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June 17, 1992

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

Dear Mr. Oliva:

QUARTERLY GROUNDWATER MONITORING REPORT SECOND QUARTER 1992, EMERY BAY MARKETPLACE, EMERYVILLE, CALIFORNIA

Enclosed is the letter report "Quarterly Groundwater Monitoring Report Second Quarter 1992, Emery Bay Marketplace, Emeryville, California," June 10, 1992. The report summarizes the quarterly groundwater monitoring activities performed at the Emery Bay Marketplace property during April 1992 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.

The purpose of the quarterly groundwater monitoring program is to confirm that petroleum hydrocarbons are confined to within the Marketplace property and have not migrated to the downgradient edge of the property. Groundwater has been monitored on the Marketplace property on a quarterly basis since the first quarter of 1990 (with the exception of the third quarter of 1990). The enclosed Quarterly Groundwater Monitoring Report supports the conclusion that groundwater conditions beneath the site are stable and that the wells on the downgradient boundary of the site do not contain hydrocarbons. Specifically, the subsurface conditions beneath the site are as described below:

- The groundwater flow direction across the site has been consistently towards the west since the inception of the quarterly groundwater monitoring program. This indicates that wells W-13, W-14, W-20, and W-24 are in the verified downgradient direction.

- Hydrocarbons are not present in the four wells located on the downgradient side of the site (wells W-13, W-14, W-20, and W-24). Although hydrocarbons were detected in wells W-20 and W-24 in one of the nine samplings of these wells (in April 1991), this low-level detection appears to be an isolated occurrence and has not been confirmed in three subsequent sampling rounds.

1135 Atlantic Avenue, Alameda, CA 94501 (510) 521-5200 FAX (510) 521-1547

It is anticipated that July 1992 will be the fourth quarter that hydrocarbons have not been detected in these wells.

- Wells W-7 and W-19 have shown consistent levels of hydrocarbons throughout the groundwater monitoring program, although the concentration of motor oil weight hydrocarbons in well W-19 were slightly higher in the fourth quarter of 1991 and first quarter of 1992 than the previous samplings.

Based upon these findings, it is recommended that the groundwater monitoring program be reduced from a quarterly to an annual basis, commencing in July 1992. On behalf of our client (Christie Avenue Partners), we request that you approve such reduction of the frequency of the groundwater monitoring program.

We will be contacting you within the next week to confirm that you have received this letter and report and to determine whether you require additional information.

Sincerely,

Julie S. Menack

Julie S. Menack, RG #4440
Supervising Geoscientist

Enclosure (1)

cc: Lynn Tolin (with enclosure)

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QUARTERLY GROUNDWATER MONITORING REPORT SECOND QUARTER 1992 EMERY BAY MARKETPLACE EMERYVILLE, CALIFORNIA

JUNE 17, 1992

McLaren Hart™

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June 17, 1992

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

Dear Ms. Tolin:

QUARTERLY GROUNDWATER MONITORING REPORT SECOND QUARTER 1992, EMERY BAY MARKETPLACE, EMERYVILLE, CALIFORNIA

This letter report documents the results of the quarterly monitoring activities conducted at the Emery Bay Marketplace (Marketplace) property during April 1992. This is the seventh 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).

It was determined in the Groundwater Characterization Report that a former asphalt refining plant, located on the northeast side of the site, may be a source of: 1) dissolved hydrocarbons detected in groundwater samples from monitoring wells located downgradient from the former refining plant location, and 2) separate-phase product observed in Well W-5 which is located near the former refining plant location.

The following activities have been completed as proposed in the Work Plan:

- Depths to groundwater have been measured at all monitoring wells on a quarterly basis since July 1990 and the data have been used to prepare groundwater elevation maps.

- Groundwater from six downgradient wells (wells W-7, W-13, W-14, W-19, W-20, and W-24) have been sampled on a quarterly basis since July 1990 to verify that petroleum hydrocarbons in groundwater are confined to the Marketplace property and have not migrated off-site. Samples were analyzed for total petroleum hydrocarbons as diesel (TPH/D) and as motor oil (TPH/MO) by modified EPA Method 8015.

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- Free product was removed from well W-5 on a bi-weekly basis for four months from July through October 1990 and on a monthly basis between October 1990 and June 1991.

- Well W-10, which could not be used for sampling because of low groundwater recharge, was abandoned on October 1, 1990. The well abandonment activities are described in the Quarterly Report dated November 28, 1990 (McLaren/Hart, 1990b).

This letter report presents the results of the depth to groundwater measurements and the groundwater quality sampling and analyses performed during the month of April 1992. The data evaluation compares data collected during this quarter to historic data collected at the site.

FIELD METHODS

Depths to groundwater in all existing wells at the Marketplace property were measured with a Solinist electronic water level indicator on April 23 (all except for well W-8) and April 24, 1992 (well W-8). A Marine Moisture Control Company oil-water interface probe was used to measure depth to oil and depth to groundwater in the well where free product was present (Well W-5). Hydrologic data sheets with original field water level data are provided in Attachment A. A summary of historic depth to groundwater measurements, monitoring well surface casing elevations, and calculated groundwater surface elevations is presented in Table 1.

A peristaltic pump was used to purge groundwater prior to sampling with a disposable bailer on April 23 and 24, 1992. Groundwater was purged until a minimum of three casing volumes of groundwater were removed, turbidity readings were below 50 NTUs and temperature, conductivity and pH readings were stabilized. Groundwater samples were collected in one-liter amber bottles and 40 milliliter volatile organic analysis (VOA) bottles.

Groundwater samples from wells W-7, W-13, W-14, W-19, W-20, and W-24 were analyzed for TPH/D and TPH/MO by Modified EPA Method 8015. These samples were sent under chain-of-custody to McLaren/Hart Analytical Laboratory (MAL) in Rancho Cordova, California. One travel blank was sent as a Quality Assurance (QA) sample on each day of sampling. A replicate sample was also sent for the groundwater sample from well W-7 as a QA sample. The analytical laboratory data sheets, QA laboratory results, chain-of-custody records, and sampling data sheets are included in Attachment B. The analytical results are summarized and presented with the historic analytical data in Table 2.

DATA EVALUATION

The data which are evaluated consist of: 1) groundwater surface elevations, as determined by the April 23, 1992 depth to groundwater measurements; 2) groundwater flow directions, as determined from the groundwater surface contour map that has been prepared based on the groundwater elevations; and 3) groundwater quality data obtained in January 1992.

Groundwater Elevations

The April 23, 1992 groundwater surface elevation contours for the artificial fill material beneath the site are presented in Figure 1. Elevations from the following wells were omitted from the preparation of groundwater surface elevation contours for the reasons described:

- Elevations from Wells W-15, W-16, and W-22 were not used to construct the map because these wells are completed in the native material below the artificial fill material.

- The groundwater elevation for Well W-5 was not used because the free product which occurs in this well is likely to affect the measured groundwater elevation.

- The elevation from Well W-7 was not used because it is significantly higher than elevations in adjacent wells. The higher elevation at Well W-7 has consistently been observed when water elevations have previously been measured. As discussed in the Groundwater Characterization Report, perched groundwater conditions may occur within the artificial fill material at this location.

Groundwater Flow Direction

The groundwater elevation map for wells completed in the native material is consistent with previous groundwater flow maps and indicates that groundwater flows in a westerly to southwesterly direction, toward Christie Avenue. The April 1992 water levels were similar to those measured in January 1992 and higher than those measured in October 1991 at the end of the dry season. The higher water levels measured in January and April 1992 are likely a result of shallow recharge from precipitation that occurred during the spring of 1992. As discussed in the Groundwater Characterization Report (McLaren, 1990a), local variations in groundwater flow near Wells W-4 and W-8 may be caused by the slurry wall that is installed to a depth of 35 feet on the upgradient property.

Groundwater Quality

Groundwater samples were collected on April 23, and 24, 1992 from six wells within and on the downgradient side of the property (W-7, W-13, W-14, W-19, W-20, and W-24). The analytical results are summarized in Table 2 and presented in Figure 1. The following discussion focuses on the results of the analyses in the quarterly monitoring program.

The purpose of the quarterly monitoring program is to confirm that total petroleum hydrocarbons (TPH) are confined to within the Marketplace property and have not migrated off-site. The six wells (W-7, W-13, W-14, W-19, W-20 and W-24) that were sampled during this quarter, have been sampled since 1989 (W-7) and since 1990 (W-13, W-14, W-19, W-20, and W-24). The following is a summary of the past as well as present analytical results for each of the six downgradient wells.

- Well W-7 is located in the center of the site. TPH/D has been detected in groundwater at levels ranging from less than 1.0 (non-detect)and 5.6 ppm. The TPH/D result from the April 1992 sampling was 3.3 ppm. Prior to the April 1992 sampling event, TPH/MO had been detected at levels between 2 and 12 ppm. The April 1992 TPH/MO result was 4.9. Therefore, in the April 1992 sampling, both TPH/D and TPH/MO results were confirmed within the past range of results for groundwater sampled from this well.

- Well W-13 is located on the downgradient, central side of the site. TPH have never been detected in groundwater from this well.

- Well W-14 is located on the downgradient, southern side of the site. TPH have never been detected in groundwater from this well.

- Well W-19 is located within the site upgradient of W-7 on the northwestern side of the site. Although TPH/D was detected one time, at 1.1 ppm in April 1990, this result has not been confirmed in subsequent sampling events. TPH/MO has been detected in groundwater sampled from well W-19 at levels ranging from less than one (the detection limit) and 35 ppm. The April 1992 TPH/MO result was within this range at 7.1 ppm.

- Well W-20 is located on the far downgradient side of the site. TPH/D has not been detected in groundwater from this well in the past as well as in April 1992. TPH/MO was detected in groundwater sampled from well W-20 in April 1991 at 2.3 ppm, but this result has not been confirmed in subsequent sampling events. TPH/MO had not been detected prior to the April 1991 sampling events.

- Well W-24 is located on the downgradient side of the site. TPH/D has not been detected in the groundwater sampled from well W-24 in either the previous or the most recent sampling events. TPH/D was detected in April 1991, but this result has not been confirmed in subsequent sampling events. TPH/MO had not been detected prior to the April 1991 sampling events.

Product thickness has been measured in wells W-5 and W-16 since October 1989. Product thickness in well W-5 has not changed very much since the free product removal program ended in June 1991. Product thickness in the most recent three quarters has ranged between 0.80 and 1.4 feet in well W-5. Prior to the end of monthly product removal for well W-5, product thickness had ranged between 0.71 and 2.12 feet. Prior to October 1991, the product thickness in well W-16 ranged between not detected and 0.07 feet. Product has not been measurable in well W-16 since October 1991.

SUMMARY AND CONCLUSIONS

The results from the ongoing quarterly monitoring activities conducted at the Emery Bay Marketplace property are summarized as follows:

- The April 1992 groundwater flow map for the artificial fill (Figure 1) is consistent with previous groundwater flow maps, and shows that groundwater flow is toward the west-southwest.

- Hydrocarbons are not present in the four wells located on the downgradient side of the site (wells W-13, W-14, W-20, and W-24). Although hydrocarbons were detected in wells W-20 and W-24 in one of the nine samplings of these wells (in April 1991), this low-level detection appears to be an isolated occurrence and has not been confirmed in three subsequent sampling rounds.

- Wells W-7 and W-19 have shown consistent levels of hydrocarbons throughout the groundwater monitoring program, although the concentration of motor oil weight hydrocarbons in well W-19 were slightly elevated in the fourth quarter of 1991 and first quarter of 1992.

These results support previous results which have shown that the occurrence of TPH is limited to within the Marketplace property and does not occur near the property boundary.

If you have any questions regarding this report, please call us at (510) 521-5200.

Sincerely,

Julie S. Menack

Julie S. Menack, RG #4440
Supervising Geoscientist

Paula A. Bolio
Associate Geoscientist

cc: Brian Oliva, Alameda County Department of Environmental Health
Lester Feldman, Regional Water Quality Control Board

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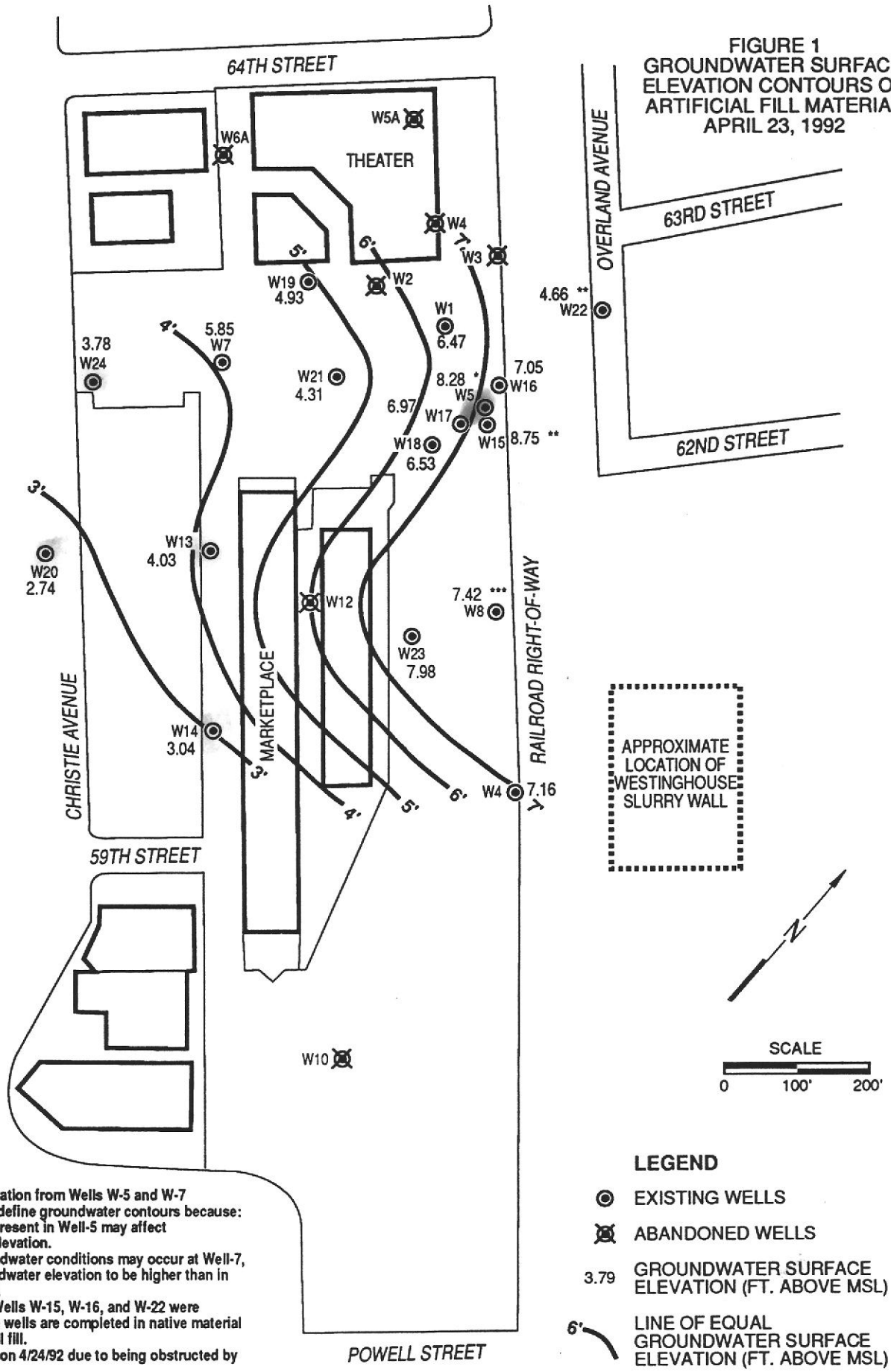
REFERENCES

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.

FIGURE 1
GROUNDWATER SURFACE ELEVATION CONTOURS OF ARTIFICIAL FILL MATERIAL APRIL 23, 1992



* Groundwater elevation from Wells W-5 and W-7 were not used to define groundwater contours because:
- * Free product present in Well-5 may affect groundwater elevation.
- * Perched groundwater conditions may occur at Well-7, causing groundwater elevation to be higher than in adjacent wells.

** Elevations from Wells W-15, W-16, and W-22 were not used because wells are completed in native material below the artificial fill.

*** Water level taken on 4/24/92 due to being obstructed by a car on 4/23/92.

LEGEND

- EXISTING WELLS
- ABANDONED WELLS
- 3.79 GROUNDWATER SURFACE ELEVATION (FT. ABOVE MSL)
- 6' LINE OF EQUAL GROUNDWATER SURFACE ELEVATION (FT. ABOVE MSL)

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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[a]	11.47	8-7-81	4.30	6.20[b]	
		9-10-81	4.40	6.10[b]	
		5-6-87	6	6.08[b]	
		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	
		4-3-91	4.74	6.73	
		10-25-91	5.22	6.25	
		1-15-92	4.88	6.59	
		4-23-92	4.98	6.49	
W-4	9.96	8-7-81	4.30	6.20[b]	
		9-10-81	4.40	6.10[b]	
		1-18-82	2.50	8.00[b]	
		3-27-85	?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	
		4-3-91	1.45	8.51	
		10-25-91	4.29	5.67	
		1-15-92	2.56	7.40	
		4-23-92	2.80	7.16	
W-5	11.41	8-7-81	4.70	7.50[b]	c
		9-10-81	4.90	7.30[b]	c
		1-18-82	2.50	9.60[b]	c
		3-27-85	?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
		4-3-91	2.42	8.99	0.03
		10-25-91	5.47	5.94	1.18
		1-15-92	3.21	8.2	0.80
		4-23-92	3.13	8.28	1.41
W-7[a]	9.05	5-6-87	3	6.88[b]	
		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	
		4-3-91	1.18	7.87	
		10-25-91	3.47	5.59	
		1-15-92	3.88	5.17	
		4-23-92	3.20	5.85	
W-8	10.43	5-6-87	5.5	6.88[b]	
		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[d]	3.33	7.10	

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)
		10-3-90	3.65	6.78	
		1-3-91	3.46	6.97	
		4-3-91	1.47	8.96	
		10-25-91	3.54	6.89	
		1-15-92	2.98	7.45	
		4-24-92	3.01	7.42	
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	
		4-3-91	3.64	4.51	
		10-25-91	4.54	3.72	
		1-15-92	3.82	4.33	
		4-23-92	4.12	4.03	
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	
		4-3-91	4.31	3.66	
		10-25-91	4.41	3.56	
		1-15-92	4.18	3.79	
		4-23-92	4.93	3.04	
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	
		4-3-91	3.05	8.48	
		10-25-91	2.88	8.65	
		1-15-92	3.54	7.99	
		4-23-92	2.78	8.75	
W-16	10.94	10-11-89	4.81	6.13	0.07
		2-22-90	3.92	7.02	NM
		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[f]	4.44	6.50	NM
		10-3-90	4.38	6.56	0.02
		1-3-91	4.67	6.27	0.02
		4-3-91	3.50	7.48	0.02
		10-25-91	4.64	6.30	NM
		1-15-92	4.11	6.83	NM
		4-23-92	3.89	7.05	NM
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	---[g]	---[g]	
		7-26-90	5.59	6.55	
		10-3-90	5.72	6.42	
		1-3-91	6.28	5.86	
		4-3-91	4.69	7.45	
		10-25-91	6.00	6.14	
		1-15-92	5.57	6.57	
		4-23-92	5.17	6.97	

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-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	
		4-3-91	4.94	6.40	
		10-25-91	5.55	5.79	
		1-15-92	5.24	6.10	
		4-23-92	4.81	6.53	
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	
		4-3-91	5.39	4.88	
		10-25-91	5.47	4.80	
		1-15-92	5.18	5.09	
		4-23-92	5.34	4.93	
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	
		4-3-91	3.84	2.98	
		10-25-91	4.07	2.75	
		1-15-92	3.75	3.07	
		4-23-92	4.08	2.74	
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	
		4-3-91	4.80	4.68	
		10-25-91	5.04	4.44	
		1-15-92	4.95	4.53	
		4-23-92	5.17	4.31	
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	
		4-3-91	7.64	4.03	
		10-25-91	6.69	4.98	
		1-15-92	7.61	4.06	
		4-23-92	7.21	4.46	
W-23	9.16	4-9-90	1.51	7.65	
		6-7-90	1.78	7.38	

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-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	
		4-3-91	4.56	4.16	
		10-25-91	5.09	3.63	
		1-15-92	4.82	3.90	
		4-23-92	4.94	3.78	

[a] Nielson Property
[b] Groundwater elevation taken from earlier reports; may not agree with calculated elevation using current top of casing elevation.
[c] Data not available.
[d] Well W-8 was not accessible on 7-25-90 and 7-26-90. It was sounded on 7-27-90.
[e] NM indicates product thickness not measurable.
[f] 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.
[g] Well W-17 not accessible on 6-7-90.
[h] Depth to groundwater measured with tape measure because water level was too shallow to measure with oil-water interface probe.

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TABLE 2

HYDROCARBONS IN GROUNDWATER
EMERY BAY MARKETPLACE SITE

Well Number	Sample Date	TPH/D Concentration (ppm)	TPH/MO Concentration (ppm)
W-1	4-14-87	---[a]	<5[b,c]
	2-28-90	<0.5	---
	4-11-90	<0.1	0.57
W-2[d]	4-15-87	<1	---
W-3[d]		---	---
W-4[d]	4-14-87	---	<5[c]
W-4	3-01-90	<0.5	---
	4-10-90	<0.1	<0.25
W-5[e]	9-27-89	20	---
B-5[d]		---	---
W-5A[d]	4-16-87	<1[f]	<1[f]
W-5[n]	10-25-91	HFA: Crude Oil or Waste Oil	
W-6[d]	4-16-87	<1[f]	<1[f]
W-7	9-26-89	1.1	---
	2-28-90	<0.5[g]	---
	4-11-90	5.6	7.5
	7-30-90	2.6	2
	10-4-90	5	6
	1-4-91	4	12
	4-3-91	<1.0[h]	3.2
	10-25-91	1.4	2.3
	10-25-91[n]	HFA: Biogenic or highly degraded material	
	1-16-92	1.6	3.6
	4-24-92	3.3	4.9
W-8	4-17-87	10[i]	---
	9-26-89	7.1	---
	3-01-90	4.5	---
	4-18-90	5.3	---
W-13	2-28-90	<0.5	---
	4-12-90	<0.5	---
	7-27-90	<0.5	<1
	10-4-90	<0.5	<1
	1-3-91	<0.5	<1
	4-4-91	<0.5	<1
	10-25-91	<0.5 = 500 ppb	<1
	1-16-92	<0.5	<0.5
	4-24-92	<0.5	<0.5
W-14	2-28-90	<0.5	---
	4-11-90	<0.1	<0.25
	7-30-90	<0.6	<1
	10-4-90	<0.5	<1
	1-4-91	<0.5	<1
	4-4-91	<0.5	<1
	10-25-91	<0.5	<1
	1-16-92	<0.5	<0.5
	4-24-92	<0.5	<0.5
W-15	9-25-89	1.2	---
	4-13-90	1.5	---

5 x 10 5

TABLE 2
(Continued)

HYDROCARBONS IN GROUNDWATER
EMERY BAY MARKETPLACE SITE

Number Well	Sample Date	TPH/D Concentration (ppm)	TPH/MO Concentration (ppm)
W-16	9-27-89	4.7	---
	2-28-90	22	---
	4-13-90	9	---
W-17	9-25-89	0.7	---
	4-13-90	1.6	---
W-18	9-26-89	3.1	---
	4-13-90	5.1	---
W-19	4-12-90	1.1	---
	4-16-90	<0.5[j]	---
	7-27-90	<1	8
	10-3-90	<0.5[k]	3
	1-3-91	<0.5	<1
	4-3-91	<2.5[h]	8.4
	10-25-91[m]	<0.5	34
	10-25-91	HFA: Motor Oil	---
	1-17-92	<10.0	29
	4-23-92	<2.0	7.1
W-20	4-12-90	<0.5	---
	4-16-90	<0.5	---
	7-30-90	<0.5	<1
	10-3-90	<0.5	<1
	1-4-91	<0.5	<1
	4-4-91	<0.5	2.3[l]
	10-25-91[m]	<0.5	<1
	10-25-91[n]	HFA: Volatiles and Semi-Volatiles not detected	---
	1-17-92	<0.5	<0.5
	4-24-92	<0.5	<0.5
W-21	4-12-90	1.4	---
	4-18-90	1.7	---
W-22	4-12-90	<0.5	---
	4-18-90	<0.5	---
W-23	4-12-90	2.9	---
	4-18-90	3.6	---
W-24	6-7-90	<0.5	---
	7-27-90	<0.5	<1
	10-3-90	<0.5	<1
	1-3-91	<0.5	<1
	4-3-91	<0.5	1.1[l]
	10-25-91[m]	<0.5	<1
	10-25-91[n]	HFA: Volatiles and Semi-Volaties not detected	---
	1-17-92	<0.5	<0.5
	4-24-92	<0.5	<0.5

[a] --- indicates no analysis made for constituent.
[b] < indicates constituent not detected above this level.
[c] Grease also not detected above 5 ppm in Wells W-1 and W-4 (Nielson)
[d] Abandoned well on Nielson property.
[e] Free product in Well W-5.
[f] Indicates total gasoline, diesel, and motor oil also not detected above 1 ppm in wells W-5A and W-6.
[g] Review of gas chromatograph indicated TPH/D present at 0.3 ppm in Well W-7 on 2-28-90.
[h] Reporting limits increased from 0.5 ppm to 1.0 ppm (W-7) and 2.5 ppm (W-19) TPH/D on 4-3-91 because samples were diluted due to presence of motor oil.
[i] Semiquantified results include gasoline, diesel, and some oil and grease in well W-8.
[j] Review of gas chromatograph indicated TPH/D present at 0.4 ppm in Well W-19 on 4-16-90.
[k] Review of gas chromatograph indicated TPH/D present at 0.3 ppm in Well W-19 on 10-3-90.
[l] The chromatographic pattern in the sample does not exactly match the motor oil standard chromatograph.
[m] BTEX analyzed 10/25/91, not detected.
[n] Hydrocarbon Fingerprinting Analysis (HFA)

ATTACHMENT A

HYDROLOGIC DATA SHEETS

McLaren

HYDRODATA

DATE: 4/23/92

PROJECT: MARKET PLACE EVENT: Quarterly SAMPLER: D. WATTS

	NO.	WELL OR LOCATION	DATE MO	DA	YR	TIME HR	MIN	MEASUREMENT	CODE	COMMENTS
	1	W-1	4	23	92	11	55	4.98	SWL	VAULT BOX FLOODED
C	2	W-4				10	40	2.80	↓	VAULT BOX FLOODED
C	3	W-5				12	45	3.13	OIL	OWI = 4.54 VAULT BOX FLOODED
	4	W-7	↓	↓	↓	09	51	3.20	SWL	
• C	5	W-8	4	24	92	09	17	3.01		VAULT BOX FLOODED WITH BENTONITE
C	6	W-13	4	23	92	10	20	4.12		
C	7	W-14				10	28	4.93		CHANGED LOCKS VAULT BOX FLOODED
C	8	W-15				11	35	2.78		CHANGED LOCKS VAULT BOX FLOODED
	9	W-16				11	40	3.89		WELL CONTAINS PRODUCT CHANGED LOCKS
• C	10	W-17				12	25	5.17		
	11	W-18				10	58	4.81		VAULT BOX FLOODED WITH BENTONITE
	12	W-19				10	07	5.34		WELL CONTAINS PRODUCT CHANGED LOCKS
C	13	W-20				09	31	4.08		
	14	W-21				10	02	5.17		
	15	W-22				12	05	7.21		VAULT BOX FLOODED
	16	W-23				10	50	1.18		
	17	W-24	↓	↓	↓	09	44	4.94	↓	VAULT BOX FLOODED WITH BENTONITE
	18									
	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)[2]
- 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.

[2]Negative pressure (Vacuum) psi = approx -(1/2 x mmHg)

C = CONE off

ATTACHMENT B

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

McLaren™ Hart

Date: May 5, 1992
LP #: 5877

Paula Arnet - Bolio
McLaren/Hart
1135 Atlantic Avenue
Alameda, CA 94501

Dear Ms. Arnet-Bolio:

Enclosed are the laboratory results for the nine samples submitted by you to the McLaren Analytical Laboratory on April 25, 1992, for the project *Market Place*.

The analysis you requested is:

Modified EPA 8015 (9 - Water)

The report consists of the following sections:

1. A copy of the chain of custody
2. Quality Control Definitions and 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,

Anthony S. Wong

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

3083 Gold Canal Drive, Rancho Cordova, CA 95670 (916) 852-6600 FAX (916) 852-7292

Pg 3/4 28718

McLaren Hart

CHAIN OF CUSTODY RECORD

FOR LABORATORY USE ONLY
Laboratory Project No.: 5877
Storage Refrigerator ID: 1, 4-23
Storage Freezer ID:
Secured: Yes ✓ No

Project Name: MARKET PLACE Project #: 04.0059805.000 Sampler: D. WATTS (Printed Name) (Signature)

Relinquished by: (Signature and Printed Name) D. WATTS		Received by: (Signature and Printed Name) FED-X	Date: 4/24/92 Time: PM
Relinquished by: (Signature and Printed Name) FED EX		Received by: (Signature and Printed Name)	Date: 4-25-92 Time: 0900
Relinquished by: (Signature and Printed Name)		~~Received by: (Signature and Printed Name)~~ Logged By Kathleen Fontecchio	Date: 4-27-92 Time: 08:00
Relinquished by: (Signature and Printed Name)		Received by: (Signature and Printed Name)	Date: Time:

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

Method of Shipment: FED-X
Shipment ID:

Circle or Add Analysis(es) Requested

a) Identify specific metals requested under Special Instructions

Sample ID Number	Sample Description: Date	Time	Description	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/MS)	625/8270 (BNA-GC/MS)	TPH/G (Gasoline-GC)	TPH/D (Diesel-GC)	418.1 (IR)	8015 Modified (GC)	Metals-Total a	Metals-Soluble a	Fluoride/Perchlorate	Chloride/pH	TDS/Percent Solid	Specific Conductivity (EC)	8015 + motor oil	TAT	Container(s) #	Container(s) Type	FOR LABORATORY USE ONLY Lab ID
1	190500	4/23/92	1500	TRIP BLANK																	X	4	1	A	5877-006
2	212855	↓	↓	↓ (SPARE)																	X	4	1	A	↓
3	190497			W-19																	X	4	1	A	-007
4	190498		↓	W-19 (SPARE)																	X	4	1	A	↓
5	212851		1605	W-7																	X	4	1	A	-008
6	212852			W-7 (SPARE)																	X	4	1	A	↓
7	212853			W-7 Replicate																	X	4	1	A	-009
8	212854	↓	↓	↓ (SPARE)																	X	4	1	A	↓
9																									
10																									

Special Instructions/Comments:
NOTE: REPLICATE FOR W-7

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

FOR LABORATORY USE ONLY. Sample Condition Upon Receipt: Samples intact. temp OK (K.F) 4-27-92

SEND DOCUMENTATION AND RESULTS TO (Check one):
☒ Project Manager/Office: PAULA ARNET-BOLIO/ALAMEDA
☐ Client Name:
Company:
Address:
Phone: ___(____)_____ Fax:

Pg 4/4 225369

McLaren Hart

CHAIN OF CUSTODY RECORD

FOR LABORATORY USE ONLY
Laboratory Project No.: 5877
Storage Refrigerator ID: A, 4-23
Storage Freezer ID:
Secured: Yes ✓ No

Project Name: MARKET PLACE Project #: 04.0059805.000 Sampler: D. WATTS (Printed Name) (Signature)

Relinquished by: (Signature and Printed Name) D. WATTS FED EX	Received by: (Signature and Printed Name) FED-X	Date: 4/24/92	Time: PM
Relinquished by: (Signature and Printed Name)	Received by: (Signature and Printed Name)	Date: 4/25/92	Time: 0900
Relinquished by: (Signature and Printed Name)	Received by: (Signature and Printed Name) Logged By Kathleen Fontenot	Date: 4-27-92	Time: 08:00
Relinquished by: (Signature and Printed Name)	Received by: (Signature and Printed Name)	Date:	Time:

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

Method of Shipment: FED-X
Shipment ID:

Circle or Add Analysis(es) Requested

Sample ID Number	Sample Description: Date	Time	Description	TAT	Container(s): #	Type	FOR LABORATORY USE ONLY: Lab ID
1	212878	4/24/92	4525 W-13	4	1	A	5877-005
2	212879	↓	↓ ↓ (SPARE)	4	1	A	" "
3							
4							
5							
6							
7							
8							
9							
10							

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/MS); 625/8270 (BNA-GC/MS); TPH/G (Gasoline-GC); TPH/D (Diesel-GC); 418.1 (IR); 8015 Modified (GC); Metals-Total a; Metals-Soluble a; Fluoride/Perchlorate; Chloride/pH; TDS/Percent Solid; Specific Conductivity (EC); 8015 + MOTOR OIL

a) Identify specific metals requested under Special Instructions

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

FOR LABORATORY USE ONLY. Sample Condition Upon Receipt: samples intact, temp OK (K.F) 4-27-92

SEND DOCUMENTATION AND RESULTS TO (Check one):
☒ Project Manager/Office: PAULA ARNET-BOLIO/ALAMEDA
☐ Client Name:
Company:
Address:
Phone: ___(____)_____ Fax:

Pg 1/4 28548

McLaren Hart

CHAIN OF CUSTODY RECORD

FOR LABORATORY USE ONLY
Laboratory Project No.: 5877
Storage Refrigerator ID: 1, 4-23
Storage Freezer ID:
Secured: Yes ✓ No

Project Name: MARKET PLACE Project #: 04.0059805.000 Sampler: D. WATP (Printed Name) (Signature)

Relinquished by: (Signature and Printed Name) D. WATP	Received by: (Signature and Printed Name)	Date:	Time:
Relinquished by: (Signature and Printed Name) FED EX	Received by: (Signature and Printed Name)	Date: 4-25-92	Time: 0900
Relinquished by: (Signature and Printed Name)	Received by: (Signature and Printed Name) logged by Kathleen Fontenot	Date: 4-27-92	Time: 08:00
Relinquished by: (Signature and Printed Name)	Received by: (Signature and Printed Name)	Date:	Time:

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

Method of Shipment: FED-X
Shipment ID:

Circle or Add Analysis(es) Requested

a) Identify specific metals requested under Special Instructions

Sample ID Number	Sample Description: Date	Time	Description	TAT	Container(s): #	Type	FOR LABORATORY USE ONLY: Lab ID
1	212856	4/24/92	0950 TRIP BLANK	4	1	A	5877-001
2	212857		↓ ↓ (SPARE)	4	1	A	
3	212861		0950 TRIP BLANK	4	1	V(HCl)	
4	212862		↓ ↓ (SPARE)	4	1		
5	212863			4	1		
6	212864		↓ ↓	4	1	↓	
7	212859		1015 W-24	4	1	A	-002
8	212860		↓ ↓ (SPARE)	4	1	A	
9	212870		1155 W-20	4	1	A	-003
10	212871	↓	↓ ↓ (SPARE)	4	1	A	

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/MS); 625/8270 (BNA-GC/MS); TPH/G (Gasoline-GC); TPH/D (Diesel-GC); 418.1 (IR); 8015 Modified (GC); Metals-Total a; Metals-Soluble a; Fluoride/Perchlorate; Chloride/pH; TDS/Percent Solid; Specific Conductivity (EC); 8015 + MOTOR OIL BTEXE CANCELLED *

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: PAULA ARNET - Bolio/ALAMEDA
☐ Client Name:
Company:
Address:
Phone: ( ) Fax:

FOR LABORATORY USE ONLY. Sample Condition Upon Receipt: Samples intact
Temp OK (R.) 4/27/92 Samples 212861 thru 212863 contain Air bubbles (R.) VOA's indicate HCl preservation (R.)

* BTXE CANCELLED per Paula A. Bolio (FAX) (R.)

Pg 2/4 225371

McLaren Hart

CHAIN OF CUSTODY RECORD

FOR LABORATORY USE ONLY
Laboratory Project No.: 5877
Storage Refrigerator ID: 1, 4-23
Storage Freezer ID:
Secured: Yes ✓ No

Project Name: MARKET PLACE Project #: 04.0059805.000 Sampler: D. WATTS (Printed Name) (Signature)

Relinquished by: (Signature and Printed Name) D. WATTS FED EX		Received by: (Signature and Printed Name) FED-X	Date: 4/24/92 Time: PM
Relinquished by: (Signature and Printed Name)		Received by: (Signature and Printed Name)	Date: 4-25-92 Time: 0900
Relinquished by: (Signature and Printed Name)		Received by: (Signature and Printed Name) Logged By Kathleen Fonfucik	Date: 4-27-92 Time: 08:00
Relinquished by: (Signature and Printed Name)		Received by: (Signature and Printed Name)	Date: Time:

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

Method of Shipment: FED-X
Shipment ID:

Circle or Add Analysis(es) Requested

a) Identify specific metals requested under Special Instructions

Sample ID Number	Sample Description: Date	Time	Description	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/MS)	625/8270 (BNA-GC/MS)	TPH/G (Gasoline-GC)	TPH/D (Diesel-GC)	418.1 (IR)	8015 Modified (GC)	Metals-Total a	Metals-Soluble a	Fluoride/Perchlorate	Chloride/pH	TDS/Percent Solid	Specific Conductivity (EC)	8015 + BTEX + MOTOR OIL CANCELED *	TAT	Container(s) #	Container(s) Type	FOR LABORATORY USE ONLY Lab ID
1	212865	4/24/92	1015	W-24																	X	4	1	V(HCl)	5877-002
2	212866			(SPARE)																	X	4	1		
3	212867																				X	4	1		
4	212868																				X	4	1		
5	212872		1155	W-20																	X	4	1	V(HCl)	-003
6	212873			(SPARE)																	X	4	1		
7	212874																				X	4	1		
8	212875																				X	4	1		
9	212876		1410	W-14																	X	4	1	A	-004
10	212877			(SPARE)																	X	4	1	A	

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

FOR LABORATORY USE ONLY. Sample Condition Upon Receipt: Samples intact temp OK (K.F) 4-27-92 Vou's indicate HCl preservation (LM)

* BTXE canceled as per Paula A. Bolio (FAX) (LM)

SEND DOCUMENTATION AND RESULTS TO (Check one):
☒ Project Manager/Office: PAULA ARNET-BOLIO / ALAMEDA
☐ Client Name:
Company:
Address:
Phone: ( ) Fax:

QUALITY CONTROL DEFINITIONS

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 5% 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.

(DC2-CN5877)

McLaren Hart™

QUALITY CONTROL REPORT

METHOD BLANK

Method: Mod. EPA 8015
Units: mg/L (ppm)

Date Analyzed: 04/28/92
Date Extracted: 04/28/92
Batch Number: 920428-1901

Compound	Carbon Range	Reporting Limit	Results of the MB
Gasoline Range	C7 - C14	0.50	BRL
Jet Fuel/Kerosene Range	C12 - C18	0.50	BRL
Diesel Range	C12 - C22	0.50	BRL
Motor Oil Range	C22 - C32	0.50	BRL
Total Petroleum Hydrocarbons		0.50	BRL

(DC2-CN5877)

McLaren Hart™

McLaren Analytical Laboratory
Spike/Spike Duplicate Recovery
Method 8015 - Modified

LP#: 5876

Analyst: EB

Batch #: 920420-2001

Date Of Analysis: 04/27/92

Spike Sample ID: LCSW/LCSDW #29

Column: DB-1

Spike ID Code: W2-814 W2-869

Instrument #: PGC #4/6

Surrogate ID Code: NA

Matrix: Water Units: mg/L

COMPOUNDS	(a) SAMPLE CONC.	(b) SPIKE CONC.	(c) SAMPLE + SPIKE CONC.	(d) SPIKE REC. %	(e) SAMPLE DUP. + SPIKE CONC.	(f) SPIKE DUP. REC. %	(g) RPD %	ACCEPTANCE LIMITS % REC	ACCEPTANCE LIMITS RPD
Gasoline	0	2.5	1.6	64	1.6	64	0	26 - 90	≤ 25
Diesel	0	2.5	1.5	60	1.6	64	6	43 - 152	≤ 25

Spike Recovery = d = ((c-a)/b) x 100
Spike Duplicate Recovery = f = ((e-a)/b) x 100
Relative Percent Difference = g = (|c-e|)/((c+e) x .5) x 100

Comments:

8015MSDR.W91

McLaren Hart™

(DC2-CN5877)

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
NS	Not Specified
NA	Not Applicable

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 standard obtained from local BP station. Gasoline is sold commercially as unleaded gasoline.

Diesel standard obtain from local Chevron station. Diesel is sold commercially 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.

The laboratory reported result for Total Petroleum Hydrocarbons is a summation result of the individual analytes.

Results are reported on the attached data sheets.

(DC2-CN5877)

McLaren Hart™

TOTAL PETROLEUM HYDROCARBONS

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

Project Name: Market Place

Project Number: 04.0059805.000

Sample Description: Trip Blank

Lab Project-ID Number: 5877-001

Sample Number: 212856

Date Sampled: 04/24/92

Date Received: 04/25/92

Date Extracted: 04/28/92

Date Analyzed: 04/28/92

Batch Number: 920428-1901

PETROLEUM HYDROCARBONS	CARBON RANGE	CONCENTRATION mg/L (ppm)	REPORTING LIMIT mg/L (ppm)
Gasoline Range	C7 - C14	BRL	0.50
Jet Fuel/Kerosene Range	C12 - C18	BRL	0.50
Diesel Range	C12 - C22	BRL	0.50
Motor Oil Range	C22 - C32	BRL	0.50
Total Petroleum Hydrocarbons		BRL	0.50

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: Nancy McDonald for CM Date: 5-5-92
Cheryl Matterson, Associate Chemist

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

040892

McLaren Hart™

TOTAL PETROLEUM HYDROCARBONS

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

Project Name: Market Place

Project Number: 04.0059805.000

Sample Description: W-24

Lab Project-ID Number: 5877-002

Sample Number: 212859

Date Sampled: 04/24/92

Date Received: 04/25/92

Date Extracted: 04/28/92

Date Analyzed: 04/28/92

Batch Number: 920428-1901

PETROLEUM HYDROCARBONS	CARBON RANGE	CONCENTRATION mg/L (ppm)	REPORTING LIMIT mg/L (ppm)
Gasoline Range	C7 - C14	BRL	0.50
Jet Fuel/Kerosene Range	C12 - C18	BRL	0.50
Diesel Range	C12 - C22	BRL	0.50
Motor Oil Range	C22 - C32	BRL	0.50
Total Petroleum Hydrocarbons		BRL	0.50

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: Nancy McDonald for CM Date: 5-5-92
Cheryl Matterson, Associate Chemist

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

040892

McLaren Hart™

TOTAL PETROLEUM HYDROCARBONS

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

Project Name: Market Place

Project Number: 04.0059805.000

Sample Description: W-20

Lab Project-ID Number: 5877-003

Sample Number: 212870

Date Sampled: 04/24/92

Date Received: 04/25/92

Date Extracted: 04/28/92

Date Analyzed: 04/28/92

Batch Number: 920428-1901

PETROLEUM HYDROCARBONS	CARBON RANGE	CONCENTRATION mg/L (ppm)	REPORTING LIMIT mg/L (ppm)
Gasoline Range	C7 - C14	BRL	0.50
Jet Fuel/Kerosene Range	C12 - C18	BRL	0.50
Diesel Range	C12 - C22	BRL	0.50
Motor Oil Range	C22 - C32	BRL	0.50
Total Petroleum Hydrocarbons		BRL	0.50

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: Nancy McDonald for CM Date: 5-5-92
Cheryl Matterson, Associate Chemist

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TOTAL PETROLEUM HYDROCARBONS

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

Project Name: Market Place

Project Number: 04.0059805.000

Sample Description: W-14

Lab Project-ID Number: 5877-004

Sample Number: 212876

Date Sampled: 04/24/92

Date Received: 04/25/92

Date Extracted: 04/28/92

Date Analyzed: 04/29/92

Batch Number: 920428-1901

PETROLEUM HYDROCARBONS	CARBON RANGE	CONCENTRATION mg/L (ppm)	REPORTING LIMIT mg/L (ppm)
Gasoline Range	C7 - C14	BRL	0.50
Jet Fuel/Kerosene Range	C12 - C18	BRL	0.50
Diesel Range	C12 - C22	BRL	0.50
Motor Oil Range	C22 - C32	BRL	0.50
Total Petroleum Hydrocarbons		BRL	0.50

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: Nancy McDonald for CM Date: 5-5-92
Cheryl Matterson, Associate Chemist

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

040892

McLaren Hart™

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TOTAL PETROLEUM HYDROCARBONS

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

Project Name: Market Place

Project Number: 04.0059805.000

Sample Description: W-13

Lab Project-ID Number: 5877-005

Sample Number: 212878

Date Sampled: 04/24/92

Date Received: 04/25/92

Date Extracted: 04/28/92

Date Analyzed: 04/29/92

Batch Number: 920428-1901

PETROLEUM HYDROCARBONS	CARBON RANGE	CONCENTRATION mg/L (ppm)	REPORTING LIMIT mg/L (ppm)
Gasoline Range	C7 - C14	BRL	0.50
Jet Fuel/Kerosene Range	C12 - C18	BRL	0.50
Diesel Range	C12 - C22	BRL	0.50
Motor Oil Range	C22 - C32	BRL	0.50
Total Petroleum Hydrocarbons		BRL	0.50

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: Nancy McDonald for CM Date: 5-5-92
Cheryl Matterson, Associate Chemist

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

040892

McLaren Hart™

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TOTAL PETROLEUM HYDROCARBONS

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

Project Name: Market Place

Project Number: 04.0059805.000

Sample Description: Trip Blank

Lab Project-ID Number: 5877-006

Sample Number: 190500

Date Sampled: 04/23/92

Date Received: 04/25/92

Date Extracted: 04/28/92

Date Analyzed: 04/29/92

Batch Number: 920428-1901

PETROLEUM HYDROCARBONS	CARBON RANGE	CONCENTRATION mg/L (ppm)	REPORTING LIMIT mg/L (ppm)
Gasoline Range	C7 - C14	BRL	0.50
Jet Fuel/Kerosene Range	C12 - C18	BRL	0.50
Diesel Range	C12 - C22	BRL	0.50
Motor Oil Range	C22 - C32	BRL	0.50
Total Petroleum Hydrocarbons		BRL	0.50

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: Nancy McDonald for CM Date: 5-5-92
Cheryl Matterson, Associate Chemist

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

040892

McLaren Hart™

TOTAL PETROLEUM HYDROCARBONS

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

Project Name: Market Place

Project Number: 04.0059805.000

Sample Description: W-19

Lab Project-ID Number: 5877-007

Sample Number: 190497

Date Sampled: 04/23/92

Date Received: 04/25/92

Date Extracted: 04/28/92

Date Analyzed: 04/29/92

Batch Number: 920428-1901

PETROLEUM HYDROCARBONS	CARBON RANGE	CONCENTRATION mg/L (ppm)	REPORTING LIMIT mg/L (ppm)
Gasoline Range	C7 - C14	BRL	2.0
Jet Fuel/Kerosene Range	C12 - C18	BRL	2.0
Diesel Range	C12 - C22	BRL	2.0
Motor Oil Range	C22 - C32	7.1	2.0
Total Petroleum Hydrocarbons		7.1	2.0

Dilution: The sample was diluted 4 fold to bring target analytes within linear working range.

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: Nancy McDonald for CM Date: 5-5-92
Cheryl Matterson, Associate Chemist

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

040892

McLaren Hart™

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TOTAL PETROLEUM HYDROCARBONS

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

Project Name: Market Place

Project Number: 04.0059805.000

Sample Description: W-7

Lab Project-ID Number: 5877-008

Sample Number: 212851

Date Sampled: 04/23/92

Date Received: 04/25/92

Date Extracted: 04/28/92

Date Analyzed: 04/29/92

Batch Number: 920428-1901

PETROLEUM HYDROCARBONS	CARBON RANGE	CONCENTRATION mg/L (ppm)	REPORTING LIMIT mg/L (ppm)
Gasoline Range	C7 - C14	BRL	1.0
Jet Fuel/Kerosene Range	C12 - C18	BRL	1.0
Diesel Range	C12 - C22	2.9	1.0
Motor Oil Range	C22 - C32	4.8	1.0
Total Petroleum Hydrocarbons		7.7	1.0

Dilution: The sample was diluted 2 fold to bring target analytes within linear working range.

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.

The chromatographic pattern of Diesel in the sample does not exactly match the standard chromatograph.

Approved By: Nancy McDonald for CM Date: 5-5-92
Cheryl Matterson, Associate Chemist

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

040892

McLaren Hart™

SAMPLING EVENT DATA SHEET

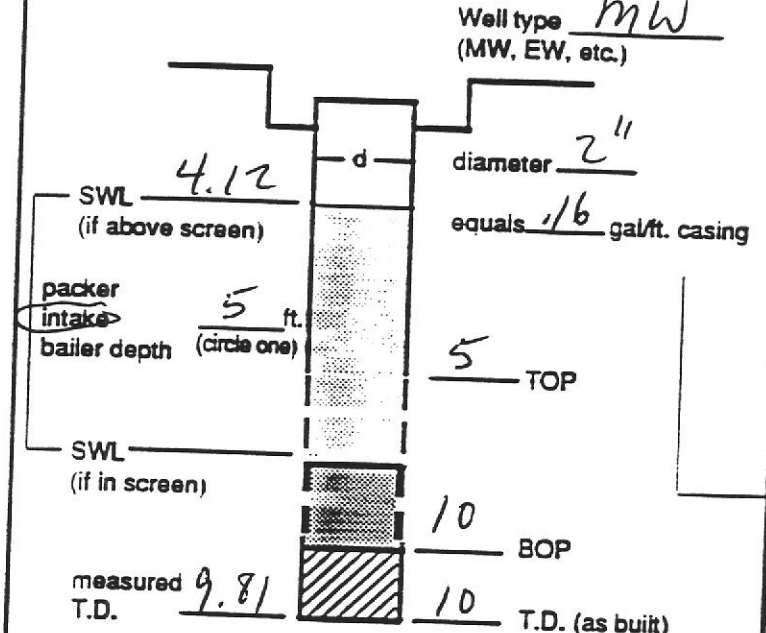
(fill out completely)

McLaren

WELL OR LOCATION W-13

PROJECT MARKET PLACE EVENT Quarterly SAMPLER D. WATTS DATE 4/24/92

Well / Hydrologic statistics



Action	Time	Pump rate	IWL (low yield)
Start pump / Begin	1450	.25 GPM	
	1454	.25 GPM	5.95
	1500	.25 GPM	7.03
	1506	.25 GPM	9.60
Stop	1508		
Sampled	1525		4.58
(Final IWL)	1535		5.02

Purge calculation

.16 gal/ft. * 5.88 ft. = 1 gals x 3 = 3 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:

DE PERI USED TO PURGE

DISP BAILER USED TO SAMPLE

50% RECOVERY: 7.06 / 80% RECOVERY: 5.30

Additional comments:

USED DESIGN T.D. FOR PURGE CALCULATION

SAMPLE TURBIDITY: 55.2

Actual gallons purged 3+

Actual volumes purged 3+

Well yield ⊕ (see below) HY

COC # 225369

Sample I.D.	Analysis	Lab
212878-79	8015+MO	MAL

Gallons purged *	TEMP °C (°F) (circle one)	EC (µs / cm)	PH	TURBIDITY (NTU)		
1. 1.0	67.3	823	7.37	6.91		
2. 2.0	65.7	754	7.36	31.9		
3. 3.0	66.6	733	7.50	24.3		
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.

McLaren

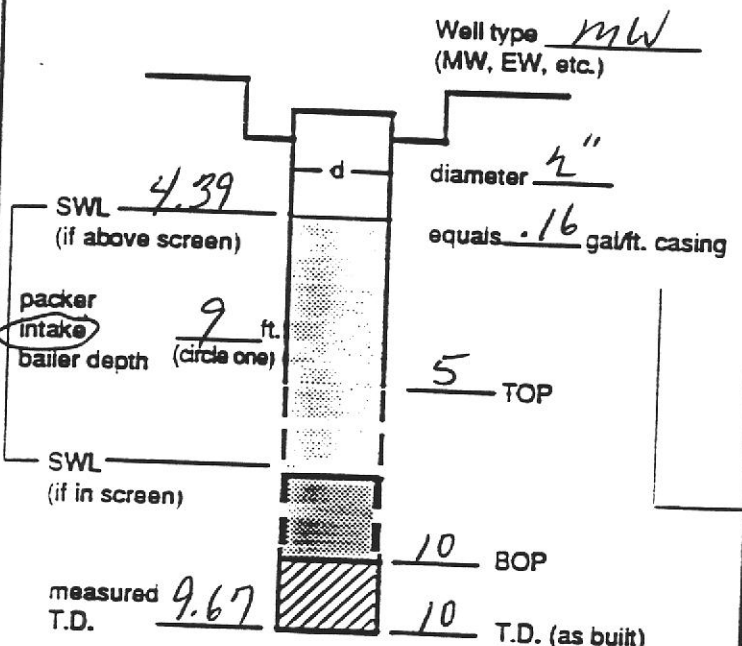
SAMPLING EVENT DATA SHEET

(fill out completely)

WELL OR LOCATION MW-14

PROJECT MARKET PLACE EVENT Quarterly SAMPLER D. WATT DATE 4/24/92

Well / Hydrologic statistics



Action	Time	Pump rate	IWL (low yield)
Start pump / Begin	1254	.17 GPM	
STOP	1259		DRY
RESTART	1320	.125 GPM	5.20
STOP	1326		DRY
~~REMOVE~~			
SOUNDING	1356	—	6.45
Stop			
Sampled	1410		5.28
(Final IWL)	1417		7.74

Purge calculation

.16 gal/ft. * 5.28 ft. = .85 gals x 3 = 2.55 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:

DC PERI to PURGE

DISPOSABLE BAILER to SAMPLE

50% RECOVERY: 7.03 80% RECOVERY: 5.45

Actual gallons purged 1.75 t

Actual volumes purged 2 t

Well yield (see below) ⊕ LY

Additional comments:

USED MEASURED T.D. for PURGE Calculation

SAMPLE TURBIDITY: 47.7

COC # 225371

Sample I.D.	Analysis	Lab
212876/77	8015+MO	MTL

Gallons purged *	TEMP °C / (F) (circle one)	EC (µs / cm)	PH	TURBIDITY (NTU)		
1. 1.00	65.5	1845	7.19	510 *	* 2:1 DILUTION RATIO	
2. 1.75	66.3	1892	7.28	19.05		
3.						
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.

McLaren

SAMPLING EVENT DATA SHEET

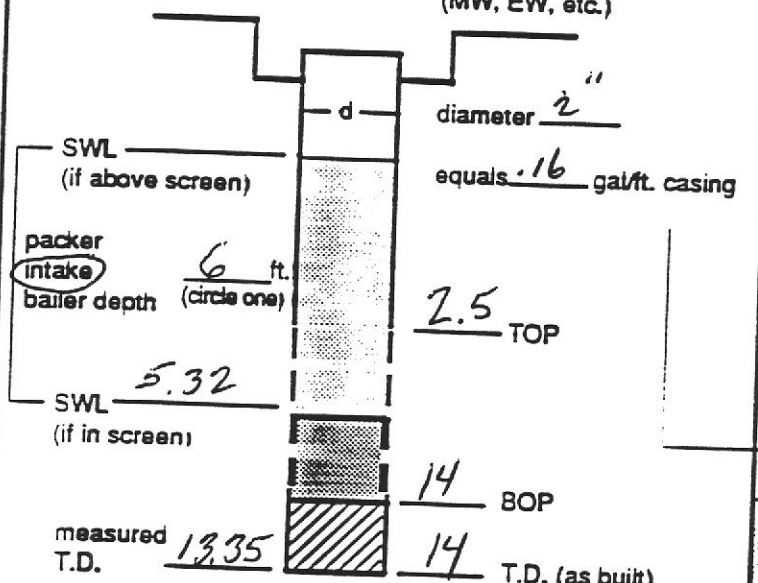
(fill out completely)

WELL OR LOCATION W-19

PROJECT MARKET PLACE EVENT Quarterly SAMPLER DW DATE 4/23/92

Well / Hydrologic statistics

Well type MW (MW, EW, etc.)



Action	Time	Pump rate	IWL (low yield)
Start pump / Begin	1410	.20 GPM	
	1420	.20 GPM	5.39
	1428	.20 GPM	5.36
	1436	.20 GPM	5.36
Stop	1440		
Sampled	1500		
(Final IWL)			

Purge calculation

.16 gal/ft. * 8.68 ft. = 1.4 gals x 3 = 4.2 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:

DC PERI USED TO PURGE

DISP. BAILER USED TO SAMPLE

Actual gallons purged 4.5 +

Actual volumes purged 3 +

Well yield (see below) ⊕ HY

COC # ~~28717~~ / 28718

Sample I.D.	Analysis	Lab
~~190496~~	~~HFS~~	~~F+B~~ AB
190497/98	8015 + MO	MAL

50% RECHARGE: 9.67 80% RECHARGE: 7.06

Additional comments:

USED DESIGN T.D. FOR PURGE CALCULATION

SLIGHT OIL SHEEN ON WATER

SAMPLE TURBIDITY: 18.17

Gallons purged *	TEMP °C (°F) (circle one)	EC (µs / cm)	PH	TURBIDITY (NTU)		
1. 1.5	71.4	1954	6.86	~~4.95~~ 4.81		
2. 2.8	69.6	2520	6.85	6.25		
3. 4.3	68.8	2320	6.88	5.19		
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-20

PROJECT MARKET PLACE EVENT Quarterly SAMPLER D. WATTS DATE 4/24/97

Well / Hydrologic statistics

Well type MW (MW, EW, etc.)

d — diameter 2"

equals .16 gal/ft. casing

SWL (if above screen)

packer / intake / bailer depth 5 ft. (circle one)

SWL 4.05 (if in screen)

2.5 TOP

17.5 BOP

measured T.D. 16.70

17.5 T.D. (as built)

Action	Time	Pump rate	IWL (low yield
Start pump / Begin	1120	.25 GPM	
	1130	.25 GPM	4.79
	1139	.25 GPM	4.98
	1148	.25 GPM	4.26
Stop	1150		
Sampled	1155		
(Final IWL)			

Purge calculation

.16 gal/ft. * 13.45 ft. = 2.16 gals x 3 = 6.5 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:

DC Perl to Purge

Disp. Bailer to Sample

50% Recovery: 10.78 80% Recovery 6.74

Actual gallons purged 6.75+

Actual volumes purged 3+

Well yield (see below) ⊕ HY

COC # ~~28544~~/28548/~~22537~~

Sample I.D.	Analysis	Lab
~~212869~~	~~HFS~~	~~FTB~~
212870/1	8015+ MOD OIL	MAL
~~212872-75~~	~~BTXE~~	~~MAL~~

Additional comments:

USED DESIGN T.D. FOR PURGE CALCULATION

MODERATE PETROLEUM ODOR

SAMPLE TURBIDITY: 10.77

Gallons purged *	TEMP °C (°F) (circle one)	EC (µs / cm)	PH	TURBIDITY (NTU)		
1. ~~PH 9.0~~ 2.25	65.2	3210	7.00	6.57		
2. 4.50	64.8	3270	6.98	1.14		
3. 6.75	64.5	3260	6.97	1.57		
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.

McLaren

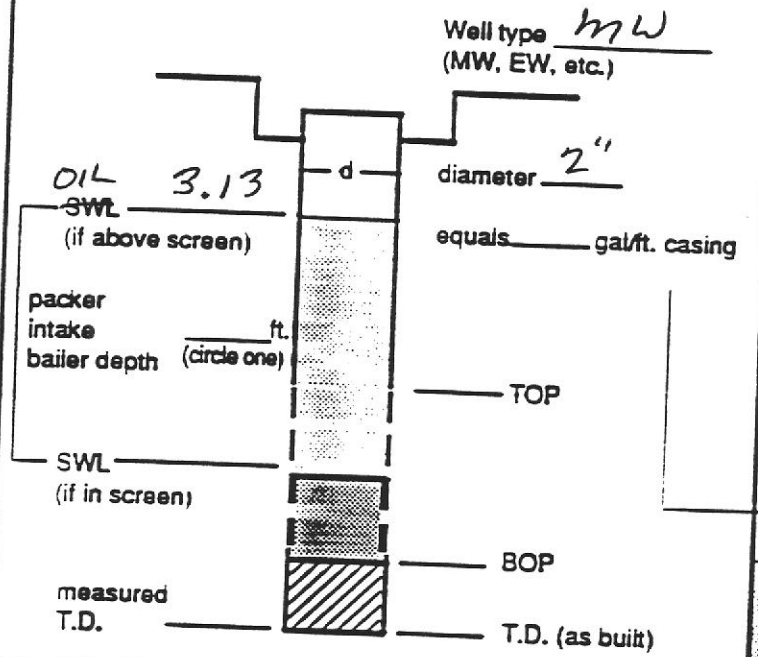
SAMPLING EVENT DATA SHEET

(fill out completely)

WELL OR LOCATION W-5

PROJECT MARKET PLACE EVENT Quarterly SAMPLER DW DATE 4/23/92

Well / Hydrologic statistics



Action	Time	Pump rate	IWL (low yield)
Start pump / Begin			
Stop			
Sampled	1315		
(Final IWL)			

Purge calculation

____ gal/ft. * ____ ft. = ____ gals x 3 = ____ 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:

USED OIL SOUNDER to MEASURE PRODUCT COLUMN.

OWI: 4.54
OIL: 3.13
1.41 = PRODUCT COLUMN

Actual gallons purged NA

Actual volumes purged NA

Well yield ⊕ NA
(see below)

COC # ~~2897~~

Sample I.D.	Analysis	Lab
~~190495~~	~~HFS~~	~~F+B~~

Additional comments:

Gallons purged *	TEMP °C / °F (circle one)	EC (µs / cm)	PH	TURBIDITY (NTU)		
1.						
2.						
3.						
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-7

PROJECT MARKET PLACE EVENT Quarterly SAMPLER R. WATTS DATE 4/23/92

Well / Hydrologic statistics

Well type MW (MW, EW, etc.)

diameter 2"

equals .16 gal/ft. casing

SWL 3.17 (if above screen)

d

packer (intake) bailer depth 5 ft. (circle one)

9.5 TOP

SWL (if in screen)

12.5 BOP

measured T.D. 12.22

12.5 T.D. (as built)

Action	Time	Pump rate	IWL (low yield)
Start pump / Begin	1540	.25 GPM	
	1546	.25 GPM	7.26
	1552	.25 GPM	7.81
	1558	.25 GPM	6.45
Stop	1600		
Sampled	1605		4.49
(Final IWL)			

Purge calculation

.16 gal/ft. * 9.33 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:

DC PERI USED TO PURGE

DISP BAILER USED TO SAMPLE

50% RECHARGE: 7.84 80% RECHARGE: 5.04

Actual gallons purged 4.5 +

Actual volumes purged 3 +

Well yield ⊕ HY

(see below)

COC # ~~28719~~/28718

Sample I.D.	Analysis	Lab
190499	HFS	F+B PAD
212851-52	8015 + MO	MAL
212853-54	8015 + MO(RP)	MAL

Additional comments:

USED DESIGN T.D. FOR PURGE CALCULATION

MODERATE PETROLEUM ODOR

SAMPLE TURBIDITY: 35.9

Gallons purged *	TEMP °C / °F (circle one)	EC (µs / cm)	PH	TURBIDITY (NTU)		
1. 1.5	71.1	2960	6.70	16.16		
2. 3.0	68.7	3660	6.68	30.5		
3. 4.5	68.2	3920	6.67	27.7		
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

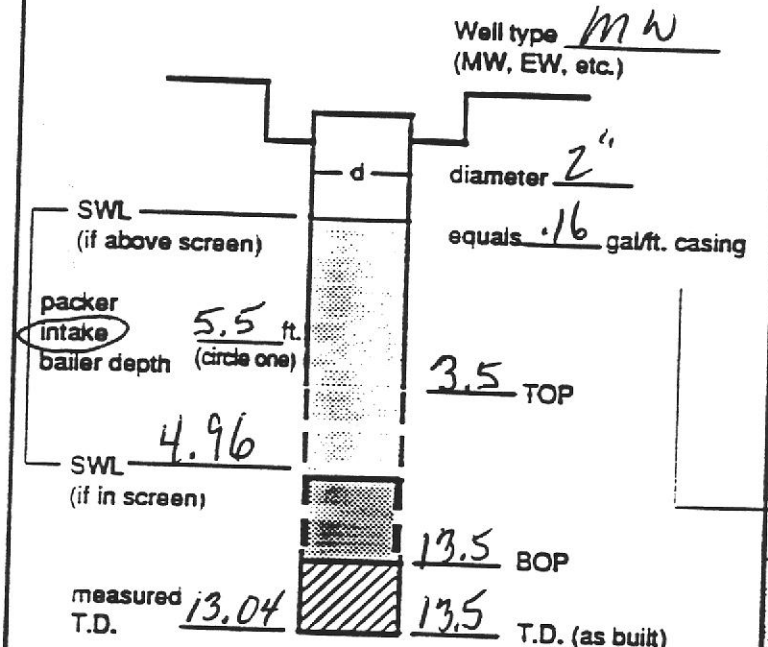
(fill out completely)

McLaren

WELL OR LOCATION W-24

PROJECT MARKET PLACE EVENT Quarterly SAMPLER D. WATTS DATE 4/24/92

Well / Hydrologic statistics



Action	Time	Pump rate	IWL (low yield)
Start pump / Begin	0945	.25 GPM	
	0951	.25 GPM	5.10
	1000	.25 GPM	4.99
	1008	.25 GPM	5.01
Stop	1010		
Sampled	1015		
(Final IWL)			

Purge calculation

.16 gal/ft. * 8.54 ft. = 1.4 gals x 3 = 4.2 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:

DC PERI USED TO PURGE

DISP BAILER USED TO SAMPLE

Actual gallons purged 4.5+

Actual volumes purged 3+

Well yield ⊕ (see below) HY

50% RECHARGE: 9.23 80% RECHARGE: 6.67

COC # ~~28549~~/28548/~~22534~~

Sample I.D.	Analysis	Lab
~~212858-64~~	~~HFS~~	~~F+B~~
212859-60	BNS + Methanol	MAL
~~212865-68~~	~~BTXE~~	~~MAL~~

Additional comments:

USED DESIGN T.D. FOR PURGE CALCULATION

SAMPLE TURBIDITY: 30.2

Gallons purged *	TEMP °C (°F) (circle one)	EC (µs / cm)	PH	TURBIDITY (NTU)		
1. 1.5	68.7	1307	7.42	5.42		
2. 3.0	68.2	1168	7.33	3.44		
3. 4.5	68.6	1137	7.33	1.88		
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.