Derived from EPA 8015. Gas Chromatograph with flame ionization detector is used to perform the analysis. Modification is due to the quantitation of petroleum fraction instead of non-halogenated volatile compounds.

Approved By: *C. Fong* Date: 1/21/91  
C. Fong

The cover letter and attachments are integral parts of this report

12/06/90





TOTAL PETROLEUM HYDROCARBONS

Analytical Method: Modified EPA 8015 {a}  
Preparation Method: EPA 3510

Project Name: Marketplace

Project Number: 59804

Sample Description: W-19

Lab Project- ID Number: 3955-002

Sample Number: 149465

Date Sampled: 01/03/91

Date Received: 01/04/91

Date Extracted: 01/04/91

Date Analyzed: 01/14/91

Batch Number: 910104-0303

PETROLEUM HYDROCARBONS

CONCENTRATION  
ug/ml (ppm)

REPORTING LIMIT  
ug/ml (ppm)

Gasoline Range	BRL	0.5
Jet Fuel/Kerosene Range	BRL	0.5
Diesel Range	BRL	0.5
Motor Oil Range	BRL	1.
Total Petroleum Hydrocarbons	BRL	1.0

Dilution: None

Comments: {a} Derived from EPA 8015. Gas Chromatograph with flame ionization detector is used to perform the analysis. Modification is due to the quantitation of petroleum fraction instead of non-halogenated volatile compounds.

Approved By: C. Fong Date: 1/21/91

The cover letter and attachments are integral parts of this report.

12/06/90



TOTAL PETROLEUM HYDROCARBONS

Analytical Method: Modified EPA 8015 {a}  
Preparation Method: EPA 3510

Project Name: Marketplace

Project Number: 59804

Sample Description: W-13 {b}

Lab Project-ID Number: 3955-003

Sample Number: 149467

Date Sampled: 01/03/91

Date Received: 01/04/91

Date Extracted: 01/04/91

Date Analyzed: 01/14/91

Batch Number: 910104-0303

PETROLEUM HYDROCARBONS

CONCENTRATION  
ug/ml (ppm)

REPORTING LIMIT  
ug/ml (ppm)

Gasoline Range	BRL	0.5
Jet Fuel/Kerosene Range	BRL	0.5
Diesel Range	BRL	0.5
Motor Oil Range	BRL	1.

Dilution: None

Comments: {a} Derived from EPA 8015. Gas Chromatograph with flame ionization detector is used to perform the analysis. Modification is due to the quantitation of petroleum fraction instead of non-halogenated volatile compounds.

{b} Revised 02/05/91.

Approved By: William Swaff. for Date: 2/5/91  
C. Fong

The cover letter and attachments are integral parts of this report.



12/06/90

TOTAL PETROLEUM HYDROCARBONS

Analytical Method: Modified EPA 8015 {a}  
Preparation Method: EPA 3510

Project Name: Marketplace

Project Number: 59804

Sample Description: W-24

Lab Project- ID Number: 3955-004

Sample Number: 149469

Date Sampled: 01/03/91

Date Received: 01/04/91

Date Extracted: 01/04/91

Date Analyzed: 01/14/91

Batch Number: 910104-0303

PETROLEUM HYDROCARBONS

CONCENTRATION  
ug/ml (ppm)

REPORTING LIMIT  
ug/ml (ppm)

Gasoline Range	BRL	0.5
Jet Fuel/Kerosene Range	BRL	0.5
Diesel Range	BRL	0.5
Motor Oil Range	BRL	1.
Total Petroleum Hydrocarbons	BRL	1.0

Dilution: None

Comments: {a} Derived from EPA 8015. Gas Chromatograph with flame ionization detector is used to perform the analysis. Modification is due to the quantitation of petroleum fraction instead of non-halogenated volatile compounds.

Approved By: C. Fong Date: 1/21/91

The cover letter and attachments are integral parts of this report.



12/06/90



Date: January 18, 1991  
LP #: 3970

Julie Menack  
McLaren/Hart  
1135 Atlantic Avenue  
Alameda, CA 94501

Dear Ms. Menack:

Enclosed are the laboratory results for the four samples submitted by you to the McLaren Analytical Laboratory on January 8, 1991, for the project *Marketplace*.

The analyses you requested are:

Mod. EPA 8015 (4 - Water)

The report consists of the following sections:

1. A copy of the chain of custody
2. Quality Control Report
3. Comments
4. Analytical results
5. Copy of final billing submitted to accounting.

Unless otherwise instructed by you, samples will be disposed of two weeks from the date of this letter.

Thank you for choosing McLaren Analytical Laboratory. We are looking forward to serving you in the future. Should you have any questions concerning this analytical report or the analytical methods employed, please do not hesitate to call.

Sincerely,

A handwritten signature in cursive script that reads 'Anthony S. Wong'.

Anthony S. Wong, Ph.D.  
Director, Laboratory/Managing Principal

224715



# CHAIN OF CUSTODY RECORD

FOR LABORATORY USE ONLY  
 Laboratory Project No.: 3970 Secured: \_\_\_\_\_  
 Storage Refrigerator ID: 4-6 Yes   
 Storage Freezer ID: \_\_\_\_\_ No

Project Name: Marketplace Project #: 59804 Sampler: colette shelly colette shelly  
(Printed Name) (Signature)  
 Relinquished by: (Signature and Printed Name) colette shelly colette shelly Received by: (Signature and Printed Name) Fed-Ex Date: 1-7-91 Time: 4:00 PM  
 Relinquished by: (Signature and Printed Name) Fed-Ex Received by: (Signature and Printed Name) Brian J O'Connor Date: 1-8-91 Time: 10:30  
 Relinquished by: (Signature and Printed Name) Received by: (Signature and Printed Name) [Signature] Date: 1-8-91 Time: 12:00 PM

SHIP TO:  
 McLaren Analytical Laboratory  
 11101 White Rock Road  
 Rancho Cordova, CA 95670  
 (916) 638-3696  
 FAX (916) 638-2842

Method of Shipment: Fed Ex  
 Shipment ID: \_\_\_\_\_

Circle or Add Analysis(es) Requested

- 601/8010 (Halogenated Volatiles-GC)
- 602/8020 (Aromatic Volatiles-GC)
- 604/8040 (Phenols-GC)
- 608/8080 (Pesticides/PCB-GC)
- 610/8100 (PNA-GC)
- 624/8240 (Volatiles-GC)
- 625/8270 (BNA-GC/MS)
- TPH/G (Gasoline-GC)
- TPH/D (Diesel-GC)
- 418/418P
- 8015 Modified (GC)
- Metals: Total
- Metals: Soluble
- Fluoride/Perchlorate
- Chloride/pH
- TDS/Percent Solid
- Specific Conductivity (EC)
- + Motor Oil

a) Identify specific metals requested under Special Instructions

Sample ID Number	Sample Description			TAT	Container(s)		FOR LABORATORY USE ONLY Lab ID
	Date	Time	Description		#	Type	
1	1/9/91	900	Trip Blank	✓	4	2 Δ	3970-001
2	1/9/91	1200	W 20	✓	4	2 Δ	-002
3	1/9/91	1310	W 7	✓	4	2 Δ	-003
4	1/9/91	1540	W 14	✓	4	2 Δ	-004
5							
6							
7							
8							
9							
10							

Special Instructions/Comments: \_\_\_\_\_

Sample Archive/Disposal:  
 Laboratory Standard  
 Other \_\_\_\_\_

TAT (Analytical Turn-Around Times) 1 = 24 hours 2 = 48 hours 3 = 1 week 4 = 2 weeks  
 Container Types: B=Brass Tube, V=VOA Vial, A=1-Liter Amber, G=Glass Jar, C=Cassette, O = Other \_\_\_\_\_

SEND DOCUMENTATION AND RESULTS TO (Check one):  
 Project Manager/Office: Julie Menack  
 Client Name: \_\_\_\_\_  
 Company: McLaren - Hart  
 Address: 1135 Atlantic Ave, Alameda  
 Phone: 415 521 5200 Fax: \_\_\_\_\_

FOR LABORATORY USE ONLY. Sample Condition Upon Receipt:  
SAMPLE 14977 BUREN WAIN RECEIPT - AP (1-8-91)

## QUALITY CONTROL REPORT

---

**METHOD BLANK RESULTS:** A method blank (MB) is a laboratory generated sample free of any contamination. The method blank assesses the degree to which the laboratory operations and procedures cause false-positive analytical results for your samples. The method blank results associated with your samples are attached.

### LABORATORY CONTROL SPIKES

The LCS Program:

The laboratory control spike is a well characterized matrix (organic pure type II water for water samples and contamination free sand for soil samples) which is spiked with certain target parameters and analyzed in duplicate at approximately 10% of the sample load in order to assure the accuracy and precision of the analytical method. The results of the laboratory control spike associated with your samples are attached.

Accuracy is measured using percent recovery, i.e.:

$$\text{Percent Recovery} = \frac{\text{(measured concentration)}}{\text{(actual concentration)}} \times 100$$

Precision is measured using the relative percent difference (RPD) from duplicate tests, i.e.:

$$\text{RPD} = \frac{\% \text{ Recovery of Spike}_{(1)} - \% \text{ Recovery of Spike}_{(2)}}{(\% \text{ Recovery of Spike}_{(1)} + \% \text{ Recovery of Spike}_{(2)})/2} \times 100$$

Control limits for accuracy and precision are different for different methods. They may also vary with the different sample matrices. They are based on laboratory average historical data and EPA limits which are approved by the Quality Assurance Department. McLaren Analytical Laboratory reanalyzes samples if the precision or accuracy is out of acceptance control limits.

(DC1-CN3970)



**QUALITY CONTROL REPORT**

---

Method: Mod. EPA 8015  
 Units: ug/ml (ppm)

Date Analyzed: 01/16/91  
 Date Extracted: 01/08/91  
 Batch Number: 910108-2001

**METHOD BLANK**

<u>Compounds</u>	<u>Reporting Limits</u>	<u>Results of the MB</u>
Gasoline Range	0.5	BRL
Jet Fuel/Kerosene Range	0.5	BRL
Diesel Range	0.5	BRL
Motor Oil Range	1.	BRL

**LABORATORY CONTROL SPIKE**

<u>Compounds</u>	<u>Concentration</u>		<u>Accuracy % Recovery</u>	<u>Precision RPD</u>	<u>Acceptance Limits<sup>a</sup></u>	
	<u>Spiked</u>	<u>Measured</u>			<u>% Recovery</u>	<u>RPD</u>
Diesel Range	2.5	1.6	66	9	43 - 152	<25

<sup>a</sup> Acceptance limits were obtained statistically from McLaren quality control data.

(DC1-CN3970)



## ABBREVIATIONS USED IN THIS REPORT

---

BRL	Below Reporting Limit
MB	Method Blank
MS	Matrix Spike
MSD	Matrix Spike Duplicate
LCS	Laboratory Control Spike
LCSD	Laboratory Control Spike Duplicate
RPD	Relative Percent Difference

## COMMENTS

---

Test methods may include minor modifications of published EPA methods (e.g., reporting limits or parameter lists). Reporting limits are adjusted to reflect dilution of the sample when appropriate. Solids and waste are analyzed with no correction made for moisture content. Blank results are reported in the Case Narrative.

Values for total petroleum hydrocarbons were calculated based only on detected peaks.

Gasoline and diesel standard obtained from local Chevron station. Gasoline is sold commercially as unleaded gasoline and diesel as diesel fuel #2.

Kerosene standard obtained from Post Jeff Chevron/Mobil Products. It is sold commercially as jet fuel and kerosene. Other jet fuel sources may produce different instrument responses and contain different hydrocarbon chains. The kerosene standard contains the same hydrocarbon chain as commercial jet fuel.

Motor oil standard obtained from local automotive store. Manufacturer and motor oil type are Pennzoil SAE 10W-40.

Results are reported on the attached data sheets.

(DC1-CN3970)





TOTAL PETROLEUM HYDROCARBONS

Analytical Method: Modified EPA 8015 (a)  
Preparation Method: EPA 3510

Project Name: Marketplace

Project Number: 59804

Sample Description: Trip Blank

Lab Project- ID Number: 3970-001

Sample Number: 149471

Date Sampled: 01/04/91

Date Received: 01/08/91

Date Extracted: 01/08/91

Date Analyzed: 01/16/91

Batch Number: 910108-2001

PETROLEUM HYDROCARBONS

CONCENTRATION  
ug/ml (ppm)

REPORTING LIMIT  
ug/ml (ppm)

Gasoline Range	BRL	0.5
Jet Fuel/Kerosene Range	BRL	0.5
Diesel Range	BRL	0.5
Motor Oil Range	BRL	1.
Total Petroleum Hydrocarbons	BRL	1.0

Dilution: None

Comments: (a) Derived from EPA 8015. Gas Chromatograph with flame ionization detector is used to perform the analysis. Modification is due to the quantitation of petroleum fraction instead of non-halogenated volatile compounds.

Approved By: C. Fong Date: 1/21/91

The cover letter and attachments are integral parts of this report.

12/06/90



TOTAL PETROLEUM HYDROCARBONS

Analytical Method: Modified EPA 8015 (a)  
 Preparation Method: EPA 3510

Project Name: Marketplace

Project Number: 59804

Sample Description: W20

Lab Project-ID Number: 3970-002

Sample Number: 149473

Date Sampled: 01/04/91

Date Received: 01/08/91

Date Extracted: 01/08/91

Date Analyzed: 01/16/91

Batch Number: 910108-2001

<u>PETROLEUM HYDROCARBONS</u>	<u>CONCENTRATION</u> ug/ml (ppm)	<u>REPORTING LIMIT</u> ug/ml (ppm)
Gasoline Range	BRL	0.5
Jet Fuel/Kerosene Range	BRL	0.5
Diesel Range	BRL	0.5
Motor Oil Range	BRL	1.
Total Petroleum Hydrocarbons	BRL	1.0

Dilution: None

Comments: {a} Derived from EPA 8015. Gas Chromatograph with flame ionization detector is used to perform the analysis. Modification is due to the quantitation of petroleum fraction instead of non-halogenated volatile compounds.

Approved By: C. Fong Date: 1/21/91

The cover letter and attachments are integral parts of this report.

12/06/90



TOTAL PETROLEUM HYDROCARBONS

Analytical Method: Modified EPA 8015 (a)  
Preparation Method: EPA 3510

Project Name: Marketplace

Project Number: 59804

Sample Description: W7

Lab Project- ID Number: 3970-003

Sample Number: 149475

Date Sampled: 01/04/91

Date Received: 01/08/91

Date Extracted: 01/08/91

Date Analyzed: 01/16/91

Batch Number: 910108-2001

PETROLEUM HYDROCARBONS


CONCENTRATION  
ug/ml (ppm)

REPORTING LIMIT  
ug/ml (ppm)

Gasoline Range	BRL	2.
Jet Fuel/Kerosene Range	BRL	2.
Diesel Range	4.	2.
Motor Oil Range	12.	4.
Total Petroleum Hydrocarbons	16.	4.

Dilution: 1:4

Comments: {a} Derived from EPA 8015. Gas Chromatograph with flame ionization detector is used to perform the analysis. Modification is due to the quantitation of petroleum fraction instead of non-halogenated volatile compounds.

Approved By:   
C. Fong

Date: 1/21/91

The cover letter and attachments are integral parts of this report.

12/06/90



TOTAL PETROLEUM HYDROCARBONS

Analytical Method: Modified EPA 8015 {a}  
Preparation Method: EPA 3510

Project Name: Marketplace

Project Number: 59804

Sample Description: W14

Lab Project- ID Number: 3970-004

Sample Number: 149478

Date Sampled: 01/04/91

Date Received: 01/08/91

Date Extracted: 01/08/91

Date Analyzed: 01/16/91

Batch Number: 910108-2001

PETROLEUM HYDROCARBONS

CONCENTRATION  
ug/ml (ppm)

REPORTING LIMIT  
ug/ml (ppm)

Gasoline Range	BRL	0.5
Jet Fuel/Kerosene Range	BRL	0.5
Diesel Range	BRL	0.5
Motor Oil Range	BRL	1.
Total Petroleum Hydrocarbons	BRL	1.0

Dilution: None

Comments: {a} Derived from EPA 8015. Gas Chromatograph with flame ionization detector is used to perform the analysis. Modification is due to the quantitation of petroleum fraction instead of non-halogenated volatile compounds.

Approved By: C. Fong Date: 1/21/91

The cover letter and attachments are integral parts of this report.

12/06/90



# SAMPLING EVENT DATA SHEET

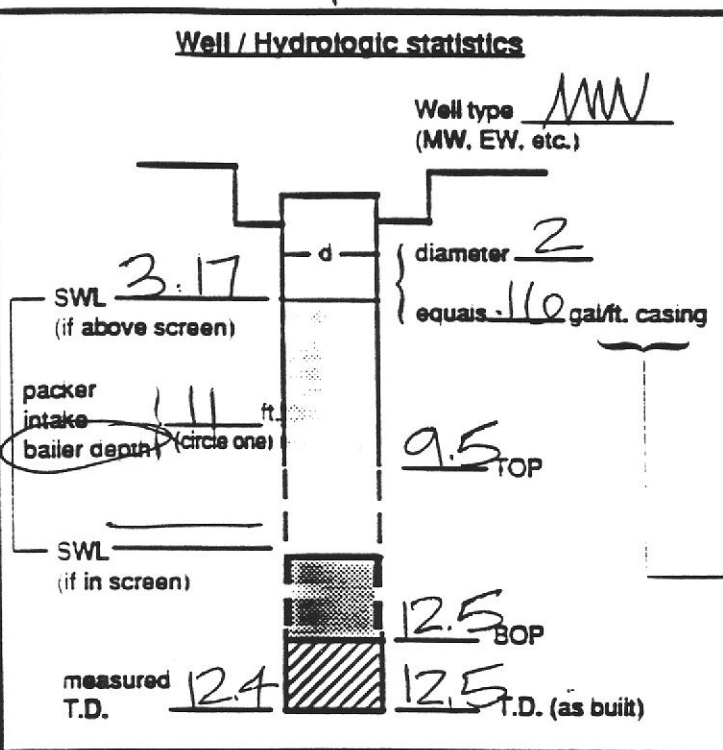
(fill out completely)



McLaren

WELL OR LOCATION # W7

PROJECT Marketplace EVENT Quarterly SAMPLER CMS DATE 1-4-91



Action	Time	Pump rate	IWL (low yield)
Start pump / Begin	1230		
			4.6 gal
Stop	1255		0.32
Sampled	1310		
(Final IWL)	440		

**Purge calculation**

110 gal/ft. \* 9.3 ft. = 1.5 gals x 3 = 4.5 gals.

SWL to BOP or packer to BOP      one volume      purge volume - 3 casings

**Head purge calculation (Airlift only)**

gal/ft. \* ft. = gals.

packer to SWL

**Equipment Used / Sampling Method / Description of Event:**

peristaltic used to purge.  
Disp. bailer used to sample.

80% = 5.06

Actual gallons purged	<u>4.5</u>
Actual volumes purged	<u>3</u>
Well yield (see below)	<u>MY</u>
COC #	<u>224715</u>
Sample I.D.	Analysis      Lab
<u>149475</u>	<u>ED15+</u> <u>MAV</u>
<u>149476</u>	<u>Motor Oil</u> <u>↓</u>

**Additional comments:**

water dark yellow/brown in color. strong product smell.

Gallons purged *	TEMP °C (°F) (circle one)	EC (µs / cm)	PH	TURBIDITY (NTU)		
1. <u>1.5</u>	<u>59.9</u>	<u>5880</u>	<u>6.42</u>	<u>15.2</u>		
2. <u>3</u>	<u>62.3</u>	<u>6640</u>	<u>6.23</u>	<u>18.9</u>		
3. <u>4.5</u>	<u>63.7</u>	<u>7280</u>	<u>6.18</u>	<u>19.5</u>		
4.						
5.						

\* Take measurement at approximately each casing volume purged.

⊕ HY - Minimal W.L. drop      MY - WL drop - able to purge 3 volumes during one sitting by reducing pump rate or cycling pump.

LY - Able to purge 3 volumes by returning later or next day.

VLY - Minimal recharge - unable to purge 3 volumes.

# SAMPLING EVENT DATA SHEET

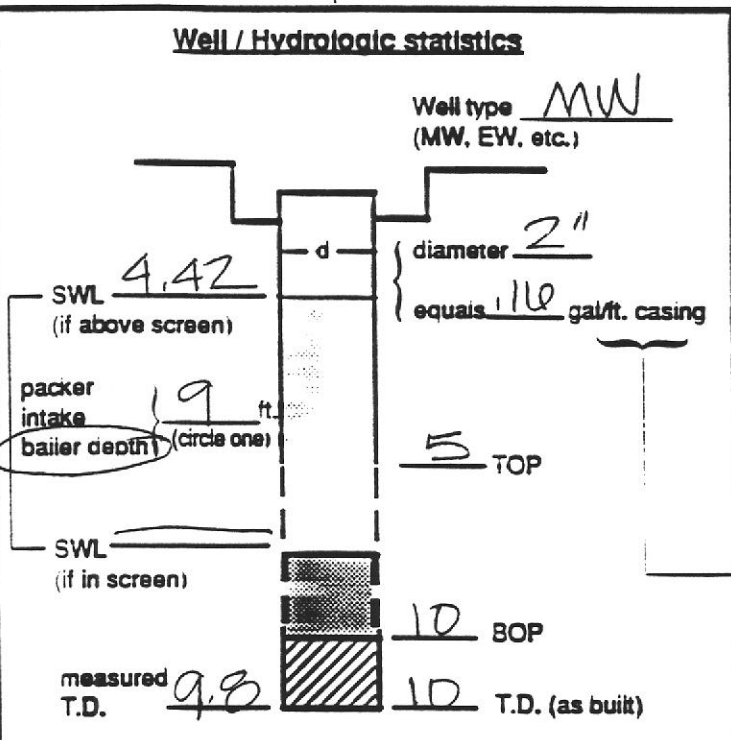
(fill out completely)



McLaren

WELL OR LOCATION W-13

PROJECT Marketplace EVENT Quarterly SAMPLER CMS DATE 1-2-91



Action	Time	Pump rate	IWL (low yield)
Start pump / Begin	<u>10:50</u>	<u>5.5 gal</u>	
	<u>11:45</u>		
Stop	<u>11:45</u>		
Sampled	<u>12:35</u>		
(Final IWL)	<u>5.53</u>		

**Purge calculation**

110 gal/ft. • 5.6 ft. = 619 gals x 3 = 2.7 gals.

SWL to BOP or packer to BOP      one volume      purge volume - 3 casings

**Head purge calculation (Airlift only)**

gal/ft. \_\_\_\_\_ ft. = \_\_\_\_\_ gals.

packer to SWL

**Equipment Used / Sampling Method / Description of Event:**  
peristaltic used to purge 3 casing volumes. Disp. bailer used to sample

Actual gallons purged	<u>5.5</u>
Actual volumes purged	<u>6</u>
Well yield (see below)	<u>MV</u>
COC #	<u>224714</u>
Sample I.D.	Analysis      Lab
<u>149467</u>	<u>8015+</u> <u>MAL</u>
<u>149468</u>	<u>Motor Oil</u> <u>↓</u>

**Additional comments:**  
PID → 0 ppm at source  
0 in breathing zone

80% recharge = 5.6 ft

Gallons purged *	TEMP °C / (°F) (circle one)	EC (us / cm)	PH	TURBIDITY (NTU)		
1. <u>1</u>						
2. <u>2</u>	<u>51.10</u>	<u>1700</u>	<u>7.02</u>	<u>9.3</u>		
3. <u>3</u>	<u>53.9</u>	<u>1730</u>	<u>7.15</u>	<u>10.9</u>		
4. <u>4</u>	<u>54.0</u>	<u>1710</u>	<u>7.18</u>	<u>8.3</u>		
5. <u>5</u>	<u>53.5</u>	<u>1860</u>	<u>7.32</u>	<u>5.7</u>		

\* Take measurement at approximately each casing volume purged.

⊕ HY - Minimal W.L. drop      MY - WL drop - able to purge 3 volumes during one sitting by reducing pump rate or cycling pump.      LY - Able to purge 3 volumes by returning later or next day.      VLY - Minimal recharge - unable to purge 3 volumes.

# SAMPLING EVENT DATA SHEET

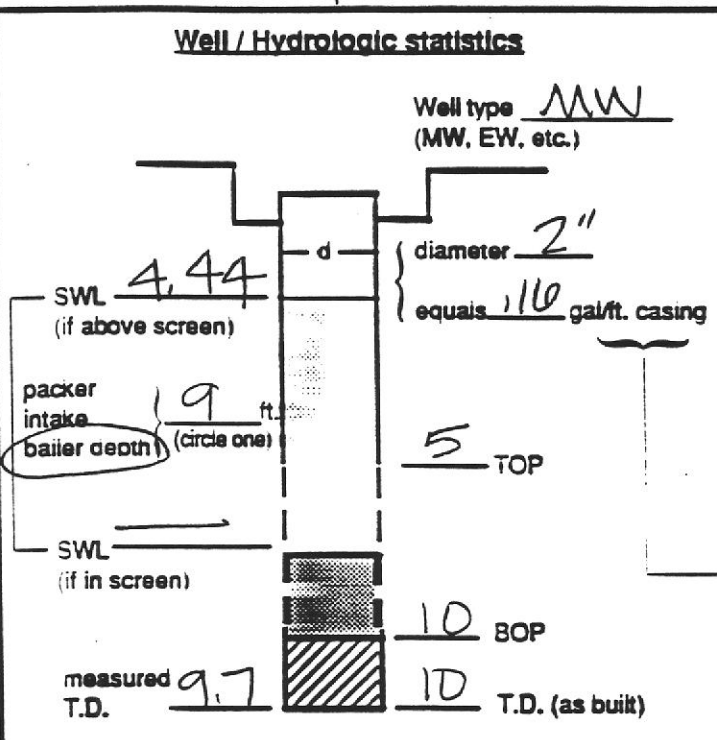
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McLaren

WELL OR LOCATION W-14

PROJECT Marketplace EVENT Quarterly SAMPLER OMS DATE 1-3-90



Action	Time	Pump rate	IWL (low yield)
Start pump / Begin	<u>1325</u>		
Stop	<u>1500</u>		
Sampled (Final IWL)	<u>1540</u>		
	<u>5.00</u>		
<b>Purge calculation</b>			
$\begin{matrix} .110 \text{ gal/ft.} \cdot 5.5 \text{ ft.} = .86 \text{ gals} \times 3 = \underline{2.65} \text{ gals.} \\ \text{SWL to BOP or} & \text{one} & \text{purge volume-} \\ \text{packer to BOP} & \text{volume} & \text{3 casings} \end{matrix}$			
<b>Head purge calculation (Airlift only)</b>			
$\text{gal/ft.} \cdot \text{ft.} = \text{gals.}$			

} 2.75 gallons

Equipment Used / Sampling Method / Description of Event:  
peristaltic used to purge, disp. bailer used to sample

Actual gallons purged	<u>2.75</u>
Actual volumes purged	<u>3</u>
Well yield (see below)	<u>MY</u>
COC #	<u>224715</u>
Sample I.D.	<u>8015+</u>
Analysis	<u>Motor oil</u>
Lab	<u>↓</u>

Additional comments:

80% recharge = 5.60

Gallons purged *	TEMP °C (°F) (circle one)	EC (µs / cm)	PH	TURBIDITY (NTU)
1. <u>1</u>	<u>57.7</u>	<u>5030</u>	<u>6.90</u>	<u>off scale</u>
2. <u>2</u>	<u>54.1</u>	<u>5950</u>	<u>7.29</u>	<u>20.8</u>
3. <u>3</u>	<u>53.4</u>	<u>5970</u>	<u>7.42</u>	<u>4.7</u>
4.				
5.				

sample turbidity

\* Take measurement at approximately each casing volume purged.

⊕ HY - Minimal W.L. drop    MY - WL drop - able to purge 3 volumes during one sitting by reducing pump rate or cycling pump.    LY - Able to purge 3 volumes by returning later or next day.    VL - Minimal recharge - unable to purge 3 volumes.

# SAMPLING EVENT DATA SHEET

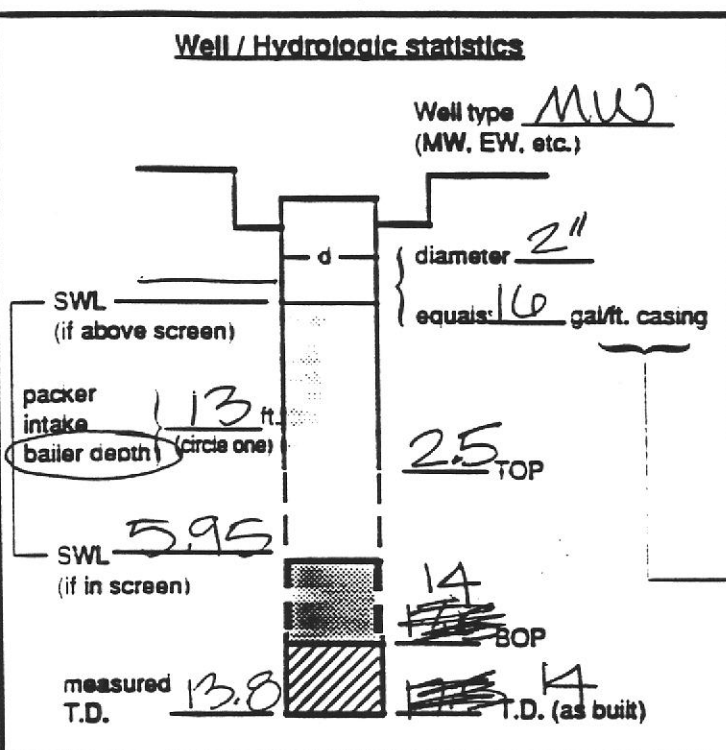
(fill out completely)



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WELL OR LOCATION W19

PROJECT Marketplace EVENT Quarterly SAMPLER AMS DATE 1-3-90



Action	Time	Pump rate	IWL (low yield)
Start pump / Begin	11:15	4 gal	
	11:20		
	11:30	4 gal	
	11:35		
Stop	11:35		
Sampled	12:15		
(Final IWL)	7.71		

**Purge calculation**

16 gal/ft. \* 8 ft. = 1.28 gals x 3 = 3.8 gals.

SWL to BOP or packer to BOP      one volume      purge volume - 3 casings

**Head purge calculation (Airlift only)**

gal/ft. \_\_\_\_\_ ft. \_\_\_\_\_ gals.

packer to SWL \_\_\_\_\_

**Equipment Used / Sampling Method / Description of Event:**  
 centrifugal used to purge 3 casing volumes. Disp. used to sample.  
 PID > 0 - 6 at source  
 0 in breathing zone

Actual gallons purged 8  
 Actual volumes purged 6  
 Well yield (see below) ⊕ HY

COC #	Sample I.D.	Analysis	Lab
<u>224-714</u>	<u>1494605</u>	<u>8015 +</u>	<u>MAL</u>
	<u>1494606</u>	<u>Motor Oil</u>	<u>↓</u>

**Additional comments:**  
 smears of dark brown product on bailer after sampling.  
 8090 = 7.6

Gallons purged *	TEMP °C (°F) (circle one)	EC (us / cm)	PH	TURBIDITY (NTU)
1. <u>4</u>	<u>60.0</u>	<u>5430</u>	<u>7.03</u>	<u>18.5</u>
2. <u>5.5</u>	<u>58.8</u>	<u>5270</u>	<u>6.72</u>	<u>91.3</u>
3. <u>8</u>	<u>61.1</u>	<u>5460</u>	<u>6.88</u>	<u>40.2</u>
4.				
5.				

\* Take measurement at approximately each casing volume purged.

⊕ HY - Minimal W.L. drop      MY - WL drop - able to purge 3 volumes during one sitting by reducing pump rate or cycling pump.

LY - Able to purge 3 volumes by returning later or next day.      VLY - Minimal recharge - unable to purge 3 volumes.





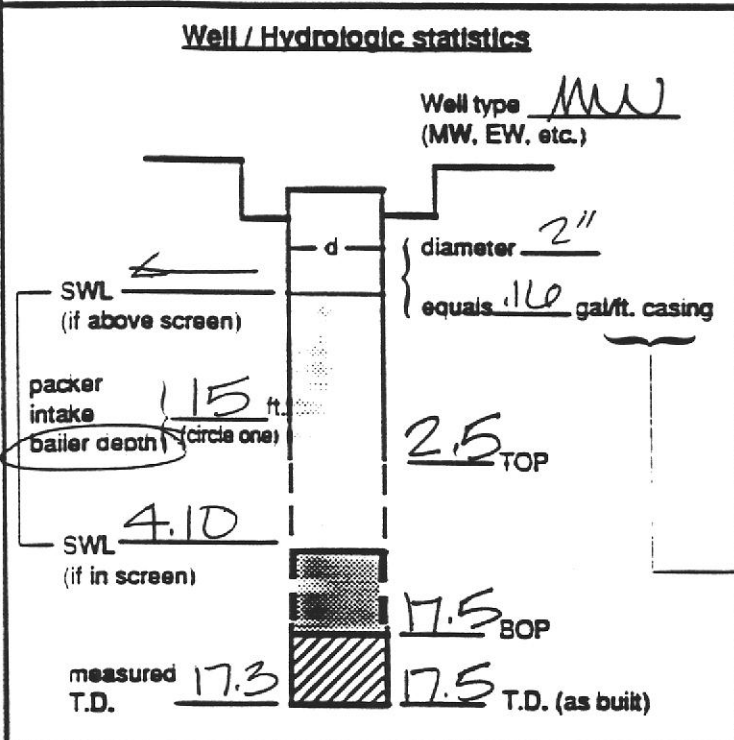
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# SAMPLING EVENT DATA SHEET

(fill out completely)

WELL OR LOCATION W20

PROJECT Marketplace EVENT Quarterly SAMPLER OMS DATE 1-4-91



Action	Time	Pump rate	IWL (low yield)
Start pump / Begin	<u>1050</u>		
		<u>0.5 gal</u>	
Stop	<u>1150</u>		
Sampled	<u>1200</u>		
(Final IWL)	<u>4.42</u>		
<b>Purge calculation</b>			
<u>116</u> gal/ft. * <u>3.4</u> ft. = <u>2.14</u> gals x 3 = <u>6.5</u> gals.			
SWL to BOP or packer to BOP		one volume	purge volume- 3 casings
<b>Head purge calculation (Airlift only)</b>			
gal/ft. * ft. = gals.			
packer to SWL			

Equipment Used / Sampling Method / Description of Event:  
peristaltic pump used to purge. Disp bailer used to sample.

Actual gallons purged	<u>6.5</u>	
Actual volumes purged	<u>3</u>	
Well yield (see below)	<u>HY</u>	
COC #	<u>224715</u>	
Sample I.D.	Analysis	Lab
<u>1A9473</u>	<u>0015 +</u>	<u>MAL</u>
<u>1A9474</u>	<u>MOTOR OIL</u>	<u>↓</u>

Additional comments:

Gallons purged *	TEMP °C (°F) (circle one)	EC (µs / cm)	PH	TURBIDITY (NTU)
<u>1. 2</u>	<u>58.7</u>	<u>9410</u>	<u>6.09</u>	<u>3.1</u>
<u>2. 4</u>	<u>60.5</u>	<u>9660</u>	<u>6.10</u>	<u>1.5</u>
<u>3. 6</u>	<u>59.8</u>	<u>9620</u>	<u>6.28</u>	<u>2.3</u>
<u>4.</u>				
<u>5.</u>				

\* Take measurement at approximately each casing volume purged.

⊕ HY - Minimal W.L. drop

MY - WL drop - able to purge 3 volumes during one sitting by reducing pump rate or cycling pump.

LY - Able to purge 3 volumes by returning later or next day.

VLY - Minimal recharge - unable to purge 3 volumes.

# SAMPLING EVENT DATA SHEET

(fill out completely)



McLaren

WELL OR LOCATION W24

PROJECT Marketplace EVENT Quarterly SAMPLER CMS DATE 1-3-90

Well / Hydrologic statistics	Action	Time	Pump rate	IWL (low yield)
Well type <u>MW</u> (MW, EW, etc.)	Start pump / Begin	1350		
			4.5 gal	
	Stop	1415		
	Sampled	1430		
	(Final IWL)			
<b>Purge calculation</b>				
$\frac{16 \text{ gal/ft.}}{1} \cdot \frac{8.3 \text{ ft.}}{1} = \frac{1.3 \text{ gals}}{1} \times 3 = \frac{4 \text{ gals.}}{1}$				
<b>Head purge calculation (Airlift only)</b>				
gal/ft. = _____ ft. = _____ gals. packer to SWL: _____				

Equipment Used / Sampling Method / Description of Event:  
peristaltic used to purge 3 casing volumes. Deep bailer used to sample.

Actual gallons purged	<u>4.5</u>
Actual volumes purged	<u>3</u>
Well yield (see below)	<u>HY</u>
COC #	<u>224714</u>
Sample I.D.	<u>8015 + 11A1</u>
	<u>Motoroil</u>
	<u>↓</u>

Additional comments:

Gallons purged	TEMP °C (°F) (circle one)	EC (µs / cm)	PH	TURBIDITY (NTU)
1. <u>2</u>	<u>58.9</u>	<u>4510</u>	<u>7.07</u>	<u>0.6</u>
2. <u>3</u>	<u>59.6</u>	<u>3780</u>	<u>6.96</u>	<u>0.9</u>
3. <u>4</u>	<u>59.3</u>	<u>3430</u>	<u>6.83</u>	<u>1.3</u>
4.				
5.				

\* Take measurement at approximately each casing volume purged.

⊕ HY - Minimal W.L. drop      MY - WL drop - able to purge 3 volumes during one sitting by reducing pump rate or cycling pump.      LY - Able to purge 3 volumes by returning later or next day.      VL - Minimal recharge - unable to purge 3 volumes.