A Report Prepared for

Carnation Company
800 North Brand Boulevard
Glendale, California 91203

QUARTERLY MONITORING REPORT
JUNE THROUGH AUGUST 1991
CARNATION FACILITY
OAKLAND, CALIFORNIA

9-18-91

HLA Job No. 20294,005.02

by

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Alameda County Health Care Services
Department of Environmental Health
Hazardous Materials Division
80 Swan Way, Room 200
Oakland, California 94621

Attention: Mr. Dennis J. Byrne
Senior Hazardous Materials Specialist

Ladies and Gentlemen:

Quarterly Monitoring Report
Carnation Facility
Oakland, California

Enclosed is Harding Lawson Associates' (HLA) Quarterly Monitoring Report for the Carnation Dairy Facility at 1310 14th Street in Oakland, California. This report describes the results of monitoring groundwater quality in June 1991, and measurement of groundwater elevations and product thickness at the facility.

If you have any questions, please feel free to contact me at (415) 899-7319.

Yours very truly,

HARDING LAWSON ASSOCIATES

R. Bruce Scheibach
Principal Hydrogeologist

Enclosure: Quarterly Monitoring Report

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1.0 INTRODUCTION

From 1929 to 1991, Carnation Company operated a dairy production facility at 1310 14th Street, Oakland, California (Plate 1). The facility was used for dairy product processing and for vehicle maintenance. An "L" shaped building consisting of a warehouse with four vehicle service bays occupies the northern and western sides of the site (Plate 2). In January 1989, Carnation excavated an underground waste oil tank, two underground gasoline tanks, and two underground diesel storage tanks, which were located beneath and south of the warehouse building. During removal of the tanks, gasoline and diesel were observed to be present as a separate phase floating in the excavations. Carnation investigated the extent of the hydrocarbons and implemented several interim remedial measures. The chemicals detected, which include free-phase gasoline, diesel, waste oil, and their dissolved chemical components, are believed to have been released from the leaking underground waste oil tank and from piping connected to the four underground fuel storage tanks. In addition to the petroleum hydrocarbons, polychlorinated biphenyls (PCBs) were detected in oil floating on the groundwater table at one location. Animal fats were also reported to have been found floating on the groundwater table beneath the facility.

In April 1991, Carnation retained Harding Lawson Associates (HLA) to conduct additional site investigations, and to perform an engineering analysis of remediation alternatives. A Work Plan for the quarterly monitoring and other site investigation work was submitted to the Alameda County Department of Environmental Health and the California Regional Water Quality Control Board in May 1991 (*HLA, 1991a*). All field work was conducted in accordance with the Quality Assurance/Quality Control (QA/QC) Plan contained in the Work Plan. This report presents the results of the first quarterly

groundwater chemistry monitoring for the period of June through August, 1991. A more comprehensive analysis of soil and groundwater chemistry at the facility is presented in the Site Characterization Report (*HLA, 1991b*).

2.0 WATER-LEVEL ELEVATION AND FREE-PHASE PETROLEUM PRODUCT MEASUREMENTS AND GROUNDWATER CHEMISTRY MONITORING

2.1 Water-Level Elevation and Free-Phase Petroleum Product Measurement

HLA conducted water-level elevation and free-phase petroleum product thickness measurements on April 16, May 24, July 9, and August 15, 1991 to monitor groundwater elevations and the thickness and distribution of free-phase petroleum product. All accessible monitoring wells and selected product recovery wells were measured during each monitoring event. Water-level and free-phase product measurements were conducted using an electrical oil-water interface probe calibrated with a steel tape. Measurement procedures are described in detail in the QA/QC Plan (*HLA, 1991a*).

2.2 Groundwater Chemistry Monitoring

On June 25 and 26, 1991, groundwater samples from 20 onsite and offsite monitoring wells that did not contain free product were collected for chemical analysis. The five monitoring wells containing free product were not sampled. QA/QC procedures followed during sampling are described in detail in the QA/QC Plan (*HLA, 1991a*).

Prior to collection of groundwater samples, the depth to free-phase petroleum product and depth to water were measured in each well using an oil-water interface probe. While purging the well prior to sampling, water levels and well production were monitored to evaluate formation permeability. Chemical analyses of the groundwater samples were performed by National Environmental Testing, Inc., Santa Rosa, California (NET). Groundwater samples were analyzed for TPH as gasoline, TPH as diesel, and TPH as motor oil using EPA Test Method 8015. To determine if volatile halogenated compounds exist in groundwater, samples from 9 of the 20 monitoring wells

(Wells MW-1, MW-4, MW-5, MW-13, MW-14, MW-15, MW-26, MW-29, and MW-32) were analyzed using EPA Test Method 8240. Samples from 10 of the remaining 11 wells were analyzed for BTEX using EPA Test Method 8020. Also, samples from 10 wells (Wells MW-1 through MW-5, MW-13, MW-16, MW-26, MW-29, and MW-32) were analyzed for polar and nonpolar oil and grease using EPA Test Methods 503D and E to assess the distribution of animal fats reported to be present in the groundwater. As described in the QA/QC Plan, a field blank was collected for each day of sampling and one duplicate water sample was analyzed for every 10 samples collected. The groundwater generated during the sampling was contained onsite and will be discharged to the sanitary sewer after obtaining a discharge permit from the East Bay Municipal Utility District (EBMUD).

3.0 RESULTS OF INVESTIGATIONS

3.1 Water-Level Elevations

Table 1 contains the groundwater elevation data collected on April 16, May 24, July 9, and August 15, 1991. All accessible monitoring wells and selected product recovery wells were used to monitor the groundwater elevations and free-phase petroleum product thicknesses.

Plate 3 presents a groundwater elevation contour map using data collected on July 9, 1991. Note that in Table 1 and on Plate 3, corrected groundwater elevations for wells containing free-phase petroleum product were calculated using an assumed product density of 0.80 grams per cubic centimeter. These groundwater elevation data were not used in contouring.

The groundwater elevation data collected each month indicate groundwater flow is to the northwest beneath the southern portion of the site, and is to the south and southwest beneath the northern portion of the site (Plate 3). The hydraulic gradient beneath the northern portion of the site is approximately 1.0×10^{-3} to 7.5×10^{-3} foot/foot (ft/ft) in a southwest direction from 16th Street onto the site. The hydraulic gradient beneath the southern portion of the site is approximately 1.0×10^{-3} ft/ft in a northwest direction. This convergent flow appears to result in a net westerly flow direction in the chemical-bearing area (Plate 3). These data contradict historical groundwater elevation data which indicated a generally north-northwest flow, offsite onto 16th Street.

3.2 Distribution of Free Product

Table 1 contains the free-product thickness data collected on April 16, May 24, July 9, and August 16, 1991. The distribution of free-phase product measured on July 9, 1991, is shown on Plate 4. In general, the horizontal extent of free-phase

product during July 1991 was similar to but less than that measured in 1989 and 1990. The apparent product thickness was greatest in Well MW-22 (5.16 feet), near the northern wall of the warehouse building (Plate 4). However, product was not and has not been observed in the five offsite wells (MW-25 through MW-29), all of which are located relatively close to the Carnation warehouse. The consistent lack of free-phase petroleum product in the offsite wells and the wells on the west side of the property (MW-3, MW-14, MW-15, and MW-16) suggests that the product is restricted to the onsite area and has not migrated offsite.

3.3 Results of Groundwater Chemistry Sampling

Twenty wells were sampled in June 1991, with duplicate samples collected from Wells MW-3 and MW-26. Chemical results for the groundwater samples are summarized in Table 2 and presented on Plate 5. Groundwater sampling forms are contained in Appendix A. Laboratory data sheets are contained in Appendix B.

all 33 were supposed to be analyzed

3.3.1 Distribution of Petroleum Hydrocarbons in Groundwater

Of the 22 samples collected from 20 wells, TPH as gasoline, diesel, and motor oil were detected in samples from only 3, 1, and 1 of the wells, respectively (Table 2). The highest TPH as gasoline, TPH as diesel, and TPH as motor oil concentrations were found in duplicate samples from Well MW-26. Oil and grease, total and non-polar, were found above the reporting limit in only 1 of 14 samples tested (Well MW-26). Dissolved BTEX compounds were found in 7 of the 22 samples. Plate 21 shows the dissolved BTEX results. The dissolved BTEX plume is fully delineated by non-detectable concentrations in samples from upgradient Wells MW-1, MW-9, MW-10, MW-4, MW-11, MW-31, MW-2, MW-12, and MW-13. No BTEX compounds were detected in samples from downgradient Wells MW-15, MW-14, and offsite Wells MW-29 and

MW-28; only 0.8 and 1.8 μg/l benzene were detected in offsite Wells MW-25 and MW-27, respectively. These data suggest that a dissolved petroleum hydrocarbon plume has not been transported a significant distance offsite.

3.3.2 Distribution of Chlorinated Hydrocarbons in Groundwater

One chlorinated hydrocarbon, 1,2-dichloroethane (1,2-DCA), was detected in duplicate samples from offsite Well MW-26 (at concentrations of 470 and 480 μg/l, respectively), and in the sample from onsite Well MW-32 (at 14 μg/l). HLA recommends continued monitoring of these two wells and analysis of samples for chlorinated hydrocarbons to verify the presence of this compound.

3.3.3 Distribution of Animal Fats in Groundwater

Total and non-polar oil and grease were found in only 1 of 14 samples tested (Well MW-26) at concentrations of 5,400 and 5,100 μg/l, respectively. Oil and grease were not detected in the duplicate sample from Well MW-26 above the reporting limit of 5,000 μg/l (Table 2).

3.3.4 Groundwater QA/QC Data

Field quality control samples consisted of 2 field blanks, 1 trip blank, and 2 duplicate samples. Analytical results are presented in Table 7, and the certified laboratory data sheets are presented in Appendix B.

Field blanks consist of organic-free deionized water that is poured into sample containers under field conditions. Field blanks are prepared and analyzed to check for potential contamination during sample preparation in the field. A field blank was poured on each of the two days that sampling occurred and transported to the analytical laboratory with the groundwater samples. No analytes were detected at or above the reported detection limits in the field blanks.

Trip blanks are prepared by the analytical laboratory and consist of organic-free deionized water provided in laboratory-prepared sample bottles; trip blanks are not decanted from their original containers. These blanks are used to detect potential contamination introduced through field or laboratory procedures. They are taken to the field and subjected to storage and transport conditions similar to those for groundwater samples. A trip blank was transported to the analytical laboratory with the groundwater samples. No analytes were detected at or above the reported detection limits in the trip blank.

Duplicate samples were collected from 2 wells (Wells MW-3 and MW-26) and were analyzed using the following EPA Test Methods: 8015, 8020, 8240, 503D, and 503E. The purpose of these samples is to evaluate analytical laboratory precision. Precision is assessed by calculating the relative percent difference (RPD) between the initial sample results (X_1) and the duplicate sample results (X_2); a low RPD indicates high precision. The equation used to calculate RPD is:

$$RPD = \frac{|X_1 - X_2|}{(X_1 + X_2)/2} \times 100$$

RPDs were calculated for 13 sets of data where analytes were detected above the reporting limit in the duplicate samples. Only 1 of the RPDs (TPH as gasoline for samples from Well MW-26) exceeded the quality assurance goal of 100 percent specified in the QA/QC Plan *(HLA, 1991a)*. The other RPDs for this quarter were generally below 50 percent, indicating good precision.

Laboratory quality control data included surrogate recoveries and blank spike recoveries. Laboratory data sheets are presented in Appendix B. In general, surrogate recoveries and blank spike recoveries were all close to 100 percent.

4.0 PROPOSED GROUNDWATER MONITORING PLAN

Carnation will continue to monitor groundwater elevations and free-phase petroleum product thicknesses monthly, and will monitor groundwater chemistry quarterly.

Due to the limited distribution of dissolved hydrocarbons, Carnation proposes to reduce the number of wells sampled to 9 wells quarterly. Wells MW-3, MW-14, MW-25, MW-26, MW-27, MW-28, MW-29, MW-30, and MW-32 will be sampled each quarter, with samples from all wells analyzed for aromatic hydrocarbons using EPA Test Method 8020. Additionally, samples from Wells MW-26 and MW-32 will be analyzed for chlorinated hydrocarbons using EPA Test Method 8010. Quality assurance/quality control samples will be collected in accordance with the QA/QC Plan (*HLA, 1991a*).

they didn't propose to discontinue certain analytes! just proposed to continue w/ a limited # analytes. Very sneaky.

5.0 REFERENCES

Harding Lawson Associates, 1991a. *Work Plan, Carnation Facility, Oakland, California.* May.

_____, 1991b. *Site Characterization Report, Carnation Facility, Oakland, California.* September.

TABLES

Table 1. Groundwater Elevations and Free-Phase Petroleum Product Thicknesses

Well Number	Measuring Point Elevation (ft AMSL)	Date	Depth to Water (ft BGS)	Depth to Product (ft BGS)	Product Thickness (ft)	Water Level Elevation* (ft AMSL)
MW- 1	16.49	4/16/91	10.27			6.22
	16.49	5/24/91	10.66			5.83
	16.49	7/9/91	11.25			5.24
	16.49	8/15/91	11.61			4.88
MW- 2	15.11	4/16/91	9.15			5.96
	15.11	5/24/91	9.48			5.63
	15.11	7/9/91	10.02			5.09
	15.11	8/15/91	10.33			4.78
MW- 3	14.30	4/16/91	8.44			5.86
	14.30	5/24/91	8.75			5.55
	14.30	7/9/91	9.26			5.04
	14.30	8/15/91	9.57			4.73
MW- 4	14.42	4/16/91	8.46			5.96
	14.42	5/24/91	Dry			
	14.42	7/9/91	9.38			5.04
	14.42	8/15/91	9.71			4.71
MW- 5	14.41	4/16/91	8.48			5.93
	14.41	5/24/91	8.81			5.60
	14.41	7/9/91	9.32			5.09
	14.41	8/15/91	9.60			4.81
MW- 6	14.12	4/16/91	8.15			5.97
	14.12	5/24/91	8.46			5.66
	14.12	7/9/91	8.95			5.17
	14.12	8/15/91	9.21			4.91
MW- 7	14.29	4/16/91	11.22	8.32	2.90	5.39
	14.29	5/24/91	10.79	7.72	3.07	5.96
	14.29	7/9/91	10.30	8.33	1.97	5.57
	14.29	8/15/91	11.04	8.40	2.64	5.36
MW- 8	14.20	4/16/91	8.15			6.05
	14.20	5/24/91	8.83	8.40	0.43	5.71
	14.20	7/9/91	9.43	8.85	0.58	5.23
	14.20	8/15/91	9.68	9.12	0.56	4.97
MW- 9	14.96	5/24/91	9.31			5.65
	14.96	7/9/91	9.86			5.10
	14.96	8/15/91	10.19			4.77
MW-10	15.73	4/16/91	9.71			6.02
	15.73	5/24/91	10.06			5.67
	15.73	7/9/91	10.62			5.11
	15.73	8/15/91	10.78			4.95
MW-11	14.55	5/24/91	8.85			5.70
	14.55	7/9/91	9.43			5.12
	14.55	8/15/91	9.74			4.81

Table 1. Groundwater Elevations and Free-Phase Petroleum Product Thicknesses

Well Number	Measuring Point Elevation (ft AMSL)	Date	Depth to Water (ft BGS)	Depth to Product (ft BGS)	Product Thickness (ft)	Water Level Elevation* (ft AMSL)
MW-12	15.28	4/16/91	9.24			6.04
	15.28	5/24/91	9.59			5.69
	15.28	7/9/91	10.14			5.14
	15.28	8/15/91	10.42			4.86
MW-13	14.85	4/16/91	8.84			6.01
	14.85	5/24/91	9.19			5.66
	14.85	7/9/91	9.73			5.12
	14.85	8/15/91	10.12			4.73
MW-14	14.10	7/9/91	9.16			4.94
	14.10	8/15/91	9.45			4.65
MW-15	14.17	7/9/91	9.24			4.93
	14.17	8/15/91	9.53			4.64
MW-16	14.11	4/16/91	8.76			5.35
	14.11	5/24/91	8.61			5.50
	14.11	7/9/91	9.14			4.97
	14.11	8/15/91	9.40			4.71
MW-22	14.44	4/16/91	12.58	7.52	5.06	5.91
	14.44	5/24/91	13.05	7.77	5.28	5.61
	14.44	7/9/91	13.43	8.27	5.16	5.14
	14.44	8/15/91	13.69	8.53	5.16	4.88
MW-23	14.48	5/24/91	9.97	8.53	1.44	5.66
	14.48	7/9/91	10.67	8.93	1.74	5.20
	14.48	8/15/91	10.91	9.26	1.65	4.89
MW-24	14.67	4/16/91	8.75			5.92
	14.67	5/24/91	9.76	8.83	0.93	5.65
	14.67	8/15/91	11.24	9.44	1.80	4.87
MW-OS25	12.86	4/17/91	7.79			5.07
	12.86	5/24/91	7.70			5.16
	12.86	7/9/91	7.42			5.44
	12.86	8/15/91	7.72			5.14
MW-OS26	12.71	4/17/91	6.93			5.78
	12.71	5/24/91	6.95			5.76
	12.71	7/9/91	7.40			5.31
	12.71	8/15/91	7.53			5.18
MW-OS27	14.04	4/17/91	9.01			5.03
	14.04	5/24/91	8.23			5.81
	14.04	7/9/91	8.71			5.33
	14.04	8/15/91	8.75			5.29
MW-OS28	13.45	4/17/91	7.55			5.90
	13.45	5/24/91	7.67			5.78
	13.45	7/9/91	8.08			5.37
	13.45	8/15/91	8.22			5.23

Table 1. Groundwater Elevations and Free-Phase Petroleum Product Thicknesses

Well Number	Measuring Point Elevation (ft AMSL)	Date	Depth to Water (ft BGS)	Depth to Product (ft BGS)	Product Thickness (ft)	Water Level Elevation* (ft AMSL)
MW-OS29	12.60	4/17/91	7.04			5.56
	12.60	5/24/91	6.90			5.70
	12.60	7/9/91	7.24			5.36
	12.60	8/15/91	7.42			5.18
MW-30	14.54	8/15/91	9.75			4.79
MW-31	14.92	8/15/91	10.14			4.78
MW-32	14.76	8/15/91	10.02			4.74
PR-20	14.36	4/16/91	9.06	7.90	1.16	6.23
	14.36	5/24/91	9.94	8.10	1.84	5.89
	14.36	7/9/91	10.07	8.74	1.33	5.35
	14.36	8/15/91	10.32	9.03	1.29	5.07
PR-22	14.43	4/16/91	9.68	8.01	1.67	6.09
	14.43	5/24/91	10.20	8.30	1.90	5.75
	14.43	7/9/91	10.44	8.83	1.61	5.28
	14.43	8/15/91	10.61	9.01	1.60	5.10
PR-24	14.32	4/16/91	8.40			5.92
PR-27	NA	5/24/91	8.58			
	NA	7/9/91	9.10			
	NA	8/15/91	9.36			
PR-31	14.08	4/16/91	7.92			6.16
PR-33	14.36	4/16/91	7.78			6.58
	14.36	5/24/91	8.30			6.06
	14.36	7/9/91	8.78			5.58
	14.36	8/15/91	9.07			5.29
PR-35	14.55	4/16/91	8.98	8.26	0.72	6.15
PR-38	14.47	4/16/91	8.58			5.89
PR-40	NA	4/16/91	8.58			
PR-41	NA	5/24/91	7.13	6.67	0.46	
	NA	7/9/91	7.76	7.13	0.63	
	NA	8/15/91	9.11	7.40	1.71	
PR-43	NA	5/24/91	8.85			
	NA	7/9/91	9.20			
	NA	8/15/91	9.87			
PR-44	NA	5/24/91	8.26	6.69	1.57	
	NA	7/9/91	9.10	7.69	1.41	
	NA	8/15/91	10.56	8.22	2.34	
PR-45	NA	5/24/91	8.93	8.85	0.08	
	NA	7/9/91	9.50	9.30	0.20	
	NA	8/15/91	9.72	9.53	0.19	

Table 1. Groundwater Elevations and Free-Phase Petroleum Product Thicknesses

Well Number	Measuring Point Elevation (ft AMSL)	Date	Depth to Water (ft BGS)	Depth to Product (ft BGS)	Product Thickness (ft)	Water Level Elevation* (ft AMSL)
PR-46	NA	7/9/91	8.60			
	NA	8/15/91	8.95			
PR-48	NA	4/16/91	8.75	8.65	0.10	
PR-49	NA	5/24/91	7.62			
PR-52	NA	5/24/91	9.26	8.76	0.50	
	NA	7/9/91	9.74	9.17	0.57	
	NA	8/15/91	10.03	9.38	0.65	
PR-53	NA	5/24/91	10.45	8.25	2.20	
	NA	7/9/91	10.57	8.85	1.72	
	NA	8/15/91	10.73	9.20	1.53	
PR-55	NA	5/24/91	9.51	8.59	0.92	
	NA	7/9/91	10.26	8.82	1.44	
	NA	8/15/91	10.58	9.07	1.51	
PR-56	NA	7/9/91	10.86	9.02	1.84	
	NA	8/15/91	10.93	9.33	1.60	
PR-57	NA	4/16/91	7.69			
PR-58	NA	4/16/91	8.99	8.03	0.96	
	NA	5/24/91	9.39	8.39	1.00	
	NA	7/9/91	10.03	8.86	1.17	
	NA	8/15/91	10.37	9.13	1.24	
PR-59	NA	4/16/91	8.09			
	NA	5/24/91	8.41			
	NA	7/9/91	9.03			
	NA	8/15/91	8.83			
PR-61	NA	5/24/91	9.06	8.94	0.12	
	NA	7/9/91	9.55	9.43	0.12	
	NA	8/15/91	9.89	9.71	0.18	
PR-63	NA	5/24/91	8.98	8.96	0.02	
	NA	7/9/91	9.46	9.45	0.01	
	NA	8/15/91	9.77	9.75	0.02	
PR-65	NA	5/24/91	8.76	8.68	0.08	
PR-67	NA	4/16/91	8.77	8.03	0.74	
PR-69	NA	4/16/91	7.08			
	NA	5/24/91	7.47			
	NA	7/9/91	8.13			
	NA	8/15/91	8.04			
PR-70	NA	4/16/91	8.86	7.46	1.40	
PR-71	NA	4/16/91	8.71			

Table 1. Groundwater Elevations and Free-Phase Petroleum Product Thicknesses

Well Number	Measuring Point Elevation (ft AMSL)	Date	Depth to Water (ft BGS)	Depth to Product (ft BGS)	Product Thickness (ft)	Water Level Elevation* (ft AMSL)
PR-72	NA	4/16/91	9.03			
PR-77	NA	5/24/91	8.65			
	NA	7/9/91	9.18			
	NA	8/15/91	9.38			
PR-81	NA	4/16/91	8.35			

* When product is present the equivalent water level elevation is calculated by adding 0.8 times the product thickness to the product/water interface elevation.

AMSL = Elevation Above Mean Sea Level
BGS = Below Ground Surface
NA = Data Not Available

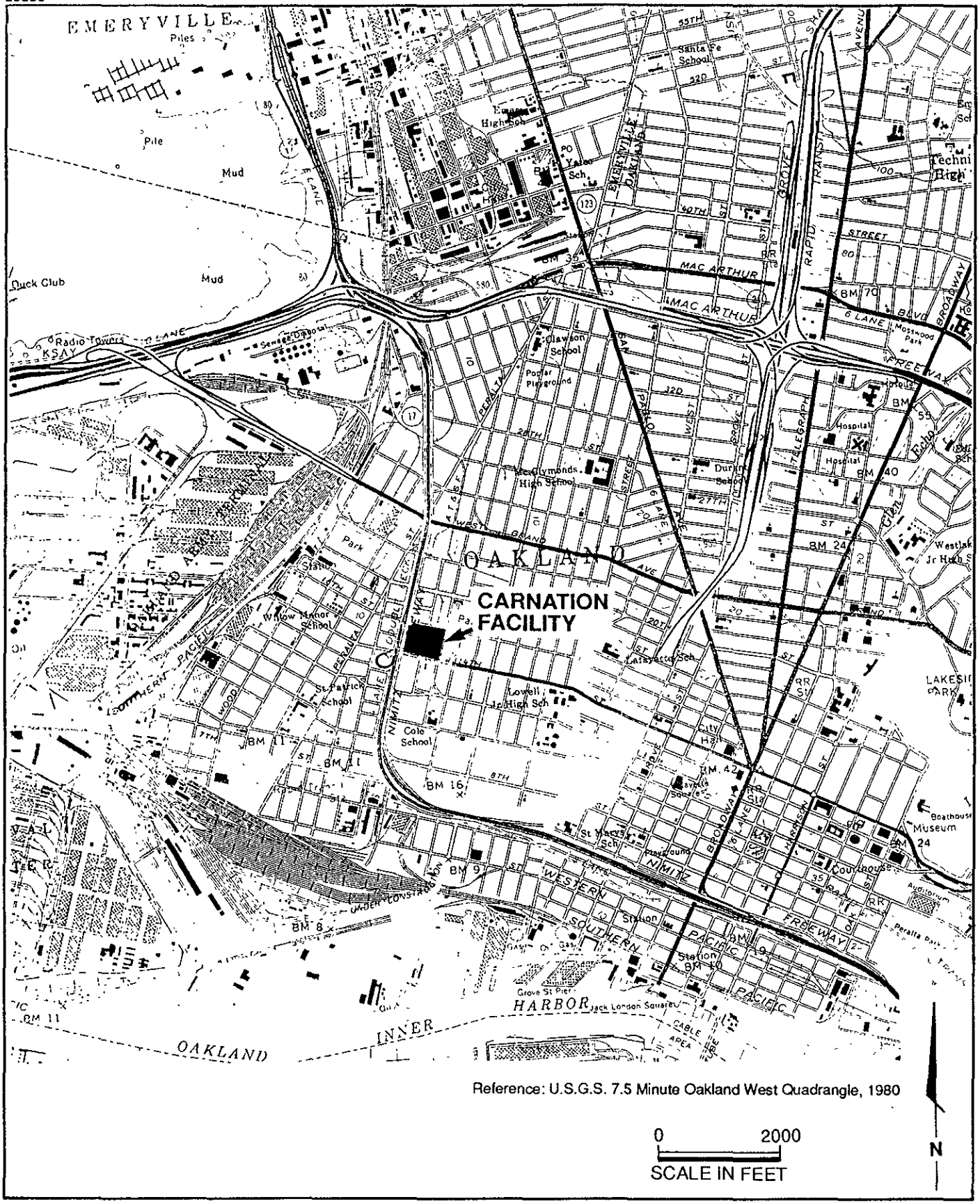
Table 2. Petroleum Hydrocarbon Concentrations in Groundwater Samples

Well Number	Sample Number	Hydrocarbon Concentrations (ug/l) TPH as gasoline	TPH as diesel	TPH as motor oil	Oil and Grease (Total)	Oil and Grease (Nonpolar)	Benzene	Toluene	Ethyl-Benzene	Xylenes (Total)	Other 8240 Compounds
MW-1	91062501	<50	<50	<500	<5000	<5000	<5.0	<5.0	<5.0	<5.0	<5.0-<10
MW-2	91062510	<50	<50	<500	<5000	<5000	<0.5	<0.5	<0.5	<0.5	NT
MW-3	91062605	<50	<50	<500	<5000	<5000	22	<0.5	0.5	<0.5	NT
MW-3 dup	91062606	100	<50	<500	<5000	<5000	25	<0.5	0.6	<0.5	NT
MW-4	91062502	<50	<50	<500	<5000	<5000	<5.0	<5.0	<5.0	<5.0	<5.0-<10
MW-5	91062509	<50	<50	<500	<5000	<5000	<5.0	<5.0	<5.0	<5.0	<5.0-<10
MW-9	91062503	<50	<50	<500	NT	NT	<0.5	<0.5	<0.5	<0.5	NT
MW-10	91062504	<50	<50	<500	NT	NT	<0.5	<0.5	<0.5	<0.5	NT
MW-11	91062505	<50	<50	<500	NT	NT	<0.5	<0.5	<0.5	<0.5	NT
MW-12	91062512	<50	<50	<500	NT	NT	<0.5	<0.5	<0.5	<0.5	NT
MW-13	91062506	<50	<50	<500	<5000	<5000	<5.0	<5.0	<5.0	<5.0	<5.0-<10
MW-14	91062507	<50	<50	<500	NT	NT	<5.0	<5.0	<5.0	<5.0	<5.0-<10
MW-15	91062508	<50	<50	<500	NT	NT	<5.0	<5.0	<5.0	<5.0	<5.0-<10
MW-16	91062513	<50	<50	<500	<5000	<5000	NT	NT	NT	NT	NT
MW-25	91062607	<50	<50	<500	NT	NT	0.8	<0.5	<0.5	<0.5	NT
MW-26	91062608	300000	2100	1600	<5000	<5000	4400	3600	260	4600	470 (1,2-DCA)
MW-26 dup	91062609	85000	1100	1000	5400	5100	3700	2700	160	3100	480 (1,2-DCA)
MW-27	91062610	<50	<50	<500	NT	NT	1.8	<0.5	<0.5	<0.5	NT
MW-28	91062601	<50	<50	<500	NT	NT	<0.5	<0.5	<0.5	<0.5	NT
MW-29	91062602	<50	<50	<500	<5000	<5000	<5.0	<5.0	<5.0	<5.0	<5.0-<10
MW-31	91062603	<50	<50	<500	NT	NT	<0.5	<0.5	<0.5	<0.5	NT
MW-32	91062604	690	<50	<500	<5000	<5000	550	<5.0	7.6	11	14 (1,2-DCA)
Field Blank	91062511	<50	<50	<500	<5000	<5000	<0.5	<0.5	<0.5	<0.5	NT
Field Blank	91062611	<50	<50	<500	<5000	<5000	<5.0	<5.0	<5.0	<5.0	<5.0-<10
Trip Blank	Trip Blank	<50	NT	NT	NT	NT	<0.5	<0.5	<0.5	<0.5	NT

Notes: <50 - Chemical not detected above reporting limit. NT- Not Tested.

PLATES

23266



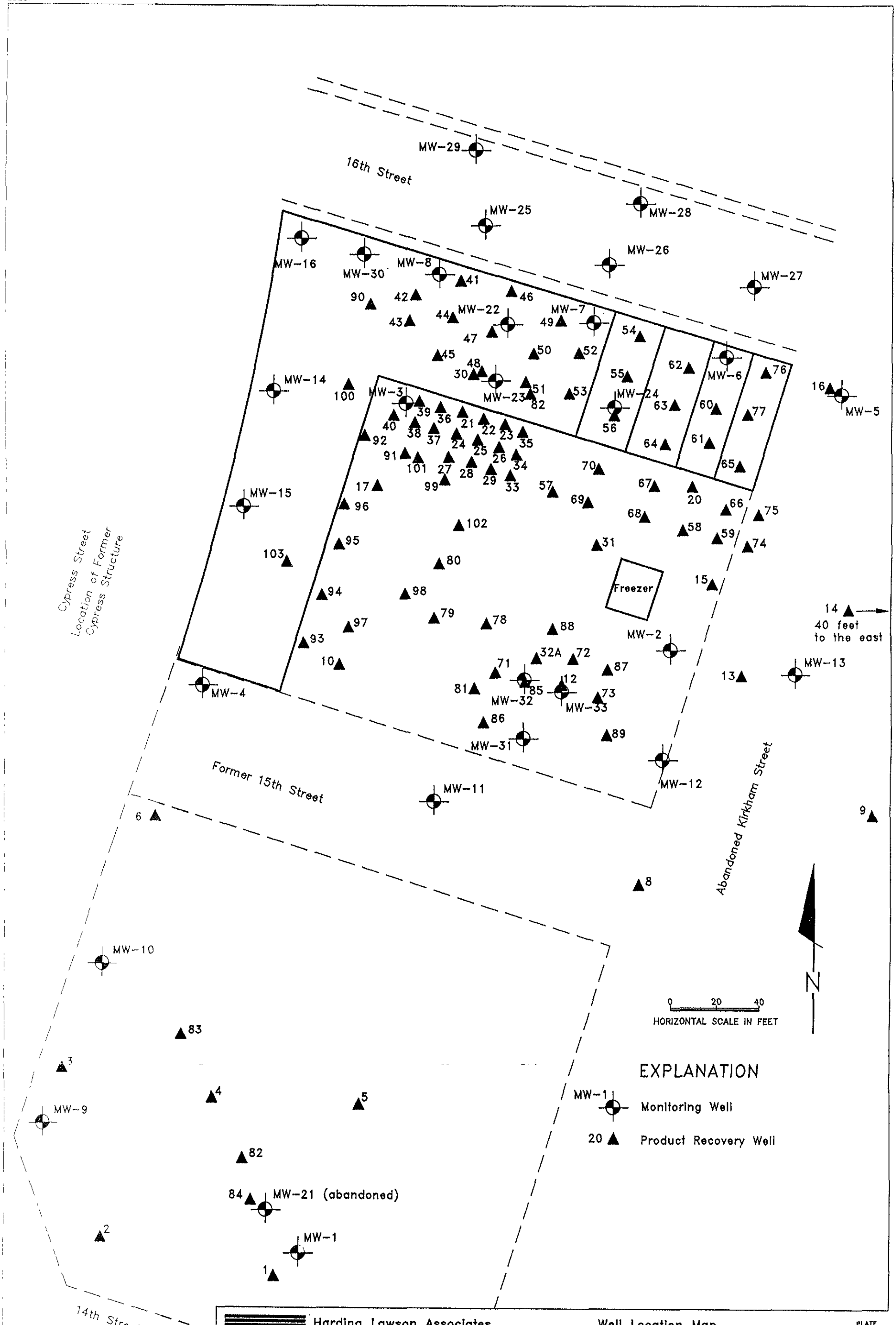
Harding Lawson Associates
Engineering and
Environmental Services

Site Location Map
Carnation Facility
Oakland, California

PLATE
1

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
NJB	20294,005.02	D. A. Craig	9/91	

23267



Harding Lawson Associates
Engineering and Environmental Services

Well Location Map
Carnation Facility
Oakland, California

PLATE 2

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
RWS	20294,0..		8/91	

23268

16th Street

MW-29
5.36

MW-25
5.44

5.40

MW-28
5.37

MW-16
4.96

MW-30
NM

MW-8*
5.23

MW-26
5.31

MW-27
5.33

5.30

5.20

MW-22*
5.14

MW-7*
5.57

5.10

MW-14
4.95

MW-3
6.04

MW-23*
5.19

MW-24
NM

MW-6
5.17

MW-5
5.09

MW-15
4.95

Cypress Street
Location of Former
Cypress Structure

5.00

Freezer

5.10

MW-2
5.09

MW-13
5.12

MW-4
5.04

NM
MW-32

MW-33
NM

MW-31
NM

Former 15th Street

MW-11
5.12

MW-12
5.14

Abandoned Kirkham Street

5.10

MW-10
5.11

0 20 40
HORIZONTAL SCALE IN FEET

N

MW-9
5.10

5.20

MW-21 (abandoned)

MW-1
5.24

14th Street

EXPLANATION

MW-1 — Monitoring Well

5.12 — Groundwater Elevation in Feet Above Mean Sea Level

* — Well Containing Free-Phase Petroleum Product. Groundwater Elevations Corrected Using Assumed Petroleum Product Density of 0.80 g/cc. Data Not Used in Contour Mapping.

NM — Not Measured

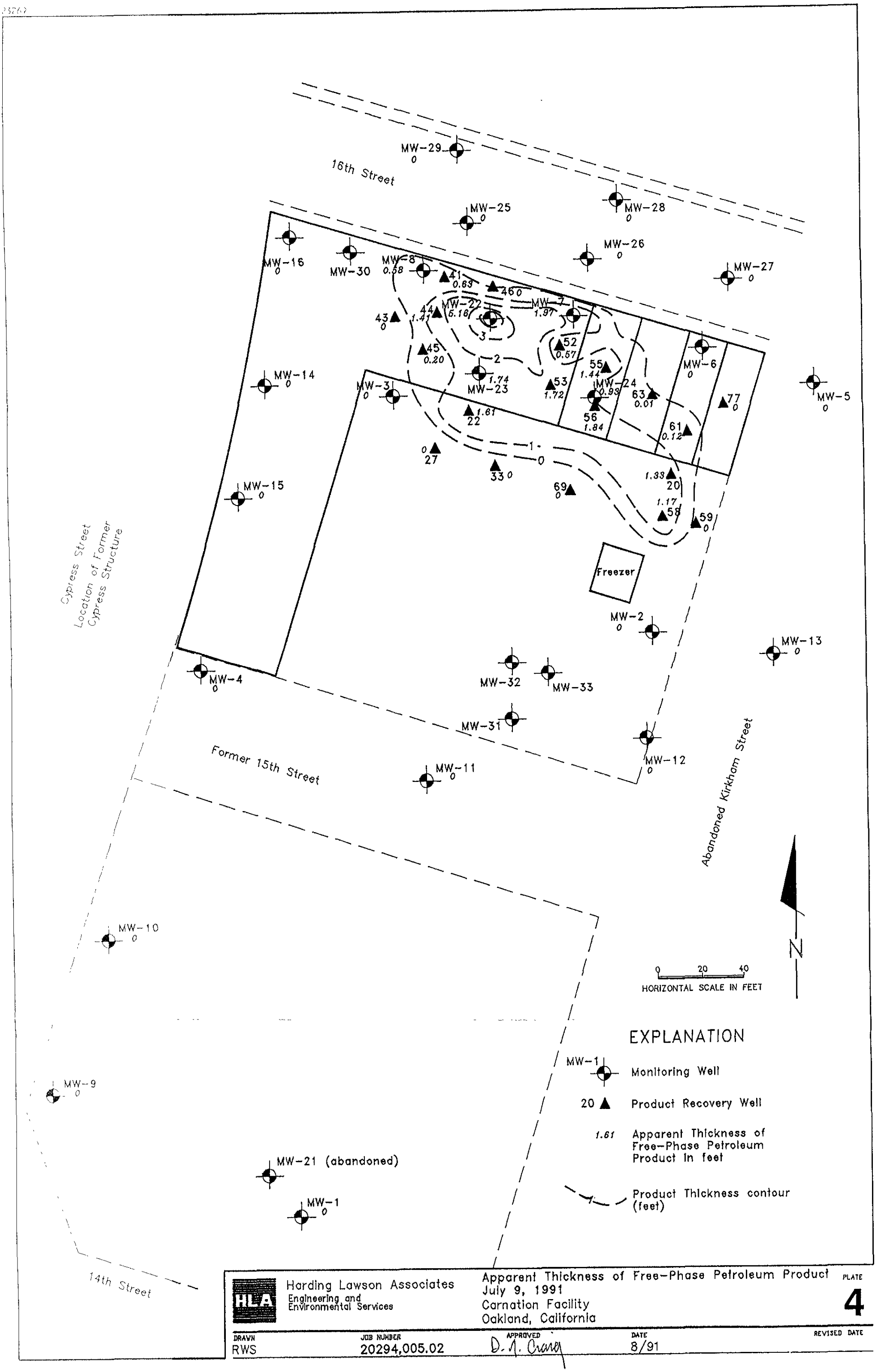
5.10 — Groundwater Elevation Contour

Hardin, Lawson Associates
Engineering and Environmental Services

Groundwater Elevations,
July 9, 1991
Carnation Facility
Oakland, California

PLATE
3

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
RWS	20294,005.02		8/91	



HLA Harding Lawson Associates
Engineering and Environmental Services

Apparent Thickness of Free-Phase Petroleum Product
July 9, 1991
Carnation Facility
Oakland, California

PLATE 4

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
RWS	20294,005.02	D. M. Crane	8/91	

23270

16th Street

MW-29
B <5.0
T <5.0
E <5.0
X <5.0

MW-25
B 0.8
T <0.5
E <0.5
X <0.5

MW-28
B <0.5
T <0.5
E <0.5
X <0.5

MW-26
B 4400
T 3600
E 260
X 4600

MW-27
B 1.8
T <0.5
E <0.5
X <0.5

MW-16
NA

MW-30
NS

MW-8
FP

MW-22
FP

MW-7
FP

MW-6
FP

MW-14
B <5.0
T <5.0
E <5.0
X <5.0

MW-3
B 25
T <0.5
E 0.6
X <0.5

MW-23
FP

MW-24
FP

MW-5
B <5.0
T <5.0
E <5.0
X <5.0

MW-15
B <5.0
T <5.0
E <5.0
X <5.0

Cypress Street
Location of Former
Cypress Structure

Freezer

MW-2
B <0.5
T <0.5
E <0.5
X <0.5

B 550
T <5.0
E 7.6
X 11

MW-32

MW-33
NS

MW-13
B <5.0
T <5.0
E <5.0
X <5.0

MW-4
B <5.0
T <5.0
E <5.0
X <5.0

Former 15th Street

MW-31
B <0.5
T <0.5
E <0.5
X <0.5

MW-11
B <0.5
T <0.5
E <0,5
X <0.5

MW-12
B <0.5
T <0.5
E <0.5
X <0.5

Abandoned Kirkham Street

MW-10
B <0.5
T <0.5
E <0.5
X <0.5

N

0 20 40
HORIZONTAL SCALE IN FEET

MW-9
B <0.5
T <0.5
E <0.5
X <0.5

MW-21 (abandoned)

MW-1
B <5.0
T <5.0
E <5.0
X <5.0

14th Street

EXPLANATION

MW-1 — Monitoring Well

FP — Free Product in Well

NS — Well not Sampled

NA — BTEX Compounds not Analyzed

COMPOUND
B=Benzene
T=Toluene
E=Ethylbenzene
X=Xylenes

CONCENTRATION
Concentration of Compound in ug/l

<0.5–Compound not Detected Above Reporting Limit

HLA
Harding Lawson Associates
Engineering and Environmental Services

Groundwater Chemistry,
June 25–26, 1991
Carnation Facility
Oakland, California

PLATE 5

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
RWS	20294,005.02		8/91	

Appendix A

GROUNDWATER SAMPLING FORMS

Harding Lawson Associates
Engineers and Geoscientists

GROUND-WATER SAMPLING FORM

Well No. MW-1
Well Type: ☑ Monitor ☐ Extraction ☐ Other
Well Material: ☑ PVC ☐ St. Steel ☐ Other
Date 6-25-91 Time 0925
Sampled by RWE: DME (Initials)

Job Name Carnation
Job Number 20294.003.02
Recorded by [signature] (Signature)

WELL PURGING

PURGE VOLUME

Casing Diameter (D in inches):
☐ 2-inch ☑ 4-inch ☐ 6-inch ☐ Other
Total Depth of Casing (TD in feet BTOC): 47
Water Level Depth (WL in feet BTOC): 11.05
Number of Well Volumes to be purged (# Vols)
☑ 3 ☐ 4 ☐ 5 ☐ 10 ☐ Other

PURGE METHOD

☐ Bailer - Type:
☐ Submersible ☑ Centrifugal ☐ Bladder; Pump No.:
☐ Other - Type:

PUMP INTAKE SETTING

☐ Near Bottom ☐ Near Top ☐ Other
Depth in feet (BTOC): 15 Screen Interval in feet (BTOC): from ___ to ___

PURGE VOLUME CALCULATION

$(47 - 11.05) \times 4^2 \times 3 \times 0.0408 = 70$ gallons

TD (feet) – WL (feet) × D (inches)² × # Vols × 0.0408 = Calculated Purge Volume

PURGE TIME

0910 Start 0920 Stop 10 min Elapsed

PURGE RATE

Initial 7 gpm Final 7 gpm

ACTUAL PURGE VOLUME

70 gallons

FIELD PARAMETER MEASUREMENT

Minutes Since Pumping Began	pH	Cond. (μmhos/cm)	T ☑ °C ☐ °F	Other turb
initial	7.0	390	18.5	> 100
35 - gals	7.0	390	19.0	60 ntu
70 "	7.0	380	19.0	42 "

Minutes Since Pumping Began	pH	Cond. (μmhos/cm)	T ☐ °C ☐ °F	Other
Meter Nos.				

Observations During Purging (Well Condition, Turbidity, Color, Odor): turbid gray, clears w/ purge
Discharge Water Disposal: ☐ Sanitary Sewer ☐ Storm Sewer ☑ Other baker tank

WELL SAMPLING

SAMPLING METHOD

☑ Bailer - Type: S.S.
☐ Submersible ☐ Centrifugal ☐ Bladder; Pump No.:
☐ Same As Above
☐ Grab - Type:
☐ Other - Type:

SAMPLE DISTRIBUTION

Sample Series: 9106

Sample No.	Volume/Cont.	Analysis Requested	Preservatives	Lab	Comments
2501	6 VOA,	TPH gas diesel	HCL, H2SO4	Net	
	3 L AG	8240, O&G			

QUALITY CONTROL SAMPLES

Duplicate Samples

Original Sample No.	Duplicate Sample No.

Blank Samples

Type	Sample No.

Other Samples

Type	Sample No.

Harding Lawson Associates
Engineers and Geoscientists

GROUND-WATER SAMPLING FORM

Well No. MW-2
Well Type: ☒ Monitor ☐ Extraction ☐ Other
Well Material: ☒ PVC ☐ St. Steel ☐ Other
Job Name Carnation
Job Number 20299.002.07
Date 6-25-91 Time 1504
Recorded by (Signature)
Sampled by RWE - DWF (Initials)

WELL PURGING

PURGE VOLUME

Casing Diameter (D in inches):
☐ 2-inch ☒ 4-inch ☐ 6-inch ☐ Other
Total Depth of Casing (TD in feet BTOC): 23.2
Water Level Depth (WL in feet BTOC): 9.88
Number of Well Volumes to be purged (# Vols)
☒ 3 ☐ 4 ☐ 5 ☐ 10 ☐ Other

PURGE METHOD

☐ Bailer - Type:
☐ Submersible ☒ Centrifugal ☐ Bladder; Pump No.:
☐ Other - Type:

PUMP INTAKE SETTING

☐ Near Bottom ☐ Near Top ☐ Other
Depth in feet (BTOC): 20 Screen Interval in feet (BTOC):
from ____ to ____

PURGE VOLUME CALCULATION

$(23.2 - 9.88) \times 4^2 \times 3 \times 0.0408 = 26$ gallons

(TD (feet) − WL (feet)) × D (inches)² × # Vols × 0.0408 = Calculated Purge Volume

PURGE TIME

1454 Start 1458 Stop 4 min Elapsed

PURGE RATE

Initial 7 gpm Final 7 gpm

ACTUAL PURGE VOLUME

28 gallons

FIELD PARAMETER MEASUREMENT

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T ☒ °C ☐ °F	Other turb
initial	6.4	825	24.0	>100
15-gals	6.4	875	22.0	
26 "	6.3	800	21.5	>100

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T ☐ °C ☐ °F	Other
Meter Nos.				

Observations During Purging (Well Condition, Turbidity, Color, Odor): silty brown
Discharge Water Disposal: ☐ Sanitary Sewer ☐ Storm Sewer ☒ Other baker tank

WELL SAMPLING

SAMPLING METHOD

☐ Same As Above
☒ Bailer - Type: S.S.
☐ Grab - Type:
☐ Submersible ☐ Centrifugal ☐ Bladder; Pump No.:
☐ Other - Type:

SAMPLE DISTRIBUTION

Sample Series: 9106

Sample No.	Volume/Cont.	Analysis Requested	Preservatives	Lab	Comments
2510	6 VOA	gas + BTEX	HCl	NAL	
	2 EAB	diesel	—		
	1 "	O & G	H_2SO_4		

QUALITY CONTROL SAMPLES

Duplicate Samples

Original Sample No.	Duplicate Sample No.

Blank Samples

Type	Sample No.
FB	2511

Other Samples

Type	Sample No.

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Harding Lawson Associates
Engineers and Geoscientists

GROUND-WATER SAMPLING FORM

Job Name: Carnation
Job Number: 20294.002.02
Recorded by: Rick Erber (Signature)

Well No.: MW-3
Well Type: ☒ Monitor ☐ Extraction ☐ Other
Well Material: ☒ PVC ☐ St. Steel ☐ Other
Date: 6-26-96 Time: 1013
Sampled by: RWE (Initials)

WELL PURGING

PURGE VOLUME

Casing Diameter (D in inches):
☐ 2-inch ☒ 4-inch ☐ 6-inch ☐ Other

Total Depth of Casing (TD in feet BTOC): 22.7
Water Level Depth (WL in feet BTOC): 9.07
Number of Well Volumes to be purged (# Vols)
☒ 3 ☐ 4 ☐ 5 ☐ 10 ☐ Other

PURGE METHOD

☐ Bailer - Type:
☐ Submersible ☒ Centrifugal ☐ Bladder; Pump No.:
☐ Other - Type:

PUMP INTAKE SETTING

☒ Near Bottom ☐ Near Top ☐ Other
Depth in feet (BTOC): Screen Interval in feet (BTOC): from ___ to ___

PURGE VOLUME CALCULATION

(22.7 TD (feet) − 9.07 WL (feet)) X 4² D (inches) X 3 # Vols X 0.0408 = 27 Calculated Purge Volume gallons

PURGE TIME

1000 Start 1005 Stop 5 min Elapsed

PURGE RATE

Initial 7 gpm Final surge gpm

ACTUAL PURGE VOLUME

30 gallons

FIELD PARAMETER MEASUREMENT

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T ☒ °C ☐ °F	Other turb
initial	6.1	900	19.0	>100
15 gals	6.5	925	21.5	
30 "	6.5	950	21.0	>100

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T ☐ °C ☐ °F	Other
Meter Nos.				

Observations During Purging (Well Condition, Turbidity, Color, Odor): silty brown HC odor
Discharge Water Disposal: ☐ Sanitary Sewer ☐ Storm Sewer ☒ Other baker tank

WELL SAMPLING

SAMPLING METHOD

☒ Bailer - Type: S.S.
☐ Submersible ☐ Centrifugal ☐ Bladder; Pump No.:
☐ Same As Above
☐ Grab - Type:
☐ Other - Type:

SAMPLE DISTRIBUTION

Sample Series: 9106

Sample No.	Volume/Cont.	Analysis Requested	Preservatives	Lab	Comments
2605	3 VOA	8015 G, 8020	HCL	Nat	
	2 liter	" D	—	↓	
	1 "	O/G	H_2SO_4		

QUALITY CONTROL SAMPLES

Duplicate Samples

Original Sample No.	Duplicate Sample No.
2605	2606

Blank Samples

Type	Sample No.

Other Samples

Type	Sample No.

RL004 OFFICE COPY 0746

Harding Lawson Associates
Engineers and Geoscientists

GROUND-WATER SAMPLING FORM

Well No. MW-4
Well Type: ☑ Monitor ☐ Extraction ☐ Other
Well Material: ☑ PVC ☐ St. Steel ☐ Other
Date 6-25-91 Time 1001
Sampled by RWE · DME (Initials)

Job Name Carnation
Job Number 20194.002.02
Recorded by [signature] (Signature)

WELL PURGING

PURGE VOLUME

Casing Diameter (D in inches):
☐ 2-inch ☑ 4-inch ☐ 6-inch ☐ Other
Total Depth of Casing (TD in feet BTOC): 40.6
Water Level Depth (WL in feet BTOC): 9.21
Number of Well Volumes to be purged (# Vols)
☑ 3 ☐ 4 ☐ 5 ☐ 10 ☐ Other

PURGE METHOD

☐ Bailer - Type:
☐ Submersible ☑ Centrifugal ☐ Bladder; Pump No.:
☐ Other - Type:

PUMP INTAKE SETTING

☐ Near Bottom ☐ Near Top ☐ Other
Depth in feet (BTOC): 15 Screen Interval in feet (BTOC): from ___ to ___

PURGE VOLUME CALCULATION

$$\left(\underset{\text{TD (feet)}}{40.6} - \underset{\text{WL (feet)}}{9.21}\right) \times \underset{\text{D (inches)}}{4}^2 \times \underset{\text{\# Vols}}{3} \times 0.0408 = \underset{\text{Calculated Purge Volume}}{61} \text{ gallons}$$

PURGE TIME

0945 Start 0954 Stop 9 min Elapsed

PURGE RATE

Initial 7 gpm Final 7 gpm

ACTUAL PURGE VOLUME

63 gallons

FIELD PARAMETER MEASUREMENT

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T ☑ °C ☐ °F	Other turb
initial	7.0	370	26.0	>100
30 - gals	6.9	380	19.0	
60 "	6.9	380	19.0	>100

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T ☐ °C ☐ °F	Other
Meter Nos.				

Observations During Purging (Well Condition, Turbidity, Color, Odor): turbid gray roots growing in well no worms
Discharge Water Disposal: ☐ Sanitary Sewer ☐ Storm Sewer ☑ Other baker tank

WELL SAMPLING

SAMPLING METHOD

☑ Bailer - Type: S.S.
☐ Submersible ☐ Centrifugal ☐ Bladder; Pump No.:
☐ Same As Above
☐ Grab - Type:
☐ Other - Type:

SAMPLE DISTRIBUTION

Sample Series: 9106

Sample No.	Volume/Cont.	Analysis Requested	Preservatives	Lab	Comments
2502	3 voa, 2 lit	8015, 0?6	HCl, HNO3	NET	
	3 voa	8240	HCL	"	

QUALITY CONTROL SAMPLES

Duplicate Samples

Original Sample No.	Duplicate Sample No.

Blank Samples

Type	Sample No.

Other Samples

Type	Sample No.

RL004

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Harding Lawson Associates
Engineers and Geoscientists

GROUND-WATER SAMPLING FORM

Job Name: Carnation
Job Number: 20294.003.02
Recorded by: Rick Erlin (Signature)

Well No.: MW-5
Well Type: ☑ Monitor ☐ Extraction ☐ Other
Well Material: ☑ PVC ☐ St. Steel ☐ Other
Date: 6-25-91 Time: 1430
Sampled by: RWE · DME (Initials)

WELL PURGING

PURGE VOLUME

Casing Diameter (D in inches):
☐ 2-inch ☑ 4-inch ☐ 6-inch ☐ Other

Total Depth of Casing (TD in feet BTOC): 23.5
Water Level Depth (WL in feet BTOC): 9.16
Number of Well Volumes to be purged (# Vols)
☑ 3 ☐ 4 ☐ 5 ☐ 10 ☐ Other

PURGE METHOD

☐ Bailer - Type:
☐ Submersible ☑ Centrifugal ☐ Bladder; Pump No.:
☐ Other - Type:

PUMP INTAKE SETTING

☐ Near Bottom ☐ Near Top ☐ Other
Depth in feet (BTOC): 20 Screen Interval in feet (BTOC): from ___ to ___

PURGE VOLUME CALCULATION

(23.5 TD (feet) − 9.16 WL (feet)) X 4² D (inches) X 3 # Vols X 0.0408 = 28 Calculated Purge Volume gallons

PURGE TIME

1420 Start 1424 Stop 4-min Elapsed

PURGE RATE

Initial 7 gpm Final 7 gpm

ACTUAL PURGE VOLUME

28 gallons

FIELD PARAMETER MEASUREMENT

Minutes Since Pumping Began	pH	Cond. (μmhos/cm)	T ☑ °C ☐ °F	Other turb
initial	6.3	925	19.5	>100
15-gals	6.3	925	20.5	
28	6.3	925	20.5	>100

Minutes Since Pumping Began	pH	Cond. (μmhos/cm)	T ☐ °C ☐ °F	Other
Meter Nos.				

Observations During Purging (Well Condition, Turbidity, Color, Odor): silty brown
Discharge Water Disposal: ☐ Sanitary Sewer ☐ Storm Sewer ☑ Other baker tank

WELL SAMPLING

SAMPLING METHOD

☑ Bailer - Type: S.S.
☐ Submersible ☐ Centrifugal ☐ Bladder; Pump No.:
☐ Same As Above
☐ Grab - Type:
☐ Other - Type:

SAMPLE DISTRIBUTION

Sample Series: 9106

Sample No.	Volume/Cont.	Analysis Requested	Preservatives	Lab	Comments
2509	6-VOA	8015 gas - 8240	HCL	Alta	
	3 L AG	8015 d. O+G	H_2SO_4	"	

QUALITY CONTROL SAMPLES

Duplicate Samples

Original Sample No.	Duplicate Sample No.

Blank Samples

Type	Sample No.

Other Samples

Type	Sample No.

Harding Lawson Associates
Engineers and Geoscientists

GROUND-WATER SAMPLING FORM

Well No. MW-9
Well Type: ☑ Monitor ☐ Extraction ☐ Other
Well Material: ☑ PVC ☐ St. Steel ☐ Other
Job Name Carnation
Job Number 20294.002.02
Date 6-25-91 Time 1049
Recorded by (Signature)
Sampled by RWE · DWS (Initials)

WELL PURGING

PURGE VOLUME

Casing Diameter (D in inches):
☐ 2-inch ☑ 4-inch ☐ 6-inch ☐ Other
Total Depth of Casing (TD in feet BTOC): 23
Water Level Depth (WL in feet BTOC): 9.69
Number of Well Volumes to be purged (# Vols)
☑ 3 ☐ 4 ☐ 5 ☐ 10 ☐ Other

PURGE METHOD

☐ Bailer - Type:
☐ Submersible ☑ Centrifugal ☐ Bladder; Pump No.:
☐ Other - Type:

PUMP INTAKE SETTING

☐ Near Bottom ☐ Near Top ☐ Other
Depth in feet (BTOC): 15 Screen Interval in feet (BTOC): from to

PURGE VOLUME CALCULATION

$$(\underset{\text{TD (feet)}}{23} - \underset{\text{WL (feet)}}{9.69}) \times \underset{\text{D (inches)}}{4}^2 \times \underset{\text{\# Vols}}{3} \times 0.0408 = \underset{\text{Calculated Purge Volume}}{26} \text{ gallons}$$

PURGE TIME

1040 Start 1044 Stop 4 min Elapsed

PURGE RATE

Initial 7 gpm Final 3 gpm

ACTUAL PURGE VOLUME

28 gallons

FIELD PARAMETER MEASUREMENT

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T ☑ °C ☐ °F	Other turb
initial	6.7	725	19.5	>100
15 - gals	6.9	650	18.5	
28 "	6.9	700	18.5	>100

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T ☐ °C ☐ °F	Other
Meter Nos.				

Observations During Purging (Well Condition, Turbidity, Color, Odor): turbid gray
Discharge Water Disposal: ☐ Sanitary Sewer ☐ Storm Sewer ☑ Other baker tank

WELL SAMPLING

SAMPLING METHOD

☑ Bailer - Type: S.S.
☐ Submersible ☐ Centrifugal ☐ Bladder; Pump No.:
☐ Same As Above
☐ Grab - Type:
☐ Other - Type:

SAMPLE DISTRIBUTION

Sample Series: 9106

Sample No.	Volume/Cont.	Analysis Requested	Preservatives	Lab	Comments
2503	3 VOA	8010	HCl	NET	
	2 1 AG	8015	H_2SO_4	"	

QUALITY CONTROL SAMPLES

Duplicate Samples

Original Sample No.	Duplicate Sample No.

Blank Samples

Type	Sample No.

Other Samples

Type	Sample No.

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0746

Harding Lawson Associates
Engineers and Geoscientists

GROUND-WATER SAMPLING FORM

Well No. MW-10
Well Type: ☒ Monitor ☐ Extraction ☐ Other
Well Material: ☒ PVC ☐ St. Steel ☐ Other
Job Name Carnation
Job Number 20294.002.02
Date 6-25-91 Time 1109
Recorded by Rick Calvin (Signature)
Sampled by RWE · DMS (Initials)

WELL PURGING

PURGE VOLUME

Casing Diameter (D in inches):
☐ 2-inch ☒ 4-inch ☐ 6-inch ☐ Other
Total Depth of Casing (TD in feet BTOC): 22.6
Water Level Depth (WL in feet BTOC): 10.49
Number of Well Volumes to be purged (# Vols)
☒ 3 ☐ 4 ☐ 5 ☐ 10 ☐ Other

PURGE METHOD

☐ Bailer - Type:
☐ Submersible ☒ Centrifugal ☐ Bladder; Pump No.:
☐ Other - Type:

PUMP INTAKE SETTING

☐ Near Bottom ☐ Near Top ☐ Other
Depth in feet (BTOC): 15 Screen Interval in feet (BTOC): from to

PURGE VOLUME CALCULATION

$$\left(\underset{\text{TD (feet)}}{22.6} - \underset{\text{WL (feet)}}{10.49}\right) \times \underset{\text{D (inches)}}{4}{}^{2} \times \underset{\text{\# Vols}}{3} \times 0.0408 = \underset{\text{Calculated Purge Volume}}{24} \text{ gallons}$$

PURGE TIME

1100 Start 1109 Stop 4 min Elapsed

PURGE RATE

Initial 7 gpm Final 7 gpm

ACTUAL PURGE VOLUME

28 gallons

FIELD PARAMETER MEASUREMENT

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T ☒ °C ☐ °F	Other turb
initial	6.7	750	18.0	>100
15 - gals	6.5	750	18.5	
28 - "	6.5	750	18.5	>100

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T ☐ °C ☐ °F	Other
Meter Nos.				

Observations During Purging (Well Condition, Turbidity, Color, Odor): slightly turbid roots/wood → turbid silty brown
Discharge Water Disposal: ☐ Sanitary Sewer ☐ Storm Sewer ☒ Other baker tank

WELL SAMPLING

SAMPLING METHOD

☐ Same As Above
☒ Bailer - Type: S.S.
☐ Grab - Type:
☐ Submersible ☐ Centrifugal ☐ Bladder; Pump No.:
☐ Other - Type:

SAMPLE DISTRIBUTION

Sample Series: 9106

Sample No.	Volume/Cont.	Analysis Requested	Preservatives	Lab	Comments
2504	3 VOA	8020	HCl	NET	
	2 1 AG	8015	H_2SO_4	"	

QUALITY CONTROL SAMPLES

Duplicate Samples

Original Sample No.	Duplicate Sample No.

Blank Samples

Type	Sample No.

Other Samples

Type	Sample No.

Harding Lawson Associates
Engineers and Geoscientists

GROUND-WATER SAMPLING FORM

Well No. MW-11
Well Type: ☒ Monitor ☐ Extraction ☐ Other
Well Material: ☒ PVC ☐ St. Steel ☐ Other
Date 6-25-91 Time 1241
Sampled by RWE · DMS (Initials)

Job Name Carnation
Job Number 20294.009.02
Recorded by (Signature)

WELL PURGING

PURGE VOLUME

Casing Diameter (D in inches):
☐ 2-inch ☒ 4-inch ☐ 6-inch ☐ Other
Total Depth of Casing (TD in feet BTOC): 22.0
Water Level Depth (WL in feet BTOC): 9.22
Number of Well Volumes to be purged (# Vols)
☒ 3 ☐ 4 ☐ 5 ☐ 10 ☐ Other

PURGE METHOD

☐ Bailer - Type:
☐ Submersible ☒ Centrifugal ☐ Bladder; Pump No.:
☐ Other - Type:

PUMP INTAKE SETTING

☐ Near Bottom ☐ Near Top ☐ Other
Depth in feet (BTOC): 15 Screen interval in feet (BTOC): from to

PURGE VOLUME CALCULATION

(22.0 (TD, feet) − 9.22 (WL, feet)) X 4 (D, inches)^2 X 3 (# Vols) X 0.0408 = 25 gallons (Calculated Purge Volume)

PURGE TIME

1233 Start 1237 Stop 4 min Elapsed

PURGE RATE

Initial 7 gpm Final 7 gpm

ACTUAL PURGE VOLUME

28 gallons

FIELD PARAMETER MEASUREMENT

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T ☒ °C ☐ °F	Other turb
Initial	6.2	725	21.5	>100
15 - gals	6.3	725	21.5	
28 "	6.3	725	22.0	>100

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T ☐ °C ☐ °F	Other
Meter Nos.				

Observations During Purging (Well Condition, Turbidity, Color, Odor): turbid brown
Discharge Water Disposal: ☐ Sanitary Sewer ☐ Storm Sewer ☒ Other baker tank

WELL SAMPLING

SAMPLING METHOD

☒ Bailer - Type: S.S.
☐ Submersible ☐ Centrifugal ☐ Bladder; Pump No.:
☐ Same As Above
☐ Grab - Type:
☐ Other - Type:

SAMPLE DISTRIBUTION

Sample Series: 9106

Sample No.	Volume/Cont.	Analysis Requested	Preservatives	Lab	Comments
2505	Bore	3 VOA	HCl	NEX	
	2 & AG	BNES	H_2SO_4	"	

QUALITY CONTROL SAMPLES

Duplicate Samples

Original Sample No.	Duplicate Sample No.

Blank Samples

Type	Sample No.

Other Samples

Type	Sample No.

Harding Lawson Associates
Engineers and Geoscientists

GROUND-WATER SAMPLING FORM

Well No. MW-12
Well Type: ☒ Monitor ☐ Extraction ☐ Other ____
Well Material: ☒ PVC ☐ St. Steel ☐ Other ____

Job Name Carnation
Job Number 20294.003.02
Date 6-25-91 Time 1602
Recorded by Rick Eaton (Signature)
Sampled by RWE - DWE (Initials)

WELL PURGING

PURGE VOLUME

Casing Diameter (D in inches):
☐ 2-inch ☒ 4-inch ☐ 6-inch ☐ Other ____
Total Depth of Casing (TD in feet BTOC): 22.8
Water Level Depth (WL in feet BTOC): 10.01
Number of Well Volumes to be purged (# Vols)
☒ 3 ☐ 4 ☐ 5 ☐ 10 ☐ Other ____

PURGE METHOD

☐ Bailer - Type: ____
☐ Submersible ☒ Centrifugal ☐ Bladder; Pump No.: ____
☐ Other - Type: ____

PUMP INTAKE SETTING

☐ Near Bottom ☐ Near Top ☐ Other ____
Depth in feet (BTOC): 20 Screen Interval in feet (BTOC): from ____ to ____

PURGE VOLUME CALCULATION

$(\underset{\text{TD (feet)}}{22.8} - \underset{\text{WL (feet)}}{10.01}) \times \underset{\text{D (inches)}}{\quad\quad}^2 \times \underset{\text{\# Vols}}{3} \times 0.0408 = \underset{\text{Calculated Purge Volume}}{25}$ gallons

PURGE TIME

1554 Start 1559 Stop 4 - min Elapsed

PURGE RATE

Initial 3 gpm Final 3 gpm

ACTUAL PURGE VOLUME

28 gallons

FIELD PARAMETER MEASUREMENT

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T ☒ °C ☐ °F	Other turb
initial	5.9	900	22.8	>100
15 - gals	6.2	900	22.0	
25 "	6.7	900	21.5	>100

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T ☐ °C ☐ °F	Other ____
Meter Nos.				

Observations During Purging (Well Condition, Turbidity, Color, Odor): turbid brown
Discharge Water Disposal: ☐ Sanitary Sewer ☐ Storm Sewer ☒ Other baker tank

WELL SAMPLING

SAMPLING METHOD

☐ Same As Above
☒ Bailer - Type: S.S.
☐ Grab - Type: ____
☐ Submersible ☐ Centrifugal ☐ Bladder; Pump No.: ____
☐ Other - Type: ____

SAMPLE DISTRIBUTION

Sample Series: 9106

Sample No.	Volume/Cont.	Analysis Requested	Preservatives	Lab	Comments
2512	3 VOA	8015-G, 8020	HCl	Net	
	2 L AG	8015 D	—	"	

QUALITY CONTROL SAMPLES

Duplicate Samples

Original Sample No.	Duplicate Sample No.

Blank Samples

Type	Sample No.

Other Samples

Type	Sample No.

Harding Lawson Associates
Engineers and Geoscientists

GROUND-WATER SAMPLING FO

Job Name 20294.003.02
Job Number Carnation
Recorded by Rick Eckm (Signature)

Well No. MW-13
Well Type: ☑ Monitor ☐ Extraction ☐ Other
Well Material: ☑ PVC ☐ St. Steel ☐ Other
Date 6-25-91 Time 1313
Sampled by RWE · DMF (Initials)

WELL PURGING

PURGE VOLUME

Casing Diameter (D in inches):
☐ 2-inch ☑ 4-inch ☐ 6-inch ☐ Other
Total Depth of Casing (TD in feet BTOC): 21.2
Water Level Depth (WL in feet BTOC): 9.55
Number of Well Volumes to be purged (# Vols)
☑ 3 ☐ 4 ☐ 5 ☐ 10 ☐ Other

PURGE METHOD

☐ Bailer - Type:
☐ Submersible ☑ Centrifugal ☐ Bladder; Pump No.:
☐ Other - Type:

PUMP INTAKE SETTING

☐ Near Bottom ☐ Near Top ☐ Other
Depth in feet (BTOC): 20 Screen Interval in feet (BTOC): from ____ to ____

PURGE VOLUME CALCULATION

$\left(\underset{\text{TD (feet)}}{21.2} - \underset{\text{WL (feet)}}{9.55}\right) \times \underset{\text{D (inches)}}{4}^2 \times \underset{\text{\# Vols}}{3} \times 0.0408 = \underset{\text{Calculated Purge Volume}}{24}$ gallons

PURGE TIME

1305 Start 1309 Stop 4 min Elapsed

PURGE RATE

Initial 7 gpm Final 7 gpm

ACTUAL PURGE VOLUME

28 gallons

FIELD PARAMETER MEASUREMENT

Minutes Since Pumping Began	pH	Cond. (μmhos/cm)	T ☑ °C ☐ °F	Other turb
initial	6.5	500	24.0	>100
15 gals	6.7	420	21.5	
25 "	6.5	500	21.5	>100

Minutes Since Pumping Began	pH	Cond. (μmhos/cm)	T ☐ °C ☐ °F	Other
Meter Nos.				

Observations During Purging (Well Condition, Turbidity, Color, Odor): turbid brown
Discharge Water Disposal: ☐ Sanitary Sewer ☐ Storm Sewer ☑ Other baker tank

WELL SAMPLING

SAMPLING METHOD

☑ Bailer - Type: S.S.
☐ Submersible ☐ Centrifugal ☐ Bladder; Pump No.:
☐ Same As Above
☐ Grab - Type:
☐ Other - Type:

SAMPLE DISTRIBUTION

Sample Series: 9106

Sample No.	Volume/Cont.	Analysis Requested	Preservatives	Lab	Comments
2506	6 VOA	gas, 8240	HCl	Nat	
	2 LAG	dies. 03.6	H_2SO_4	"	

QUALITY CONTROL SAMPLES

Duplicate Samples

Original Sample No.	Duplicate Sample No.

Blank Samples

Type	Sample No.

Other Samples

Type	Sample No.

Harding Lawson Associates
Engineers and Geoscientists

GROUND-WATER SAMPLING FORM

Well No. MW-14
Well Type: ☑ Monitor ☐ Extraction ☐ Other
Well Material: ☐ PVC ☐ St. Steel ☐ Other
Job Name Carnation
Job Number 20294.002.02
Date 6-25-91 Time 1345
Recorded by (Signature)
Sampled by RWE-DWE (Initials)

WELL PURGING

PURGE VOLUME

Casing Diameter (D in inches):
☑ 2-inch ☐ 4-inch ☐ 6-inch ☐ Other
Total Depth of Casing (TD in feet BTOC): 19.5
Water Level Depth (WL in feet BTOC): 8.99
Number of Well Volumes to be purged (# Vols)
☑ 3 ☐ 4 ☐ 5 ☐ 10 ☐ Other

PURGE METHOD

☑ Bailer - Type: PVC
☐ Submersible ☐ Centrifugal ☐ Bladder; Pump No.:
☐ Other - Type:

PUMP INTAKE SETTING

☐ Near Bottom ☐ Near Top ☐ Other
Depth in feet (BTOC): Screen Interval in feet (BTOC): from to

PURGE VOLUME CALCULATION

$(19.5 - 8.99) \times 2^2 \times 3 \times 0.0408 = 5$ gallons

(TD (feet) − WL (feet)) × D (inches)² × # Vols × 0.0408 = Calculated Purge Volume

PURGE TIME

1335 Start 1340 Stop 5 min Elapsed

PURGE RATE

Initial - gpm Final - gpm

ACTUAL PURGE VOLUME

5 gallons

FIELD PARAMETER MEASUREMENT

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T ☑ °C ☐ °F	Other turb
initial	6.3	800	18.5	>100
3-gals	6.4	800	18.0	
5 "	6.4	800	18.0	>100

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T ☐ °C ☐ °F	Other
Meter Nos.				

Observations During Purging (Well Condition, Turbidity, Color, Odor): silty-sandy brown roots in well
Discharge Water Disposal: ☐ Sanitary Sewer ☐ Storm Sewer ☑ Other baker tank

WELL SAMPLING

SAMPLING METHOD

☑ Bailer - Type: S.S.
☐ Submersible ☐ Centrifugal ☐ Bladder; Pump No.:
☐ Same As Above
☐ Grab - Type:
☐ Other - Type:

SAMPLE DISTRIBUTION

Sample Series: 9106

Sample No.	Volume/Cont.	Analysis Requested	Preservatives	Lab	Comments
2507	3 VOA	8020	HCl	Net	
	2 L AG	8015	H_2SO_4	"	

QUALITY CONTROL SAMPLES

Duplicate Samples

Original Sample No.	Duplicate Sample No.

Blank Samples

Type	Sample No.

Other Samples

Type	Sample No.

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GROUND-WATER SAMPLING FI

Well No. MW-15
Well Type: ☑ Monitor ☐ Extraction ☐ Other
Well Material: ☑ PVC ☐ St. Steel ☐ Other
Job Name Carnation
Job Number 207.94.007.02
Date 6-25-91 Time 1410
Recorded by (Signature)
Sampled by RWE · DMS (Initials)

WELL PURGING

PURGE VOLUME

Casing Diameter (D in inches):
☑ 2-inch ☐ 4-inch ☐ 6-inch ☐ Other
Total Depth of Casing (TD in feet BTOC): 18.5
Water Level Depth (WL in feet BTOC): 9.14
Number of Well Volumes to be purged (# Vols)
☑ 3 ☐ 4 ☐ 5 ☐ 10 ☐ Other

PURGE METHOD

☑ Bailer - Type: PVC
☐ Submersible ☐ Centrifugal ☐ Bladder; Pump No.:
☐ Other - Type:

PUMP INTAKE SETTING

☐ Near Bottom ☐ Near Top ☐ Other
Depth in feet (BTOC): Screen Interval in feet (BTOC): from to

PURGE VOLUME CALCULATION

$(18.5 - 9.14) \times 2^2 \times 3 \times 0.0408 = 5$ gallons

(TD (feet) − WL (feet)) × D (inches)² × # Vols × 0.0408 = Calculated Purge Volume

PURGE TIME

1400 Start 1405 Stop Elapsed

PURGE RATE

Initial gpm Final gpm

ACTUAL PURGE VOLUME

gallons

FIELD PARAMETER MEASUREMENT

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T ☑ °C ☐ °F	Other turb
initial	6.2	800	16.5	>100
3-gals	6.3	800	16.0	
5 "	6.3	800	16.0	>100

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T ☐ °C ☐ °F	Other
Meter Nos.				

Observations During Purging (Well Condition, Turbidity, Color, Odor): silty-sandy brown H2S odor roots
Discharge Water Disposal: ☐ Sanitary Sewer ☐ Storm Sewer ☑ Other baker tank

WELL SAMPLING

SAMPLING METHOD

☑ Bailer - Type: S.S.
☐ Submersible ☐ Centrifugal ☐ Bladder; Pump No.:
☐ Same As Above
☐ Grab - Type:
☐ Other - Type:

SAMPLE DISTRIBUTION

Sample Series: 9106

Sample No.	Volume/Cont.	Analysis Requested	Preservatives	Lab	Comments
2508	3 VOA	8020	HCl	NET	
	2 L AG	8015	H_2SO_4	"	

QUALITY CONTROL SAMPLES

Duplicate Samples

Original Sample No.	Duplicate Sample No.

Blank Samples

Type	Sample No.

Other Samples

Type	Sample No.

Harding Lawson Associates
Engineers and Geoscientists

GROUND-WATER SAMPLING FORM

Well No. MW-16
Well Type: ☑ Monitor ☐ Extraction ☐ Other
Well Material: ☑ PVC ☐ St. Steel ☐ Other
Date 6-25-91 Time 1630
Sampled by RWE - DME (Initials)

Job Name Carnation
Job Number 20294. 002.02
Recorded by [signature] (Signature)

WELL PURGING

PURGE VOLUME
Casing Diameter (D in inches):
☑ 2-inch ☐ 4-inch ☐ 6-inch ☐ Other
Total Depth of Casing (TD in feet BTOC): 20.6
Water Level Depth (WL in feet BTOC): 9.08
Number of Well Volumes to be purged (# Vols)
☑ 3 ☐ 4 ☐ 5 ☐ 10 ☐ Other

PURGE METHOD
☑ Bailer - Type: S.S.
☐ Submersible ☐ Centrifugal ☐ Bladder; Pump No.:
☐ Other - Type:

PUMP INTAKE SETTING
☐ Near Bottom ☐ Near Top ☐ Other
Depth in feet (BTOC): Screen Interval in feet (BTOC): from to

PURGE VOLUME CALCULATION
$\left(\underset{TD\ (feet)}{20.6} - \underset{WL\ (feet)}{9.08} \right) \times \underset{D\ (inches)}{2}^{2} \times \underset{\#\ Vols}{3} \times 0.0408 = \underset{Calculated\ Purge\ Volume}{6}$ gallons

PURGE TIME
1617 Start 1623 Stop 6-min Elapsed

PURGE RATE
Initial - gpm Final - gpm

ACTUAL PURGE VOLUME
6 gallons

FIELD PARAMETER MEASUREMENT

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T ☑°C ☐°F	Other turb
initial	5.8	775	18.5	>100
3 - gals	6.3	750	18.0	
6 "	6.3	775	18.0	>100

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T ☐°C ☐°F	Other
Meter Nos.				

Observations During Purging (Well Condition, Turbidity, Color, Odor): silty brown roots
Discharge Water Disposal: ☐ Sanitary Sewer ☐ Storm Sewer ☑ Other baker tank

WELL SAMPLING

SAMPLING METHOD
☑ Bailer - Type: S.S.
☐ Submersible ☐ Centrifugal ☐ Bladder; Pump No.:
☐ Same As Above
☐ Grab - Type:
☐ Other - Type:

SAMPLE DISTRIBUTION
Sample Series: 9106

Sample No.	Volume/Cont.	Analysis Requested	Preservatives	Lab	Comments
2513	3 VOA	8015 gas	HCL	Net	
	2 lAG	" diesel	—	↓	
	1 "	O&G	H2SO4		

QUALITY CONTROL SAMPLES

Duplicate Samples

Original Sample No.	Duplicate Sample No.

Blank Samples

Type	Sample No.

Other Samples

Type	Sample No.

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Engineers and Geoscientists

GROUND-WATER SAMPLING FORM

Well No. MW-25 B (street)
Well Type: ☑ Monitor ☐ Extraction ☐ Other _____
Well Material: ☑ PVC ☐ St. Steel ☐ Other _____
Date 6-26-91 Time 1152
Sampled by RWE · DME (Initials)

Job Name Carnation
Job Number 20194.002.02
Recorded by Rick Eaton (Signature)

WELL PURGING

PURGE VOLUME

Casing Diameter (D in inches):
☐ 2-inch ☑ 4-inch ☐ 6-inch ☐ Other _____
Total Depth of Casing (TD in feet BTOC): 19.5
Water Level Depth (WL in feet BTOC): 7.25
Number of Well Volumes to be purged (# Vols)
☑ 3 ☐ 4 ☐ 5 ☐ 10 ☐ Other _____

PURGE METHOD

☐ Bailer - Type: _____
☐ Submersible ☑ Centrifugal ☐ Bladder; Pump No.: _____
☐ Other - Type: _____

PUMP INTAKE SETTING

☑ Near Bottom ☐ Near Top ☐ Other _____
Depth in feet (BTOC): _____ Screen Interval in feet (BTOC): from _____ to _____

PURGE VOLUME CALCULATION

$\left(\frac{19.5}{\text{TD (feet)}} - \frac{7.25}{\text{WL (feet)}}\right) \times \frac{4^2}{\text{D (inches)}} \times \frac{3}{\text{\# Vols}} \times 0.0408 = \frac{24}{\text{Calculated Purge Volume}}$ gallons

PURGE TIME

1130 Start 1141 Stop 11 min Elapsed

PURGE RATE

Initial 2 gpm Final — gpm

ACTUAL PURGE VOLUME

10 gallons

FIELD PARAMETER MEASUREMENT

dry @ 10-gals

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T ☑ °C ☐ °F	Other turb
initial	6.3	235	17.0	> 100

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T ☐ °C ☐ °F	Other
Meter Nos.				

final WL = 14.42 @ 1149

Observations During Purging (Well Condition, Turbidity, Color, Odor): silty brown
Discharge Water Disposal: ☐ Sanitary Sewer ☐ Storm Sewer ☑ Other baker tank

WELL SAMPLING

SAMPLING METHOD

☑ Bailer - Type: S.S.
☐ Submersible ☐ Centrifugal ☐ Bladder; Pump No.: _____

☐ Same As Above
☐ Grab - Type: _____
☐ Other - Type: _____

SAMPLE DISTRIBUTION

Sample Series: 9106

Sample No.	Volume/Cont.	Analysis Requested	Preservatives	Lab	Comments
25B07	3 - VOA	8015-G, 8020	HCl	NET	
	2 Amb	" D	-	"	

QUALITY CONTROL SAMPLES

Duplicate Samples

Original Sample No.	Duplicate Sample No.

Blank Samples

Type	Sample No.

Other Samples

Type	Sample No.

Harding Lawson Associates
Engineers and Geoscientists

GROUND-WATER SAMPLING FORM

Well No. MW-26
Well Type: ☒ Monitor ☐ Extraction ☐ Other ____
Well Material: ☒ PVC ☐ St. Steel ☐ Other ____
Job Name Canada
Job Number 20294.002.02
Date 6-26-91 Time 1235
Recorded by Rick Evans (Signature)
Sampled by RLE-DMS (Initials)

WELL PURGING

PURGE VOLUME

Casing Diameter (D in inches):
☐ 2-inch ☒ 4-inch ☐ 6-inch ☐ Other ____
Total Depth of Casing (TD in feet BTOC): 25.0
Water Level Depth (WL in feet BTOC): 3.29
Number of Well Volumes to be purged (# Vols)
☒ 3 ☐ 4 ☐ 5 ☐ 10 ☐ Other ____

PURGE METHOD

☐ Bailer - Type: ____
☐ Submersible ☒ Centrifugal ☐ Bladder; Pump No.: ____
☐ Other - Type: ____

PUMP INTAKE SETTING

☒ Near Bottom ☐ Near Top ☐ Other ____
Depth in feet (BTOC): 20 Screen Interval in feet (BTOC): from ____ to ____

PURGE VOLUME CALCULATION

$(25.0 - 3.29) \times 4^2 \times 3 \times 0.0408 = 35$ gallons

(TD (feet) − WL (feet)) × D (inches)² × # Vols × 0.0408 = Calculated Purge Volume

PURGE TIME

1205 Start 1210 Stop 5 min Elapsed

PURGE RATE

Initial 7 gpm Final 7 gpm

ACTUAL PURGE VOLUME

35 gallons

FIELD PARAMETER MEASUREMENT

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T ☒ °C ☐ °F	Other turb
initial	6.5	525	19.5	9 NTU
15 gals	6.5	600	19.5	
35 "	6.5	600	20.0	70 NTU

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T ☐ °C ☐ °F	Other
Meter Nos.				

Observations During Purging (Well Condition, Turbidity, Color, Odor): slightly turbid sheen HC odor
Discharge Water Disposal: ☐ Sanitary Sewer ☐ Storm Sewer ☒ Other broken tank

WELL SAMPLING

SAMPLING METHOD

☒ Bailer - Type: S.S.
☐ Submersible ☐ Centrifugal ☐ Bladder; Pump No.: ____
☐ Same As Above
☐ Grab - Type: ____
☐ Other - Type: ____

SAMPLE DISTRIBUTION

Sample Series: 9106

Sample No.	Volume/Cont.	Analysis Requested	Preservatives	Lab	Comments
2608	6 VOA	8015-G, 8240	HCl	Net	
	2 1 AGL	" D	-		
	1 1 AGL	O&G	H_2SO_4		

QUALITY CONTROL SAMPLES

Duplicate Samples

Original Sample No.	Duplicate Sample No.
2608	2609

Blank Samples

Type	Sample No.

Other Samples

Type	Sample No.

Harding Lawson Associates
Engineers and Geoscientists

GROUND-WATER SAMPLING FORM

Well No. MW-23
Well Type: ☒ Monitor ☐ Extraction ☐ Other
Well Material: ☒ PVC ☐ St. Steel ☐ Other
Job Name Canadian
Job Number 20294.002.07
Date 6-26-91 Time 1308
Recorded by (Signature)
Sampled by RWE - DWT (Initials)

WELL PURGING

PURGE VOLUME

Casing Diameter (D in inches):
☐ 2-inch ☒ 4-inch ☐ 6-inch ☐ Other
Total Depth of Casing (TD in feet BTOC): 23.9
Water Level Depth (WL in feet BTOC): 8.48
Number of Well Volumes to be purged (# Vols)
☒ 3 ☐ 4 ☐ 5 ☐ 10 ☐ Other

PURGE METHOD

☐ Bailer - Type:
☐ Submersible ☒ Centrifugal ☐ Bladder; Pump No.:
☐ Other - Type:

PUMP INTAKE SETTING

☐ Near Bottom ☐ Near Top ☐ Other
Depth in feet (BTOC): 20 Screen Interval in feet (BTOC): from to

PURGE VOLUME CALCULATION

$$\left(\frac{23.9}{\text{TD (feet)}} - \frac{8.48}{\text{WL (feet)}}\right) \times \frac{4^2}{\text{D (inches)}} \times \frac{3}{\text{\# Vols}} \times 0.0408 = \frac{30}{\text{Calculated Purge Volume}} \text{ gallons}$$

PURGE TIME

1253 Start 1302 Stop 5 m Elapsed

PURGE RATE

Initial 7 gpm Final 7 gpm

ACTUAL PURGE VOLUME

30 gallons

FIELD PARAMETER MEASUREMENT

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T ☒ °C ☐ °F	Other turb
initial	6.6	230	20.5	>100
15 gals	6.7	170	20.0	
30 "	6.7	160	20.0	>100

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T ☐ °C ☐ °F	Other
Meter Nos.				

Observations During Purging (Well Condition, Turbidity, Color, Odor): silty brown
Discharge Water Disposal: ☐ Sanitary Sewer ☐ Storm Sewer ☒ Other baker tank

WELL SAMPLING

SAMPLING METHOD

☐ Same As Above
☐ Bailer - Type:
☐ Grab - Type:
☐ Submersible ☐ Centrifugal ☐ Bladder; Pump No.:
☐ Other - Type:

SAMPLE DISTRIBUTION

Sample Series: 9106

Sample No.	Volume/Cont.	Analysis Requested	Preservatives	Lab	Comments
2610	3 VOA	BOLS-G BOND	HCL	NET	
	2 L AG	" D	-	"	

QUALITY CONTROL SAMPLES

Duplicate Samples

Original Sample No.	Duplicate Sample No.

Blank Samples

Type	Sample No.
FB-2	2611

Other Samples

Type	Sample No.

Harding Lawson Associates
Engineers and Geoscientists

GROUND-WATER SAMPLING FORM

Job Name: Carnation
Job Number: 20294.003.02
Recorded by: Rick Erikson (Signature)

Well No.: MW-28
Well Type: ☒ Monitor ☐ Extraction ☐ Other
Well Material: ☒ PVC ☐ St. Steel ☐ Other
Date: 6-26-91 Time: 0810
Sampled by: RWE · DWE (Initials)

WELL PURGING

PURGE VOLUME

Casing Diameter (D in inches):
☐ 2-inch ☒ 4-inch ☐ 6-inch ☐ Other
Total Depth of Casing (TD in feet BTOC): 25.1
Water Level Depth (WL in feet BTOC): 7.83
Number of Well Volumes to be purged (# Vols)
☒ 3 ☐ 4 ☐ 5 ☐ 10 ☐ Other

PURGE METHOD

☐ Bailer - Type:
☐ Submersible ☒ Centrifugal ☐ Bladder; Pump No.:
☐ Other - Type:

PUMP INTAKE SETTING

☐ Near Bottom ☐ Near Top ☐ Other
Depth in feet (BTOC): 20 Screen Interval in feet (BTOC): from ___ to ___

PURGE VOLUME CALCULATION

$$(25.1 - 7.83) \times 4^2 \times 3 \times 0.0408 = 34 \text{ gallons}$$

(TD (feet) − WL (feet)) X D² (inches) X # Vols X 0.0408 = Calculated Purge Volume

PURGE TIME

0759 Start 0804 Stop 5 min Elapsed

PURGE RATE

Initial 7 gpm Final 7 gpm

ACTUAL PURGE VOLUME

35 gallons

FIELD PARAMETER MEASUREMENT

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T ☒°C ☐°F	Other turb
initial	6.3	240	17.0	>100
15-gals	6.8	210	18.5	
34 "	6.8	230	19.0	>100

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T ☐°C ☐°F	Other
Meter Nos.				

Observations During Purging (Well Condition, Turbidity, Color, Odor): silty brown
Discharge Water Disposal: ☐ Sanitary Sewer ☐ Storm Sewer ☒ Other baker tank

WELL SAMPLING

SAMPLING METHOD

☒ Bailer - Type: S.S.
☐ Submersible ☐ Centrifugal ☐ Bladder; Pump No.:
☐ Same As Above
☐ Grab - Type:
☐ Other - Type:

SAMPLE DISTRIBUTION

Sample Series: 9106

Sample No.	Volume/Cont.	Analysis Requested	Preservatives	Lab	Comments
2601	3-VOA	8015-gas, 8020	HCL	Nat	
	2 L Ab	" diesel			

QUALITY CONTROL SAMPLES

Duplicate Samples

Original Sample No.	Duplicate Sample No.

Blank Samples

Type	Sample No.

Other Samples

Type	Sample No.

Harding Lawson Associates
Engineers and Geoscientists

GROUND-WATER SAMPLING FORM

Job Name Carnation
Job Number 20294.002.02
Recorded by Bill Carlson (Signature)

Well No. MW-29
Well Type: ☑ Monitor ☐ Extraction ☐ Other
Well Material: ☑ PVC ☐ St. Steel ☐ Other
Date 6-26-91 Time 0940
Sampled by RWE - DWE (Initials)

WELL PURGING

PURGE VOLUME

Casing Diameter (D in Inches):
☐ 2-inch ☑ 4-inch ☐ 6-inch ☐ Other
Total Depth of Casing (TD in feet BTOC): 22.8
Water Level Depth (WL in feet BTOC): 7.18
Number of Well Volumes to be purged (# Vols)
☑ 3 ☐ 4 ☐ 5 ☐ 10 ☐ Other

PURGE METHOD

☐ Bailer - Type:
☐ Submersible ☑ Centrifugal ☐ Bladder; Pump No.:
☐ Other - Type:

PUMP INTAKE SETTING

☐ Near Bottom ☐ Near Top ☐ Other
Depth in feet (BTOC): 20 Screen Interval in feet (BTOC): from to

PURGE VOLUME CALCULATION

$$\left(\underset{\text{TD (feet)}}{22.8} - \underset{\text{WL (feet)}}{7.18}\right) \times \underset{\text{D (inches)}}{4}^{2} \times \underset{\text{\# Vols}}{3} \times 0.0408 = \underset{\text{Calculated Purge Volume}}{31} \text{ gallons}$$

PURGE TIME

0824 Start 0829 Stop 5 min Elapsed

PURGE RATE

Initial 7 gpm Final 7 gpm

ACTUAL PURGE VOLUME

31 gallons

FIELD PARAMETER MEASUREMENT

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T ☑ °C ☐ °F	Other turb
initial	7.5	175	18.5	>100
15 gals	7.0	295	18.5	
30+	7.0	240	18.5	>100

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T ☐ °C ☐ °F	Other
Meter Nos.				

Observations During Purging (Well Condition, Turbidity, Color, Odor): sl. cloudy brown
Discharge Water Disposal: ☐ Sanitary Sewer ☐ Storm Sewer ☑ Other baker tank

WELL SAMPLING

SAMPLING METHOD

☑ Bailer - Type: S.S.
☐ Submersible ☐ Centrifugal ☐ Bladder; Pump No.:
☐ Same As Above
☐ Grab - Type:
☐ Other - Type:

SAMPLE DISTRIBUTION

Sample Series: 9106

Sample No.	Volume/Cont.	Analysis Requested	Preservatives	Lab	Comments
2602	6 VOA	8015-G, 8240	HCl	Net	
	2 1 Al	" D	-		
	1 "	O&G	H_2SO_4		

QUALITY CONTROL SAMPLES

Duplicate Samples

Original Sample No.	Duplicate Sample No.

Blank Samples

Type	Sample No.

Other Samples

Type	Sample No.

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Harding Lawson Associates
Engineers and Geoscientists

GROUND-WATER SAMPLING FORM

Well No. mw-31
Well Type: ☑ Monitor ☐ Extraction ☐ Other
Well Material: ☑ PVC ☐ St. Steel ☐ Other
Date 6-26-91 Time 0912
Sampled by RWE · DMT (Initials)

Job Name Carnation
Job Number 20294.003.02
Recorded by Rick E[illegible] (Signature)

WELL PURGING

PURGE VOLUME

Casing Diameter (D in inches):
☐ 2-inch ☑ 4-inch ☐ 6-inch ☐ Other

Total Depth of Casing (TD in feet BTOC): 24.0
Water Level Depth (WL in feet BTOC): 9.55
Number of Well Volumes to be purged (# Vols)
☑ 3 ☐ 4 ☐ 5 ☐ 10 ☐ Other

PURGE METHOD

☐ Bailer - Type:
☐ Submersible ☑ Centrifugal ☐ Bladder; Pump No.:
☐ Other - Type:

PUMP INTAKE SETTING

☐ Near Bottom ☐ Near Top ☐ Other
Depth in feet (BTOC): 20 Screen Interval in feet (BTOC): from ___ to ___

PURGE VOLUME CALCULATION

(24.0 TD (feet) − 9.55 WL (feet)) X 4² D (inches) X 3 # Vols X 0.0408 = 28 Calculated Purge Volume gallons

PURGE TIME

0906 Start 0910 Stop 4 min Elapsed

PURGE RATE

Initial 7 gpm Final 7 gpm

ACTUAL PURGE VOLUME

28 gallons

FIELD PARAMETER MEASUREMENT

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T ☑ °C ☐ °F	Other turb
initial	6.6	400	19.5	>100
15-gals	6.4	500	21.5	
28-	6.5	500	21.0	>100

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T ☐ °C ☐ °F	Other
Meter Nos.				

Observations During Purging (Well Condition, Turbidity, Color, Odor): silty brown
Discharge Water Disposal: ☐ Sanitary Sewer ☐ Storm Sewer ☑ Other baker tank

WELL SAMPLING

SAMPLING METHOD

☑ Bailer - Type: S.S.
☐ Submersible ☐ Centrifugal ☐ Bladder; Pump No.:
☐ Same As Above
☐ Grab - Type:
☐ Other - Type:

SAMPLE DISTRIBUTION

Sample Series: 9106

Sample No.	Volume/Cont.	Analysis Requested	Preservatives	Lab	Comments
2603	3 VOA	8015-G, 8020	HCl	NET	
	2 l Am	" D	–	"	

QUALITY CONTROL SAMPLES

Duplicate Samples

Original Sample No.	Duplicate Sample No.

Blank Samples

Type	Sample No.

Other Samples

Type	Sample No.

Harding Lawson Associates
Engineers and Geoscientists

GROUND-WATER SAMPLING FORM

Well No. MW-32
Well Type: ☒ Monitor ☐ Extraction ☐ Other ____
Well Material: ☒ PVC ☐ St. Steel ☐ Other ____
Job Name Carnation
Job Number 20999.002.02
Date 6-26-91 Time 0945
Recorded by ____ (Signature)
Sampled by RWS, DMT (Initials)

WELL PURGING

PURGE VOLUME

Casing Diameter (D in inches):
☐ 2-inch ☑ 4-inch ☐ 6-inch ☐ Other ____
Total Depth of Casing (TD in feet BTOC): 23.1
Water Level Depth (WL in feet BTOC): 9.64
Number of Well Volumes to be purged (# Vols)
☑ 3 ☐ 4 ☐ 5 ☐ 10 ☐ Other ____

PURGE METHOD

☐ Bailer - Type: ____
☐ Submersible ☑ Centrifugal ☐ Bladder; Pump No.: ____
☐ Other - Type: ____

PUMP INTAKE SETTING

☑ Near Bottom ☐ Near Top ☐ Other ____
Depth in feet (BTOC): 20 Screen Interval in feet (BTOC):
from ____ to ____

PURGE VOLUME CALCULATION

$$\left(\underset{\text{TD (feet)}}{23.1} - \underset{\text{WL (feet)}}{9.64}\right) \times \underset{\text{D (inches)}}{4}{}^{2} \times \underset{\text{\# Vols}}{3} \times 0.0408 = \underset{\text{Calculated Purge Volume}}{26} \text{ gallons}$$

PURGE TIME

0932 Start 0938 Stop 6 min Elapsed

PURGE RATE

Initial 3 gpm Final ~~sample~~ gpm

ACTUAL PURGE VOLUME

26 gallons

FIELD PARAMETER MEASUREMENT

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T ☒ °C ☐ °F	Other turb
initial	6.4	800	19.5	2100
15-gals	6.5	800	20.0	
26-	6.5	750	20.0	2100

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T ☐ °C ☐ °F	Other ____
Meter Nos.				

Observations During Purging (Well Condition, Turbidity, Color, Odor): silty brown water sediment removed
Discharge Water Disposal: ☐ Sanitary Sewer ☐ Storm Sewer ☑ Other baker tank

WELL SAMPLING

SAMPLING METHOD

☑ Bailer - Type: S.S.
☐ Submersible ☐ Centrifugal ☐ Bladder; Pump No.: ____
☐ Same As Above
☐ Grab - Type: ____
☐ Other - Type: ____

SAMPLE DISTRIBUTION

Sample Series: 9105

Sample No.	Volume/Cont.	Analysis Requested	Preservatives	Lab	Comments
2604	6 VOA	B015-6, B240	HCl	NET	
	2 L Amb	" D	-		
	1 "	O&G	H_2SO_4	1	

QUALITY CONTROL SAMPLES

Duplicate Samples		Blank Samples		Other Samples	
Original Sample No.	Duplicate Sample No.	Type	Sample No.	Type	Sample No.

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Appendix B

GROUNDWATER CHEMISTRY LABORATORY RESULTS AND CHAIN OF CUSTODY FORMS

NET NATIONAL ENVIRONMENTAL TESTING, INC.

NET Pacific, Inc.
435 Tesconi Circle
Santa Rosa, CA 95401
Tel: (707) 526-7200
Fax: (707) 526-9623

Bruce Scheibach
Harding Lawson Associates
200 Rush Landing
Novato, CA 94947

Date: 07-16-91
NET Client Acct. No: 281
NET Pacific Log No: 8296
Received: 06-25-91 1752

Client Reference Information

Carnation-Oakland, Job: 20294,007.02

Sample analysis in support of the project referenced above has been completed and results are presented on following pages. Please refer to the enclosed "Key to Abbreviations" for definition of terms. Should you have questions regarding procedures or results, please feel welcome to contact Client Services.

Approved by:

Jules Skamarack
Laboratory Manager

Enclosure(s)

NET Pacific, Inc.

Client Acct: 281 Date: 07-16-91
Client Name: Harding Lawson Associates Page: 2
NET Log No: 8296

Ref: Carnation-Oakland, Job: 20294,007.02

SAMPLE DESCRIPTION: 91062501 06-25-91 0930
LAB Job No: (-89669)

Parameter	Method	Reporting Limit	Results	Units
Oil & Grease(Total)	EPA9070	5	ND	mg/L
Oil & Grease(Non-Polar)	SM5520BF	5	ND	mg/L
PETROLEUM HYDROCARBONS			--	
VOLATILE (WATER)			--	
DILUTION FACTOR *			1	
DATE ANALYZED			07-08-91	
METHOD GC FID/5030			--	
as Gasoline		0.05	ND	mg/L
PETROLEUM HYDROCARBONS			--	
EXTRACTABLE (WATER)			--	
DILUTION FACTOR *			1	
DATE EXTRACTED			06-28-91	
DATE ANALYZED			07-02-91	
METHOD GC FID/3510			--	
as Diesel		0.05	ND	mg/L
as Motor Oil		0.5	ND	mg/L

Ref: Carnation-Oakland, Job: 20294,007.02

SAMPLE DESCRIPTION: 91062501 06-25-91 0930
LAB Job No: (-89669)

Parameter	Method	Reporting Limit	Results	Units
METHOD 8240				
DATE ANALYZED			07-02-91	
DILUTION FACTOR *			1	
Acetone		10	ND	ug/L
Benzene		5.0	ND	ug/L
Bromodichloromethane		5.0	ND	ug/L
Bromoform		5.0	ND	ug/L
Bromomethane		5.0	ND	ug/L
2-Butanone		10	ND	ug/L
Carbon Disulfide		5.0	ND	ug/L
Carbon Tetrachloride		5.0	ND	ug/L
Chlorobenzene		5.0	ND	ug/L
Chloroethane		5.0	ND	ug/L
2-Chloroethyl Vinyl Ether		10	ND	ug/L
Chloroform		5.0	ND	ug/L
Chloromethane		5.0	ND	ug/L
Dibromochloromethane		5.0	ND	ug/L
1,2-Dichlorobenzene		6.0	ND	ug/L
1,3-Dichlorobenzene		6.0	ND	ug/L
1,4-Dichlorobenzene		6.0	ND	ug/L
1,1-Dichloroethane		5.0	ND	ug/L
1,2-Dichloroethane		5.0	ND	ug/L
1,1-Dichloroethene		5.0	ND	ug/L
trans-1,2-Dichloroethene		5.0	ND	ug/L
1,2-Dichloropropane		5.0	ND	ug/L
cis-1,3-Dichloropropene		5.0	ND	ug/L
trans-1,3-Dichloropropene		5.0	ND	ug/L
Ethylbenzene		5.0	ND	ug/L
2-Hexanone		10	ND	ug/L
Methylene Chloride		5.0	ND	ug/L
4-Methyl-2-pentanone		10	ND	ug/L
Styrene		5.0	ND	ug/L
1,1,2,2-Tetrachloroethane		5.0	ND	ug/L
Tetrachloroethene		5.0	ND	ug/L
Toluene		5.0	ND	ug/L
1,1,1-Trichloroethane		5.0	ND	ug/L
1,1,2-Trichloroethane		5.0	ND	ug/L
Trichloroethene		5.0	ND	ug/L
Trichlorofluoromethane		5.0	ND	ug/L
Vinyl acetate		10	ND	ug/L
Vinyl chloride		5.0	ND	ug/L
Xylenes, total		5.0	ND	ug/L
SURROGATE RESULTS			--	
Toluene-d8			95	% Rec.
Bromofluorobenzene			92	% Rec.
1,2-Dichloroethane-d4			85	% Rec.

Ref: Carnation-Oakland, Job: 20294,007.02

SAMPLE DESCRIPTION: 91062502 06-25-91 1000
LAB Job No: (-89670)

Parameter	Method	Reporting Limit	Results	Units
Oil & Grease(Total)	EPA9070	5	ND	mg/L
Oil & Grease(Non-Polar)	SM5520BF	5	ND	mg/L
PETROLEUM HYDROCARBONS			--	
VOLATILE (WATER)			--	
DILUTION FACTOR *			1	
DATE ANALYZED			07-08-91	
METHOD GC FID/5030			--	
as Gasoline		0.05	ND	mg/L
PETROLEUM HYDROCARBONS			--	
EXTRACTABLE (WATER)			--	
DILUTION FACTOR *			1	
DATE EXTRACTED			06-28-91	
DATE ANALYZED			07-02-91	
METHOD GC FID/3510			--	
as Diesel		0.05	ND	mg/L
as Motor Oil		0.5	ND	mg/L

Ref: Carnation-Oakland, Job: 20294,007.02

SAMPLE DESCRIPTION: 91062502 06-25-91 1000
LAB Job No: (-89670)

Parameter	Method	Reporting Limit	Results	Units
METHOD 8240				
DATE ANALYZED			07-02-91	
DILUTION FACTOR *			1	
Acetone		10	ND	ug/L
Benzene		5.0	ND	ug/L
Bromodichloromethane		5.0	ND	ug/L
Bromoform		5.0	ND	ug/L
Bromomethane		5.0	ND	ug/L
2-Butanone		10	ND	ug/L
Carbon Disulfide		5.0	ND	ug/L
Carbon Tetrachloride		5.0	ND	ug/L
Chlorobenzene		5.0	ND	ug/L
Chloroethane		5.0	ND	ug/L
2-Chloroethyl Vinyl Ether		10	ND	ug/L
Chloroform		5.0	ND	ug/L
Chloromethane		5.0	ND	ug/L
Dibromochloromethane		5.0	ND	ug/L
1,2-Dichlorobenzene		6.0	ND	ug/L
1,3-Dichlorobenzene		6.0	ND	ug/L
1,4-Dichlorobenzene		6.0	ND	ug/L
1,1-Dichloroethane		5.0	ND	ug/L
1,2-Dichloroethane		5.0	ND	ug/L
1,1-Dichloroethene		5.0	ND	ug/L
trans-1,2-Dichloroethene		5.0	ND	ug/L
1,2-Dichloropropane		5.0	ND	ug/L
cis-1,3-Dichloropropene		5.0	ND	ug/L
trans-1,3-Dichloropropene		5.0	ND	ug/L
Ethylbenzene		5.0	ND	ug/L
2-Hexanone		10	ND	ug/L
Methylene Chloride		5.0	ND	ug/L
4-Methyl-2-pentanone		10	ND	ug/L
Styrene		5.0	ND	ug/L
1,1,2,2-Tetrachloroethane		5.0	ND	ug/L
Tetrachloroethene		5.0	ND	ug/L
Toluene		5.0	ND	ug/L
1,1,1-Trichloroethane		5.0	ND	ug/L
1,1,2-Trichloroethane		5.0	ND	ug/L
Trichloroethene		5.0	ND	ug/L
Trichlorofluoromethane		5.0	ND	ug/L
Vinyl acetate		10	ND	ug/L
Vinyl chloride		5.0	ND	ug/L
Xylenes, total		5.0	ND	ug/L
SURROGATE RESULTS			--	
Toluene-d8			97	% Rec.
Bromofluorobenzene			101	% Rec.
1,2-Dichloroethane-d4			92	% Rec.

NET Pacific, Inc

Client Acct: 281 Date: 07-16-91
Client Name: Harding Lawson Associates Page: 6
NET Log No: 8296

Ref: Carnation-Oakland, Job: 20294,007.02

SAMPLE DESCRIPTION: 91062506 06-25-91 1315
LAB Job No: (-89671)

Parameter	Method	Reporting Limit	Results	Units
Oil & Grease(Total)	EPA9070	5	ND	mg/L
Oil & Grease(Non-Polar)	SM5520BF	5	ND	mg/L
PETROLEUM HYDROCARBONS			--	
VOLATILE (WATER)			--	
DILUTION FACTOR *			1	
DATE ANALYZED			07-02-91	
METHOD GC FID/5030			--	
as Gasoline		0.05	ND	mg/L
PETROLEUM HYDROCARBONS			--	
EXTRACTABLE (WATER)			--	
DILUTION FACTOR *			1	
DATE EXTRACTED			06-28-91	
DATE ANALYZED			07-02-91	
METHOD GC FID/3510			--	
as Diesel		0.05	ND	mg/L
as Motor Oil		0.5	ND	mg/L

Ref: Carnation-Oakland, Job: 20294,007.02

SAMPLE DESCRIPTION: 91062506 06-25-91 1315
LAB Job No: (-89671)

Parameter	Method	Reporting Limit	Results	Units
METHOD 8240				
DATE ANALYZED			07-03-91	
DILUTION FACTOR *			1	
Acetone		10	ND	ug/L
Benzene		5.0	ND	ug/L
Bromodichloromethane		5.0	ND	ug/L
Bromoform		5.0	ND	ug/L
Bromomethane		5.0	ND	ug/L
2-Butanone		10	ND	ug/L
Carbon Disulfide		5.0	ND	ug/L
Carbon Tetrachloride		5.0	ND	ug/L
Chlorobenzene		5.0	ND	ug/L
Chloroethane		5.0	ND	ug/L
2-Chloroethyl Vinyl Ether		10	ND	ug/L
Chloroform		5.0	ND	ug/L
Chloromethane		5.0	ND	ug/L
Dibromochloromethane		5.0	ND	ug/L
1,2-Dichlorobenzene		6.0	ND	ug/L
1,3-Dichlorobenzene		6.0	ND	ug/L
1,4-Dichlorobenzene		6.0	ND	ug/L
1,1-Dichloroethane		5.0	ND	ug/L
1,2-Dichloroethane		5.0	ND	ug/L
1,1-Dichloroethene		5.0	ND	ug/L
trans-1,2-Dichloroethene		5.0	ND	ug/L
1,2-Dichloropropane		5.0	ND	ug/L
cis-1,3-Dichloropropene		5.0	ND	ug/L
trans-1,3-Dichloropropene		5.0	ND	ug/L
Ethylbenzene		5.0	ND	ug/L
2-Hexanone		10	ND	ug/L
Methylene Chloride		5.0	ND	ug/L
4-Methyl-2-pentanone		10	ND	ug/L
Styrene		5.0	ND	ug/L
1,1,2,2-Tetrachloroethane		5.0	ND	ug/L
Tetrachloroethene		5.0	ND	ug/L
Toluene		5.0	ND	ug/L
1,1,1-Trichloroethane		5.0	ND	ug/L
1,1,2-Trichloroethane		5.0	ND	ug/L
Trichloroethene		5.0	ND	ug/L
Trichlorofluoromethane		5.0	ND	ug/L
Vinyl acetate		10	ND	ug/L
Vinyl chloride		5.0	ND	ug/L
Xylenes, total		5.0	ND	ug/L
SURROGATE RESULTS			--	
Toluene-d8			99	% Rec.
Bromofluorobenzene			100	% Rec.
1,2-Dichloroethane-d4			105	% Rec.

Ref: Carnation-Oakland, Job: 20294,007.02

SAMPLE DESCRIPTION: 91062509 06-25-91 1445
LAB Job No: (-89672)

Parameter	Method	Reporting Limit	Results	Units
Oil & Grease(Total)	EPA9070	5	ND	mg/L
Oil & Grease(Non-Polar)	SM5520BF	5	ND	mg/L
PETROLEUM HYDROCARBONS			--	
VOLATILE (WATER)			--	
DILUTION FACTOR *			1	
DATE ANALYZED			07-08-91	
METHOD GC FID/5030			--	
as Gasoline		0.05	ND	mg/L
PETROLEUM HYDROCARBONS			--	
EXTRACTABLE (WATER)			--	
DILUTION FACTOR *			1	
DATE EXTRACTED			06-28-91	
DATE ANALYZED			07-02-91	
METHOD GC FID/3510			--	
as Diesel		0.05	ND	mg/L
as Motor Oil		0.5	ND	mg/L

Ref: Carnation-Oakland, Job: 20294,007.02

SAMPLE DESCRIPTION: 91062509 06-25-91 1445
LAB Job No: (-89672)

Parameter	Method	Reporting Limit	Results	Units
METHOD 8240				
DATE ANALYZED			07-03-91	
DILUTION FACTOR *			1	
Acetone		10	ND	ug/L
Benzene		5.0	ND	ug/L
Bromodichloromethane		5.0	ND	ug/L
Bromoform		5.0	ND	ug/L
Bromomethane		5.0	ND	ug/L
2-Butanone		10	ND	ug/L
Carbon Disulfide		5.0	ND	ug/L
Carbon Tetrachloride		5.0	ND	ug/L
Chlorobenzene		5.0	ND	ug/L
Chloroethane		5.0	ND	ug/L
2-Chloroethyl Vinyl Ether		10	ND	ug/L
Chloroform		5.0	ND	ug/L
Chloromethane		5.0	ND	ug/L
Dibromochloromethane		5.0	ND	ug/L
1,2-Dichlorobenzene		6.0	ND	ug/L
1,3-Dichlorobenzene		6.0	ND	ug/L
1,4-Dichlorobenzene		6.0	ND	ug/L
1,1-Dichloroethane		5.0	ND	ug/L
1,2-Dichloroethane		5.0	ND	ug/L
1,1-Dichloroethene		5.0	ND	ug/L
trans-1,2-Dichloroethene		5.0	ND	ug/L
1,2-Dichloropropane		5.0	ND	ug/L
cis-1,3-Dichloropropene		5.0	ND	ug/L
trans-1,3-Dichloropropene		5.0	ND	ug/L
Ethylbenzene		5.0	ND	ug/L
2-Hexanone		10	ND	ug/L
Methylene Chloride		5.0	ND	ug/L
4-Methyl-2-pentanone		10	ND	ug/L
Styrene		5.0	ND	ug/L
1,1,2,2-Tetrachloroethane		5.0	ND	ug/L
Tetrachloroethene		5.0	ND	ug/L
Toluene		5.0	ND	ug/L
1,1,1-Trichloroethane		5.0	ND	ug/L
1,1,2-Trichloroethane		5.0	ND	ug/L
Trichloroethene		5.0	ND	ug/L
Trichlorofluoromethane		5.0	ND	ug/L
Vinyl acetate		10	ND	ug/L
Vinyl chloride		5.0	ND	ug/L
Xylenes, total		5.0	ND	ug/L
SURROGATE RESULTS			--	
Toluene-d8			102	% Rec.
Bromofluorobenzene			104	% Rec.
1,2-Dichloroethane-d4			110	% Rec.

Ref: Carnation-Oakland, Job: 20294,007.02

SAMPLE DESCRIPTION: 91062503 06-25-91 1030
LAB Job No: (-89792)

Parameter	Method	Reporting Limit	Results	Units
PETROLEUM HYDROCARBONS			--	
VOLATILE (WATER)			--	
DILUTION FACTOR *			1	
DATE ANALYZED			07-08-91	
METHOD GC FID/5030			--	
as Gasoline		0.05	ND	mg/L
METHOD 602			--	
DILUTION FACTOR *			1	
DATE ANALYZED			07-08-91	
Benzene		0.5	ND	ug/L
Ethylbenzene		0.5	ND	ug/L
Toluene		0.5	ND	ug/L
Xylenes, total		0.5	ND	ug/L
PETROLEUM HYDROCARBONS			--	
EXTRACTABLE (WATER)			--	
DILUTION FACTOR *			1	
DATE EXTRACTED			06-28-91	
DATE ANALYZED			07-02-91	
METHOD GC FID/3510			--	
as Diesel		0.05	ND	mg/L
as Motor Oil		0.5	ND	mg/L

NET Pacific, Inc

Client Acct: 281 Date: 07-16-91
Client Name: Harding Lawson Associates Page: 11
NET Log No: 8296

Ref: Carnation-Oakland, Job: 20294,007.02

SAMPLE DESCRIPTION: 91062504 06-25-91 1115
LAB Job No: (-89793)

Parameter	Method	Reporting Limit	Results	Units
PETROLEUM HYDROCARBONS			--	
VOLATILE (WATER)			--	
DILUTION FACTOR *			1	
DATE ANALYZED			07-08-91	
METHOD GC FID/5030			--	
as Gasoline		0.05	ND	mg/L
METHOD 602			--	
DILUTION FACTOR *			1	
DATE ANALYZED			07-08-91	
Benzene		0.5	ND	ug/L
Ethylbenzene		0.5	ND	ug/L
Toluene		0.5	ND	ug/L
Xylenes, total		0.5	ND	ug/L
PETROLEUM HYDROCARBONS			--	
EXTRACTABLE (WATER)			--	
DILUTION FACTOR *			1	
DATE EXTRACTED			06-28-91	
DATE ANALYZED			07-02-91	
METHOD GC FID/3510			--	
as Diesel		0.05	ND	mg/L
as Motor Oil		0.5	ND	mg/L

Ref: Carnation-Oakland, Job: 20294,007.02

SAMPLE DESCRIPTION: 91062505 06-25-91 1230
LAB Job No: (-89794)

Parameter	Method	Reporting Limit	Results	Units
PETROLEUM HYDROCARBONS			--	
VOLATILE (WATER)			--	
DILUTION FACTOR *			1	
DATE ANALYZED			07-08-91	
METHOD GC FID/5030			--	
as Gasoline		0.05	ND	mg/L
METHOD 602			--	
DILUTION FACTOR *			1	
DATE ANALYZED			07-08-91	
Benzene		0.5	ND	ug/L
Ethylbenzene		0.5	ND	ug/L
Toluene		0.5	ND	ug/L
Xylenes, total		0.5	ND	ug/L
PETROLEUM HYDROCARBONS			--	
EXTRACTABLE (WATER)			--	
DILUTION FACTOR *			1	
DATE EXTRACTED			06-28-91	
DATE ANALYZED			07-02-91	
METHOD GC FID/3510			--	
as Diesel		0.05	ND	mg/L
as Motor Oil		0.5	ND	mg/L

Ref: Carnation-Oakland, Job: 20294,007.02

SAMPLE DESCRIPTION: 91062512 06-25-91 1600
LAB Job No: (-89795)

Parameter	Method	Reporting Limit	Results	Units
PETROLEUM HYDROCARBONS			--	
VOLATILE (WATER)			--	
DILUTION FACTOR *			1	
DATE ANALYZED			07-08-91	
METHOD GC FID/5030			--	
as Gasoline		0.05	ND	mg/L
METHOD 602			--	
DILUTION FACTOR *			1	
DATE ANALYZED			07-08-91	
Benzene		0.5	ND	ug/L
Ethylbenzene		0.5	ND	ug/L
Toluene		0.5	ND	ug/L
Xylenes, total		0.5	ND	ug/L
PETROLEUM HYDROCARBONS			--	
EXTRACTABLE (WATER)			--	
DILUTION FACTOR *			1	
DATE EXTRACTED			06-28-91	
DATE ANALYZED			07-02-91	
METHOD GC FID/3510			--	
as Diesel		0.05	ND	mg/L
as Motor Oil		0.5	ND	mg/L

Ref: Carnation-Oakland, Job: 20294,007.02

SAMPLE DESCRIPTION: 91062507 06-25-91 1345
LAB Job No: (-89799)

Parameter	Method	Reporting Limit	Results	Units
PETROLEUM HYDROCARBONS			--	
VOLATILE (WATER)			--	
DILUTION FACTOR *			1	
DATE ANALYZED			07-08-91	
METHOD GC FID/5030			--	
as Gasoline		0.05	ND	mg/L
PETROLEUM HYDROCARBONS			--	
EXTRACTABLE (WATER)			--	
DILUTION FACTOR *			1	
DATE EXTRACTED			06-28-91	
DATE ANALYZED			07-02-91	
METHOD GC FID/3510			--	
as Diesel		0.05	ND	mg/L
as Motor Oil		0.5	ND	mg/L

Ref: Carnation-Oakland, Job: 20294,007.02

SAMPLE DESCRIPTION: 91062507 06-25-91 1345
LAB Job No: (-89799)

Parameter	Method	Reporting Limit	Results	Units
METHOD 8240				
DATE ANALYZED			07-03-91	
DILUTION FACTOR *			1	
Acetone		10	ND	ug/L
Benzene		5.0	ND	ug/L
Bromodichloromethane		5.0	ND	ug/L
Bromoform		5.0	ND	ug/L
Bromomethane		5.0	ND	ug/L
2-Butanone		10	ND	ug/L
Carbon Disulfide		5.0	ND	ug/L
Carbon Tetrachloride		5.0	ND	ug/L
Chlorobenzene		5.0	ND	ug/L
Chloroethane		5.0	ND	ug/L
2-Chloroethyl Vinyl Ether		10	ND	ug/L
Chloroform		5.0	ND	ug/L
Chloromethane		5.0	ND	ug/L
Dibromochloromethane		5.0	ND	ug/L
1,2-Dichlorobenzene		6.0	ND	ug/L
1,3-Dichlorobenzene		6.0	ND	ug/L
1,4-Dichlorobenzene		6.0	ND	ug/L
1,1-Dichloroethane		5.0	ND	ug/L
1,2-Dichloroethane		5.0	ND	ug/L
1,1-Dichloroethene		5.0	ND	ug/L
trans-1,2-Dichloroethene		5.0	ND	ug/L
1,2-Dichloropropane		5.0	ND	ug/L
cis-1,3-Dichloropropene		5.0	ND	ug/L
trans-1,3-Dichloropropene		5.0	ND	ug/L
Ethylbenzene		5.0	ND	ug/L
2-Hexanone		10	ND	ug/L
Methylene Chloride		5.0	ND	ug/L
4-Methyl-2-pentanone		10	ND	ug/L
Styrene		5.0	ND	ug/L
1,1,2,2-Tetrachloroethane		5.0	ND	ug/L
Tetrachloroethene		5.0	ND	ug/L
Toluene		5.0	ND	ug/L
1,1,1-Trichloroethane		5.0	ND	ug/L
1,1,2-Trichloroethane		5.0	ND	ug/L
Trichloroethene		5.0	ND	ug/L
Trichlorofluoromethane		5.0	ND	ug/L
Vinyl acetate		10	ND	ug/L
Vinyl chloride		5.0	ND	ug/L
Xylenes, total		5.0	ND	ug/L
SURROGATE RESULTS			--	
Toluene-d8			104	% Rec.
Bromofluorobenzene			104	% Rec.
1,2-Dichloroethane-d4			112	% Rec.

NET Pacific, Inc

Client Acct: 281 Date: 07-16-91
Client Name: Harding Lawson Associates Page: 16
NET Log No: 8296

Ref: Carnation-Oakland, Job: 20294,007.02

SAMPLE DESCRIPTION: 91062508 06-25-91 1415
LAB Job No: (-89800)

Parameter	Method	Reporting Limit	Results	Units
PETROLEUM HYDROCARBONS			--	
VOLATILE (WATER)			--	
DILUTION FACTOR *			1	
DATE ANALYZED			07-08-91	
METHOD GC FID/5030			--	
as Gasoline		0.05	ND	mg/L
PETROLEUM HYDROCARBONS			--	
EXTRACTABLE (WATER)			--	
DILUTION FACTOR *			1	
DATE EXTRACTED			06-28-91	
DATE ANALYZED			07-02-91	
METHOD GC FID/3510			--	
as Diesel		0.05	ND	mg/L
as Motor Oil		0.5	ND	mg/L

NET Pacific, Inc

Client Acct: 281 Date: 07-16-91
Client Name: Harding Lawson Associates Page: 17
NET Log No: 8296

Ref: Carnation-Oakland, Job: 20294,007.02

SAMPLE DESCRIPTION: 91062508 06-25-91 1415
LAB Job No: (-89800)

Parameter	Method	Reporting Limit	Results	Units
METHOD 8240				
DATE ANALYZED			07-03-91	
DILUTION FACTOR *			1	
Acetone		10	ND	ug/L
Benzene		5.0	ND	ug/L
Bromodichloromethane		5.0	ND	ug/L
Bromoform		5.0	ND	ug/L
Bromomethane		5.0	ND	ug/L
2-Butanone		10	ND	ug/L
Carbon Disulfide		5.0	ND	ug/L
Carbon Tetrachloride		5.0	ND	ug/L
Chlorobenzene		5.0	ND	ug/L
Chloroethane		5.0	ND	ug/L
2-Chloroethyl Vinyl Ether		10	ND	ug/L
Chloroform		5.0	ND	ug/L
Chloromethane		5.0	ND	ug/L
Dibromochloromethane		5.0	ND	ug/L
1,2-Dichlorobenzene		6.0	ND	ug/L
1,3-Dichlorobenzene		6.0	ND	ug/L
1,4-Dichlorobenzene		6.0	ND	ug/L
1,1-Dichloroethane		5.0	ND	ug/L
1,2-Dichloroethane		5.0	ND	ug/L
1,1-Dichloroethene		5.0	ND	ug/L
trans-1,2-Dichloroethene		5.0	ND	ug/L
1,2-Dichloropropane		5.0	ND	ug/L
cis-1,3-Dichloropropene		5.0	ND	ug/L
trans-1,3-Dichloropropene		5.0	ND	ug/L
Ethylbenzene		5.0	ND	ug/L
2-Hexanone		10	ND	ug/L
Methylene Chloride		5.0	ND	ug/L
4-Methyl-2-pentanone		10	ND	ug/L
Styrene		5.0	ND	ug/L
1,1,2,2-Tetrachloroethane		5.0	ND	ug/L
Tetrachloroethene		5.0	ND	ug/L
Toluene		5.0	ND	ug/L
1,1,1-Trichloroethane		5.0	ND	ug/L
1,1,2-Trichloroethane		5.0	ND	ug/L
Trichloroethene		5.0	ND	ug/L
Trichlorofluoromethane		5.0	ND	ug/L
Vinyl acetate		10	ND	ug/L
Vinyl chloride		5.0	ND	ug/L
Xylenes, total		5.0	ND	ug/L
SURROGATE RESULTS			--	
Toluene-d8			103	% Rec.
Bromofluorobenzene			106	% Rec.
1,2-Dichloroethane-d4			111	% Rec.

Ref: Carnation-Oakland, Job: 20294,007,02

SAMPLE DESCRIPTION: 91062510 06-25-91 1515
LAB Job No: (-89805)

Parameter	Method	Reporting Limit	Results	Units
Oil & Grease(Total)	EPA9070	5	ND	mg/L
Oil & Grease(Non-Polar)	SM5520BF	5	ND	mg/L
PETROLEUM HYDROCARBONS			--	
VOLATILE (WATER)			--	
DILUTION FACTOR *			1	
DATE ANALYZED			07-08-91	
METHOD GC FID/5030			--	
as Gasoline		0.05	ND	mg/L
METHOD 602			--	
DILUTION FACTOR *			1	
DATE ANALYZED			07-08-91	
Benzene		0.5	ND	ug/L
Ethylbenzene		0.5	ND	ug/L
Toluene		0.5	ND	ug/L
Xylenes, total		0.5	ND	ug/L
PETROLEUM HYDROCARBONS			--	
EXTRACTABLE (WATER)			--	
DILUTION FACTOR *			1	
DATE EXTRACTED			06-28-91	
DATE ANALYZED			07-02-91	
METHOD GC FID/3510			--	
as Diesel		0.05	ND	mg/L
as Motor Oil		0.5	ND	mg/L

Ref: Carnation-Oakland, Job: 20294,007.02

SAMPLE DESCRIPTION: 91062511 06-25-91 1530
LAB Job No: (-89806)

Parameter	Method	Reporting Limit	Results	Units
Oil & Grease(Total)	EPA9070	5	ND	mg/L
Oil & Grease(Non-Polar)	SM5520BF	5	ND	mg/L
PETROLEUM HYDROCARBONS			--	
VOLATILE (WATER)			--	
DILUTION FACTOR *			1	
DATE ANALYZED			07-08-91	
METHOD GC FID/5030			--	
as Gasoline		0.05	ND	mg/L
METHOD 602			--	
DILUTION FACTOR *			1	
DATE ANALYZED			07-08-91	
Benzene		0.5	ND	ug/L
Ethylbenzene		0.5	ND	ug/L
Toluene		0.5	ND	ug/L
Xylenes, total		0.5	ND	ug/L
PETROLEUM HYDROCARBONS			--	
EXTRACTABLE (WATER)			--	
DILUTION FACTOR *			1	
DATE EXTRACTED			06-28-91	
DATE ANALYZED			07-02-91	
METHOD GC FID/3510			--	
as Diesel		0.05	ND	mg/L
as Motor Oil		0.5	ND	mg/L

Ref: Carnation-Oakland, Job: 20294,007.02

SAMPLE DESCRIPTION: 91062511 06-25-91 1530
LAB Job No: (-89806)

Parameter	Method	Reporting Limit	Results	Units
METHOD 8240				
DATE ANALYZED			07-03-91	
DILUTION FACTOR *			1	
Acetone		10	ND	ug/L
Benzene		5.0	ND	ug/L
Bromodichloromethane		5.0	ND	ug/L
Bromoform		5.0	ND	ug/L
Bromomethane		5.0	ND	ug/L
2-Butanone		10	ND	ug/L
Carbon Disulfide		5.0	ND	ug/L
Carbon Tetrachloride		5.0	ND	ug/L
Chlorobenzene		5.0	ND	ug/L
Chloroethane		5.0	ND	ug/L
2-Chloroethyl Vinyl Ether		10	ND	ug/L
Chloroform		5.0	ND	ug/L
Chloromethane		5.0	ND	ug/L
Dibromochloromethane		5.0	ND	ug/L
1,2-Dichlorobenzene		6.0	ND	ug/L
1,3-Dichlorobenzene		6.0	ND	ug/L
1,4-Dichlorobenzene		6.0	ND	ug/L
1,1-Dichloroethane		5.0	ND	ug/L
1,2-Dichloroethane		5.0	ND	ug/L
1,1-Dichloroethene		5.0	ND	ug/L
trans-1,2-Dichloroethene		5.0	ND	ug/L
1,2-Dichloropropane		5.0	ND	ug/L
cis-1,3-Dichloropropene		5.0	ND	ug/L
trans-1,3-Dichloropropene		5.0	ND	ug/L
Ethylbenzene		5.0	ND	ug/L
2-Hexanone		10	ND	ug/L
Methylene Chloride		5.0	ND	ug/L
4-Methyl-2-pentanone		10	ND	ug/L
Styrene		5.0	ND	ug/L
1,1,2,2-Tetrachloroethane		5.0	ND	ug/L
Tetrachloroethene		5.0	ND	ug/L
Toluene		5.0	ND	ug/L
1,1,1-Trichloroethane		5.0	ND	ug/L
1,1,2-Trichloroethane		5.0	ND	ug/L
Trichloroethene		5.0	ND	ug/L
Trichlorofluoromethane		5.0	ND	ug/L
Vinyl acetate		10	ND	ug/L
Vinyl chloride		5.0	ND	ug/L
Xylenes, total		5.0	ND	ug/L
SURROGATE RESULTS			--	
Toluene-d8			106	% Rec.
Bromofluorobenzene			107	% Rec.
1,2-Dichloroethane-d4			111	% Rec.

NET Pacific, Inc.

Client Acct: 281 Date: 07-16-91
Client Name: Harding Lawson Associates Page: 21
NET Log No: 8296

Ref: Carnation-Oakland, Job: 20294,007.02

SAMPLE DESCRIPTION: 91062513 06-25-91 1630
LAB Job No: (-89824)

Parameter	Method	Reporting Limit	Results	Units
Oil & Grease(Total)	EPA9070	5	ND	mg/L
Oil & Grease(Non-Polar)	SM5520BF	5	ND	mg/L
PETROLEUM HYDROCARBONS			--	
VOLATILE (WATER)			--	
DILUTION FACTOR *			1	
DATE ANALYZED			07-08-91	
METHOD GC FID/5030			--	
as Gasoline		0.05	ND	mg/L
PETROLEUM HYDROCARBONS			--	
EXTRACTABLE (WATER)			--	
DILUTION FACTOR *			1	
DATE EXTRACTED			06-28-91	
DATE ANALYZED			07-02-91	
METHOD GC FID/3510			--	
as Diesel		0.05	ND	mg/L
as Motor Oil		0.5	ND	mg/L

Ref: Carnation-Oakland, Job: 20294,007.02

QUALITY CONTROL DATA

Parameter	Reporting Limits	Units	Cal Verf Stand % Recovery	Blank Data	Spike % Recovery	Duplicate Spike % Recovery	RPD
O&G(Total)	5	mg/L	101	ND	96	101	5.1
O&G(Non-Polar)	5	mg/L	92	ND	N/A	N/A	N/A
O&G(Total)	5	mg/L	98	ND	96	95	1.1
O&G(Non-Polar)	5	mg/L	98	ND	N/A	N/A	N/A
Diesel	0.05	mg/L	99	ND	47	55	16
Motor Oil	0.5	mg/L	96	ND	N/A	N/A	N/A
Gasoline	0.05	mg/L	110	ND	113	100	13
COMMENT: Blank Results were ND on other analytes tested.							
Gasoline	0.05	mg/L	99	ND	100	90	11
COMMENT: Blank Results were ND on other analytes tested.							
Benzene	5.0	ug/L	90	ND	103	106	3.4
Chlorobenzene	5.0	ug/L	96	ND	106	105	0
1,1-Dichloroethene	5.0	ug/L	101	ND	100	95	5.1
Toluene	5.0	ug/L	96	ND	106	103	2.9
Trichloroethene	5.0	ug/L	99	ND	107	110	2.4
COMMENT: Blank Results were ND on other analytes tested.							

NET Pacific, Inc.

KEY TO ABBREVIATIONS and METHOD REFERENCES

<	:	Less than; When appearing in results column indicates analyte not detected at the value following. This datum supercedes the listed Reporting Limit.
*	:	Reporting Limits are a function of the dilution factor for any given sample. To obtain the actual reporting limits for this sample, multiply the stated Reporting Limits by the dilution factor (but do not multiply reported values).
ICVS	:	Initial Calibration Verification Standard (External Standard).
mean	:	Average; sum of measurements divided by number of measurements.
mg/Kg (ppm)	:	Concentration in units of milligrams of analyte per kilogram of sample, wet-weight basis (parts per million).
mg/L	:	Concentration in units of milligrams of analyte per liter of sample.
mL/L/hr	:	Milliliters per liter per hour.
MPN/100 mL	:	Most probable number of bacteria per one hundred milliliters of sample.
N/A	:	Not applicable.
NA	:	Not analyzed.
ND	:	Not detected; the analyte concentration is less than applicable listed reporting limit.
NTU	:	Nephelometric turbidity units.
RPD	:	Relative percent difference, 100 [Value 1 - Value 2]/mean value.
SNA	:	Standard not available.
ug/Kg (ppb)	:	Concentration in units of micrograms of analyte per kilogram of sample, wet-weight basis (parts per billion).
ug/L	:	Concentration in units of micrograms of analyte per liter of sample.
umhos/cm	:	Micromhos per centimeter.

Method References

Methods 100 through 493: see "Methods for Chemical Analysis of Water & Wastes", U.S. EPA, 600/4-79-020, rev. 1983.

Methods 601 through 625: see "Guidelines Establishing Test Procedures for the Analysis of Pollutants" U.S. EPA, 40 CFR, Part 136, rev. 1988.

Methods 1000 through 9999: see "Test Methods for Evaluating Solid Waste", U.S. EPA SW-846, 3rd edition, 1986.

SM: see "Standard Methods for the Examination of Water & Wastewater, 16th Edition, APHA, 1985.

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Date: 07-17-91
NET Client Acct. No: 281
NET Pacific Log No: 8324
Received: 06-26-91 1610

Client Reference Information

Carnation-Oakland, 20294.007.02

Sample analysis in support of the project referenced above has been completed and results are presented on following pages. Please refer to the enclosed "Key to Abbreviations" for definition of terms. Should you have questions regarding procedures or results, please feel welcome to contact Client Services.

Approved by:

Jules Skamarack
Laboratory Manager

Enclosure(s)

NET Pacific, Inc.

Client Acct: 281 Date: 07-17-91
Client Name: Harding Lawson Associates Page: 2
NET Log No: 8324

Ref: Carnation-Oakland, 20294.007.02

SAMPLE DESCRIPTION: 91062601 06-26-91 0815
LAB Job No: (-89840)

Parameter	Method	Reporting Limit	Results	Units
PETROLEUM HYDROCARBONS			--	
VOLATILE (WATER)			--	
DILUTION FACTOR *			1	
DATE ANALYZED			07-08-91	
METHOD GC FID/5030			--	
as Gasoline		0.05	ND	mg/L
METHOD 602			--	
Benzene		0.5	ND	ug/L
Ethylbenzene		0.5	ND	ug/L
Toluene		0.5	ND	ug/L
Xylenes, total		0.5	ND	ug/L
PETROLEUM HYDROCARBONS			--	
EXTRACTABLE (WATER)			--	
DILUTION FACTOR *			1	
DATE EXTRACTED			06-28-91	
DATE ANALYZED			06-30-91	
METHOD GC FID/3510			--	
as Diesel		0.05	ND	mg/L
as Motor Oil		0.5	ND	mg/L

NET Pacific, Inc.

Client Acct: 281 Date: 07-17-91
Client Name: Harding Lawson Associates Page: 3
NET Log No: 8324

Ref: Carnation-Oakland, 20294.007.02

SAMPLE DESCRIPTION: 91062603 06-26-91 0920
LAB Job No: (-89841)

Parameter	Method	Reporting Limit	Results	Units
PETROLEUM HYDROCARBONS			--	
VOLATILE (WATER)			--	
DILUTION FACTOR *			1	
DATE ANALYZED			07-08-91	
METHOD GC FID/5030			--	
as Gasoline		0.05	ND	mg/L
METHOD 602			--	
Benzene		0.5	ND	ug/L
Ethylbenzene		0.5	ND	ug/L
Toluene		0.5	ND	ug/L
Xylenes, total		0.5	ND	ug/L
PETROLEUM HYDROCARBONS			--	
EXTRACTABLE (WATER)			--	
DILUTION FACTOR *			1	
DATE EXTRACTED			06-28-91	
DATE ANALYZED			06-30-91	
METHOD GC FID/3510			--	
as Diesel		0.05	ND	mg/L
as Motor Oil		0.5	ND	mg/L

NET Pacific, Inc

Client Acct: 281
Client Name: Harding Lawson Associates
NET Log No: 8324

Date: 07-17-91
Page: 4

Ref: Carnation-Oakland, 20294.007.02

SAMPLE DESCRIPTION: 91062607 06-26-91 1145
LAB Job No: (-89842)

Parameter	Method	Reporting Limit	Results	Units
PETROLEUM HYDROCARBONS			--	
VOLATILE (WATER)			--	
DILUTION FACTOR *			1	
DATE ANALYZED			07-08-91	
METHOD GC FID/5030			--	
as Gasoline		0.05	ND	mg/L
METHOD 602			--	
Benzene		0.5	0.8	ug/L
Ethylbenzene		0.5	ND	ug/L
Toluene		0.5	ND	ug/L
Xylenes, total		0.5	ND	ug/L
PETROLEUM HYDROCARBONS			--	
EXTRACTABLE (WATER)			--	
DILUTION FACTOR *			1	
DATE EXTRACTED			06-28-91	
DATE ANALYZED			06-30-91	
METHOD GC FID/3510				
as Diesel		0.05	ND	mg/L
as Motor Oil		0.5	ND	mg/L

NET Pacific, Inc.

Client Acct: 281 Date: 07-17-91
Client Name: Harding Lawson Associates Page: 5
NET Log No: 8324

Ref: Carnation-Oakland, 20294.007.02

SAMPLE DESCRIPTION: 91062610 06-26-91 1300
LAB Job No: (-89843)

Parameter	Method	Reporting Limit	Results	Units
PETROLEUM HYDROCARBONS			--	
VOLATILE (WATER)			--	
DILUTION FACTOR *			1	
DATE ANALYZED			07-08-91	
METHOD GC FID/5030			--	
as Gasoline		0.05	ND	mg/L
METHOD 602			--	
Benzene		0.5	1.8	ug/L
Ethylbenzene		0.5	ND	ug/L
Toluene		0.5	ND	ug/L
Xylenes, total		0.5	ND	ug/L
PETROLEUM HYDROCARBONS			--	
EXTRACTABLE (WATER)			--	
DILUTION FACTOR *			1	
DATE EXTRACTED			06-28-91	
DATE ANALYZED			06-30-91	
METHOD GC FID/3510			--	
as Diesel		0.05	ND	mg/L
as Motor Oil		0.5	ND	mg/L

Ref: Carnation-Oakland, 20294.007.02

SAMPLE DESCRIPTION: 91062602 06-26-91 0840
LAB Job No: (-89859)

Parameter	Method	Reporting Limit	Results	Units
Oil & Grease(Total)	EPA9070	5	ND	mg/L
Oil & Grease(Non-Polar)	SM5520BF	5	ND	mg/L
PETROLEUM HYDROCARBONS			--	
VOLATILE (WATER)			--	
DILUTION FACTOR *			1	
DATE ANALYZED			07-08-91	
METHOD GC FID/5030			--	
as Gasoline		0.05	ND	mg/L
PETROLEUM HYDROCARBONS			--	
EXTRACTABLE (WATER)			--	
DILUTION FACTOR *			1	
DATE EXTRACTED			06-28-91	
DATE ANALYZED			06-30-91	
METHOD GC FID/3510			--	
as Diesel		0.05	ND	mg/L
as Motor Oil		0.5	ND	mg/L

Ref: Carnation-Oakland, 20294.007.02

SAMPLE DESCRIPTION: 91062602 06-26-91 0840
LAB Job No: (-89859)

Parameter	Method	Reporting Limit	Results	Units
METHOD 8240				
DATE ANALYZED			07-08-91	
DILUTION FACTOR *			1	
Acetone		10	ND	ug/L
Benzene		5.0	ND	ug/L
Bromodichloromethane		5.0	ND	ug/L
Bromoform		5.0	ND	ug/L
Bromomethane		5.0	ND	ug/L
2-Butanone		10	ND	ug/L
Carbon Disulfide		5.0	ND	ug/L
Carbon Tetrachloride		5.0	ND	ug/L
Chlorobenzene		5.0	ND	ug/L
Chloroethane		5.0	ND	ug/L
2-Chloroethyl Vinyl Ether		10	ND	ug/L
Chloroform		5.0	ND	ug/L
Chloromethane		5.0	ND	ug/L
Dibromochloromethane		5.0	ND	ug/L
1,2-Dichlorobenzene		6.0	ND	ug/L
1,3-Dichlorobenzene		6.0	ND	ug/L
1,4-Dichlorobenzene		6.0	ND	ug/L
1,1-Dichloroethane		5.0	ND	ug/L
1,2-Dichloroethane		5.0	ND	ug/L
1,1-Dichloroethene		5.0	ND	ug/L
trans-1,2-Dichloroethene		5.0	ND	ug/L
1,2-Dichloropropane		5.0	ND	ug/L
cis-1,3-Dichloropropene		5.0	ND	ug/L
trans-1,3-Dichloropropene		5.0	ND	ug/L
Ethylbenzene		5.0	ND	ug/L
2-Hexanone		10	ND	ug/L
Methylene Chloride		5.0	ND	ug/L
4-Methyl-2-pentanone		10	ND	ug/L
Styrene		5.0	ND	ug/L
1,1,2,2-Tetrachloroethane		5.0	ND	ug/L
Tetrachloroethene		5.0	ND	ug/L
Toluene		5.0	ND	ug/L
1,1,1-Trichloroethane		5.0	ND	ug/L
1,1,2-Trichloroethane		5.0	ND	ug/L
Trichloroethene		5.0	ND	ug/L
Trichlorofluoromethane		5.0	ND	ug/L
Vinyl acetate		10	ND	ug/L
Vinyl chloride		5.0	ND	ug/L
Xylenes, total		5.0	ND	ug/L
SURROGATE RESULTS			--	
Toluene-d8			96	% Rec.
Bromofluorobenzene			96	% Rec.
1,2-Dichloroethane-d4			86	% Rec.

Ref: Carnation-Oakland, 20294.007.02

SAMPLE DESCRIPTION: 91062604 06-26-91 0950
LAB Job No: (-89860)

Parameter	Method	Reporting Limit	Results	Units
Oil & Grease(Total)	EPA9070	5	ND	mg/L
Oil & Grease(Non-Polar)	SM5520BF	5	ND	mg/L
PETROLEUM HYDROCARBONS			--	
VOLATILE (WATER)			--	
DILUTION FACTOR *			1	
DATE ANALYZED			07-08-91	
METHOD GC FID/5030			--	
as Gasoline		0.05	0.69	mg/L
PETROLEUM HYDROCARBONS			--	
EXTRACTABLE (WATER)			--	
DILUTION FACTOR *			1	
DATE EXTRACTED			06-28-91	
DATE ANALYZED			06-30-91	
METHOD GC FID/3510			--	
as Diesel		0.05	ND	mg/L
as Motor Oil		0.5	ND	mg/L

NET Pacific, Inc

Client Acct: 281
Client Name: Harding Lawson Associates
NET Log No: 8324

Date: 07-17-91
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Ref: Carnation-Oakland, 20294.007.02

SAMPLE DESCRIPTION: 91062604 06-26-91 0950
LAB Job No: (-89860)

Parameter	Method	Reporting Limit	Results	Units
METHOD 8240				
DATE ANALYZED			07-08-91	
DILUTION FACTOR *			1	
Acetone		10	ND	ug/L
Benzene		25	550	ug/L
Bromodichloromethane		5.0	ND	ug/L
Bromoform		5.0	ND	ug/L
Bromomethane		5.0	ND	ug/L
2-Butanone		10	ND	ug/L
Carbon Disulfide		5.0	ND	ug/L
Carbon Tetrachloride		5.0	ND	ug/L
Chlorobenzene		5.0	ND	ug/L
Chloroethane		5.0	ND	ug/L
2-Chloroethyl Vinyl Ether		10	ND	ug/L
Chloroform		5.0	ND	ug/L
Chloromethane		5.0	ND	ug/L
Dibromochloromethane		5.0	ND	ug/L
1,2-Dichlorobenzene		6.0	ND	ug/L
1,3-Dichlorobenzene		6.0	ND	ug/L
1,4-Dichlorobenzene		6.0	ND	ug/L
1,1-Dichloroethane		5.0	ND	ug/L
1,2-Dichloroethane		5.0	14	ug/L
1,1-Dichloroethene		5.0	ND	ug/L
trans-1,2-Dichloroethene		5.0	ND	ug/L
1,2-Dichloropropane		5.0	ND	ug/L
cis-1,3-Dichloropropene		5.0	ND	ug/L
trans-1,3-Dichloropropene		5.0	ND	ug/L
Ethylbenzene		5.0	7.6	ug/L
2-Hexanone		10	ND	ug/L
Methylene Chloride		5.0	ND	ug/L
4-Methyl-2-pentanone		10	ND	ug/L
Styrene		5.0	ND	ug/L
1,1,2,2-Tetrachloroethane		5.0	ND	ug/L
Tetrachloroethene		5.0	ND	ug/L
Toluene		5.0	ND	ug/L
1,1,1-Trichloroethane		5.0	ND	ug/L
1,1,2-Trichloroethane		5.0	ND	ug/L
Trichloroethene		5.0	ND	ug/L
Trichlorofluoromethane		5.0	ND	ug/L
Vinyl acetate		10	ND	ug/L
Vinyl chloride		5.0	ND	ug/L
Xylenes, total		5.0	11	ug/L
SURROGATE RESULTS			--	
Toluene-d8			98	% Rec.
Bromofluorobenzene			98	% Rec.
1,2-Dichloroethane-d4			102	% Rec.

Ref: Carnation-Oakland, 20294.007.02

SAMPLE DESCRIPTION: 91062608 06-26-91 1210
LAB Job No: (-89861)

Parameter	Method	Reporting Limit	Results	Units
Oil & Grease(Total)	EPA9070	5	ND	mg/L
Oil & Grease(Non-Polar)	SM5520BF	5	ND	mg/L
PETROLEUM HYDROCARBONS			--	
VOLATILE (WATER)			--	
DILUTION FACTOR *			1000	
DATE ANALYZED			07-08-91	
METHOD GC FID/5030			--	
as Gasoline		0.05	300	mg/L
PETROLEUM HYDROCARBONS			--	
EXTRACTABLE (WATER)			--	
DILUTION FACTOR *			1	
DATE EXTRACTED			06-28-91	
DATE ANALYZED			06-30-91	
METHOD GC FID/3510			--	
as Diesel		0.05	2.1	mg/L
as Motor Oil		0.5	1.6	mg/L

Ref: Carnation-Oakland, 20294.007.02

SAMPLE DESCRIPTION: 91062608 06-26-91 1210
LAB Job No: (-89861)

Parameter	Method	Reporting Limit	Results	Units
METHOD 8240				
DATE ANALYZED			07-09-91	
DILUTION FACTOR *			25	
Acetone		10	ND	ug/L
Benzene		5.0	4400	ug/L
Bromodichloromethane		5.0	ND	ug/L
Bromoform		5.0	ND	ug/L
Bromomethane		5.0	ND	ug/L
2-Butanone		10	ND	ug/L
Carbon Disulfide		5.0	ND	ug/L
Carbon Tetrachloride		5.0	ND	ug/L
Chlorobenzene		5.0	ND	ug/L
Chloroethane		5.0	ND	ug/L
2-Chloroethyl Vinyl Ether		10	ND	ug/L
Chloroform		5.0	ND	ug/L
Chloromethane		5.0	ND	ug/L
Dibromochloromethane		5.0	ND	ug/L
1,2-Dichlorobenzene		6.0	ND	ug/L
1,3-Dichlorobenzene		6.0	ND	ug/L
1,4-Dichlorobenzene		6.0	ND	ug/L
1,1-Dichloroethane		5.0	ND	ug/L
1,2-Dichloroethane		5.0	470	ug/L
1,1-Dichloroethene		5.0	ND	ug/L
trans-1,2-Dichloroethene		5.0	ND	ug/L
1,2-Dichloropropane		5.0	ND	ug/L
cis-1,3-Dichloropropene		5.0	ND	ug/L
trans-1,3-Dichloropropene		5.0	ND	ug/L
Ethylbenzene		5.0	260	ug/L
2-Hexanone		10	ND	ug/L
Methylene Chloride		5.0	ND	ug/L
4-Methyl-2-pentanone		10	ND	ug/L
Styrene		5.0	ND	ug/L
1,1,2,2-Tetrachloroethane		5.0	ND	ug/L
Tetrachloroethene		5.0	ND	ug/L
Toluene		5.0	3600	ug/L
1,1,1-Trichloroethane		5.0	ND	ug/L
1,1,2-Trichloroethane		5.0	ND	ug/L
Trichloroethene		5.0	ND	ug/L
Trichlorofluoromethane		5.0	ND	ug/L
Vinyl acetate		10	ND	ug/L
Vinyl chloride		5.0	ND	ug/L
Xylenes, total		5.0	4600	ug/L
SURROGATE RESULTS			--	
Toluene-d8			98	% Rec.
Bromofluorobenzene			100	% Rec.
1,2-Dichloroethane-d4			98	% Rec.

Ref: Carnation-Oakland, 20294.007.02

SAMPLE DESCRIPTION: 91062609 06-26-91 1230
LAB Job No: (-89862**)

Parameter	Method	Reporting Limit	Results	Units
Oil & Grease(Total)	EPA9070	5	5.4	mg/L
Oil & Grease(Non-Polar)	SM5520BF	5	5.1	mg/L
PETROLEUM HYDROCARBONS			--	
VOLATILE (WATER)			--	
DILUTION FACTOR *			20	
DATE ANALYZED			07-09-91	
METHOD GC FID/5030			--	
as Gasoline		0.05	14	mg/L
PETROLEUM HYDROCARBONS			--	
VOLATILE (WATER)			--	
DILUTION FACTOR *			100	
DATE ANALYZED			07-08-91	
METHOD GC FID/5030			--	
as Gasoline		0.05	85	mg/L
PETROLEUM HYDROCARBONS			--	
EXTRACTABLE (WATER)			--	
DILUTION FACTOR *			1	
DATE EXTRACTED			06-28-91	
DATE ANALYZED			06-30-91	
METHOD GC FID/3510			--	
as Diesel		0.05	1.1	mg/L
as Motor Oil		0.5	1.0	mg/L

** Note: This sample was analyzed for gasoline on 07-08-91 at a 1:100 dilution and reanalyzed 07-09-91 at a 1:20 dilution. The results from both dates were reported and there was variability between the voa vials.

NET Pacific, Inc

Client Acct: 281
Client Name: Harding Lawson Associates
NET Log No: 8324

Date: 07-17-91
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Ref: Carnation-Oakland, 20294.007.02

SAMPLE DESCRIPTION: 91062609 06-26-91 1230
LAB Job No: (-89862)

Parameter	Method	Reporting Limit	Results	Units
METHOD 8240				
DATE ANALYZED			07-09-91	
DILUTION FACTOR *			20	
Acetone		10	ND	ug/L
Benzene		5.0	3700	ug/L
Bromodichloromethane		5.0	ND	ug/L
Bromoform		5.0	ND	ug/L
Bromomethane		5.0	ND	ug/L
2-Butanone		10	ND	ug/L
Carbon Disulfide		5.0	ND	ug/L
Carbon Tetrachloride		5.0	ND	ug/L
Chlorobenzene		5.0	ND	ug/L
Chloroethane		5.0	ND	ug/L
2-Chloroethyl Vinyl Ether		10	ND	ug/L
Chloroform		5.0	ND	ug/L
Chloromethane		5.0	ND	ug/L
Dibromochloromethane		5.0	ND	ug/L
1,2-Dichlorobenzene		6.0	ND	ug/L
1,3-Dichlorobenzene		6.0	ND	ug/L
1,4-Dichlorobenzene		6.0	ND	ug/L
1,1-Dichloroethane		5.0	ND	ug/L
1,2-Dichloroethane		5.0	480	ug/L
1,1-Dichloroethene		5.0	ND	ug/L
trans-1,2-Dichloroethene		5.0	ND	ug/L
1,2-Dichloropropane		5.0	ND	ug/L
cis-1,3-Dichloropropene		5.0	ND	ug/L
trans-1,3-Dichloropropene		5.0	ND	ug/L
Ethylbenzene		5.0	160	ug/L
2-Hexanone		10	ND	ug/L
Methylene Chloride		5.0	ND	ug/L
4-Methyl-2-pentanone		10	ND	ug/L
Styrene		5.0	ND	ug/L
1,1,2,2-Tetrachloroethane		5.0	ND	ug/L
Tetrachloroethene		5.0	ND	ug/L
Toluene		5.0	2700	ug/L
1,1,1-Trichloroethane		5.0	ND	ug/L
1,1,2-Trichloroethane		5.0	ND	ug/L
Trichloroethene		5.0	ND	ug/L
Trichlorofluoromethane		5.0	ND	ug/L
Vinyl acetate		10	ND	ug/L
Vinyl chloride		5.0	ND	ug/L
Xylenes, total		5.0	3100	ug/L
SURROGATE RESULTS			--	
Toluene-d8			100	% Rec.
Bromofluorobenzene			101	% Rec.
1,2-Dichloroethane-d4			102	% Rec.

NET Pacific, Inc

Client Acct: 281
Client Name: Harding Lawson Associates
NET Log No: 8324

Date: 07-17-91
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Ref: Carnation-Oakland, 20294.007.02

SAMPLE DESCRIPTION: 91062605 06-26-91 1015
LAB Job No: (-89863)

Parameter	Method	Reporting Limit	Results	Units
Oil & Grease(Total)	EPA9070	5	ND	mg/L
Oil & Grease(Non-Polar)	SM5520BF	5	ND	mg/L
PETROLEUM HYDROCARBONS			--	
VOLATILE (WATER)			--	
DILUTION FACTOR *			1	
DATE ANALYZED			07-08-91	
METHOD GC FID/5030			--	
as Gasoline		0.05	ND	mg/L
METHOD 602			--	
Benzene		0.5	22	ug/L
Ethylbenzene		0.5	0.5	ug/L
Toluene		0.5	ND	ug/L
Xylenes, total		0.5	ND	ug/L
PETROLEUM HYDROCARBONS			--	
EXTRACTABLE (WATER)			--	
DILUTION FACTOR *			1	
DATE EXTRACTED			06-28-91	
DATE ANALYZED			06-30-91	
METHOD GC FID/3510			--	
as Diesel		0.05	ND	mg/L
as Motor Oil		0.5	ND	mg/L

Ref: Carnation-Oakland, 20294.007.02

SAMPLE DESCRIPTION: 91062606 06-26-91 1040
LAB Job No: (-89864)

Parameter	Method	Reporting Limit	Results	Units
Oil & Grease(Total)	EPA9070	5	ND	mg/L
Oil & Grease(Non-Polar)	SM5520BF	5	ND	mg/L
PETROLEUM HYDROCARBONS			--	
VOLATILE (WATER)			--	
DILUTION FACTOR *			1	
DATE ANALYZED			07-02-91	
METHOD GC FID/5030			--	
as Gasoline		0.05	0.10	mg/L
METHOD 602			--	
Benzene		0.5	25	ug/L
Ethylbenzene		0.5	0.6	ug/L
Toluene		0.5	ND	ug/L
Xylenes, total		0.5	ND	ug/L
PETROLEUM HYDROCARBONS			--	
EXTRACTABLE (WATER)			--	
DILUTION FACTOR *			1	
DATE EXTRACTED			06-28-91	
DATE ANALYZED			06-30-91	
METHOD GC FID/3510			--	
as Diesel		0.05	ND	mg/L
as Motor Oil		0.5	ND	mg/L

Ref: Carnation-Oakland, 20294.007.02

SAMPLE DESCRIPTION: 91062611 06-26-91 1330
LAB Job No: (-89867)

Parameter	Method	Reporting Limit	Results	Units
Oil & Grease(Total)	EPA9070	5	ND	mg/L
Oil & Grease(Non-Polar)	SM5520BF	5	ND	mg/L
PETROLEUM HYDROCARBONS			--	
VOLATILE (WATER)			--	
DILUTION FACTOR *			1	
DATE ANALYZED			07-08-91	
METHOD GC FID/5030			--	
as Gasoline		0.05	ND	mg/L
METHOD 602			--	
Benzene		0.5	ND	ug/L
Ethylbenzene		0.5	ND	ug/L
Toluene		0.5	ND	ug/L
Xylenes, total		0.5	ND	ug/L
PETROLEUM HYDROCARBONS			--	
EXTRACTABLE (WATER)			--	
DILUTION FACTOR *			1	
DATE EXTRACTED			06-28-91	
DATE ANALYZED			06-30-91	
METHOD GC FID/3510			--	
as Diesel		0.05	ND	mg/L
as Motor Oil		0.5	ND	mg/L

Ref: Carnation-Oakland, 20294.007.02

SAMPLE DESCRIPTION: 91062611 06-26-91 1330
LAB Job No: (-89867)

Parameter	Method	Reporting Limit	Results	Units
METHOD 8240				
DATE ANALYZED			07-08-91	
DILUTION FACTOR *			1	
Acetone		10	ND	ug/L
Benzene		5.0	ND	ug/L
Bromodichloromethane		5.0	ND	ug/L
Bromoform		5.0	ND	ug/L
Bromomethane		5.0	ND	ug/L
2-Butanone		10	ND	ug/L
Carbon Disulfide		5.0	ND	ug/L
Carbon Tetrachloride		5.0	ND	ug/L
Chlorobenzene		5.0	ND	ug/L
Chloroethane		5.0	ND	ug/L
2-Chloroethyl Vinyl Ether		10	ND	ug/L
Chloroform		5.0	ND	ug/L
Chloromethane		5.0	ND	ug/L
Dibromochloromethane		5.0	ND	ug/L
1,2-Dichlorobenzene		6.0	ND	ug/L
1,3-Dichlorobenzene		6.0	ND	ug/L
1,4-Dichlorobenzene		6.0	ND	ug/L
1,1-Dichloroethane		5.0	ND	ug/L
1,2-Dichloroethane		5.0	ND	ug/L
1,1-Dichloroethene		5.0	ND	ug/L
trans-1,2-Dichloroethene		5.0	ND	ug/L
1,2-Dichloropropane		5.0	ND	ug/L
cis-1,3-Dichloropropene		5.0	ND	ug/L
trans-1,3-Dichloropropene		5.0	ND	ug/L
Ethylbenzene		5.0	ND	ug/L
2-Hexanone		10	ND	ug/L
Methylene Chloride		5.0	ND	ug/L
4-Methyl-2-pentanone		10	ND	ug/L
Styrene		5.0	ND	ug/L
1,1,2,2-Tetrachloroethane		5.0	ND	ug/L
Tetrachloroethene		5.0	ND	ug/L
Toluene		5.0	ND	ug/L
1,1,1-Trichloroethane		5.0	ND	ug/L
1,1,2-Trichloroethane		5.0	ND	ug/L
Trichloroethene		5.0	ND	ug/L
Trichlorofluoromethane		5.0	ND	ug/L
Vinyl acetate		10	ND	ug/L
Vinyl chloride		5.0	ND	ug/L
Xylenes, total		5.0	ND	ug/L
SURROGATE RESULTS			--	
Toluene-d8			102	% Rec.
Bromofluorobenzene			90	% Rec.
1,2-Dichloroethane-d4			82	% Rec.

NET Pacific, Inc.

Client Acct: 281
Client Name: Harding Lawson Associates
NET Log No: 8324

Date: 07-17-91
Page: 18

Ref: Carnation-Oakland, Job: 20294.007.02

SAMPLE DESCRIPTION: Trip Blank 06-26-91
LAB Job No: (-90084)

Parameter	Method	Reporting Limit	Results	Units
PETROLEUM HYDROCARBONS			--	
VOLATILE (WATER)			--	
DILUTION FACTOR *			1	
DATE ANALYZED			07-08-91	
METHOD GC FID/5030			--	
as Gasoline		0.05	ND	mg/L
METHOD 602			--	
DILUTION FACTOR *			1	
DATE ANALYZED			07-08-91	
Benzene		0.5	ND	ug/L
Ethylbenzene		0.5	ND	ug/L
Toluene		0.5	ND	ug/L
Xylenes, total		0.5	ND	ug/L

Ref: Carnation-Oakland, 20294.007.02

QUALITY CONTROL DATA

Parameter	Reporting Limits	Units	Cal Verf Stand % Recovery	Blank Data	Spike % Recovery	Duplicate Spike % Recovery	RPD
O&G(Total)	5	mg/L	97	ND	102	101	< 1
O&G(Non-Polar)	5	mg/L	97	ND	N/A	N/A	N/A
Diesel	0.05	mg/L	99	ND	46	51	11
Motor Oil	0.5	mg/L	81	ND	N/A	N/A	N/A
Gasoline	0.05	mg/L	110	ND	106	110	3.3
Benzene	0.5	ug/L	94	ND	112	118	3.2
Toluene	0.5	ug/L	101	ND	102	105	2.5
COMMENT: Blank Results were ND on other analytes tested.							
Gasoline	0.05	mg/L	110	ND	113	100	12
Benzene	0.5	ug/L	79	ND	95	89	6.0
Toluene	0.5	ug/L	93	ND	96	90	6.0
COMMENT: Blank Results were ND on other analytes tested.							
Gasoline	0.05	mg/L	110	ND	98	105	7.0
Benzene	0.5	ug/L	79	ND	96	98	2.0
Toluene	0.5	ug/L	93	ND	97	98	1.0
COMMENT: Blank Results were ND on other analytes tested.							
Benzene	5.0	ug/L	95	ND	93	99	5.6
Chlorobenzene	5.0	ug/L	99	ND	101	99	2.2
1,1-Dichloroethene	5.0	ug/L	112	ND	86	77	12
Toluene	5.0	ug/L	95	ND	103	99	3.8
Trichloroethene	5.0	ug/L	102	ND	101	92	9.7
COMMENT: Blank Results were ND on other analytes tested.							

NET Pacific, Inc

KEY TO ABBREVIATIONS and METHOD REFERENCES

<	:	Less than; When appearing in results column indicates analyte not detected at the value following. This datum supercedes the listed Reporting Limit.
*	:	Reporting Limits are a function of the dilution factor for any given sample. To obtain the actual reporting limits for this sample, multiply the stated Reporting Limits by the dilution factor (but do not multiply reported values).
ICVS	:	Initial Calibration Verification Standard (External Standard).
mean	:	Average; sum of measurements divided by number of measurements.
mg/Kg (ppm)	:	Concentration in units of milligrams of analyte per kilogram of sample, (parts per million).
mg/L	:	Concentration in units of milligrams of analyte per liter of sample.
mL/L/hr	:	Milliliters per liter per hour.
MPN/100 mL	:	Most probable number of bacteria per one hundred milliliters of sample.
N/A	:	Not applicable.
NA	:	Not analyzed.
ND	:	Not detected; the analyte concentration is less than applicable listed reporting limit.
NTU	:	Nephelometric turbidity units.
RPD	:	Relative percent difference, 100 [Value 1 - Value 2]/mean value.
SNA	:	Standard not available.
ug/Kg (ppb)	:	Concentration in units of micrograms of analyte per kilogram of sample, (parts per billion).
ug/L	:	Concentration in units of micrograms of analyte per liter of sample.
umhos/cm	:	Micromhos per centimeter.

Method References

Methods 100 through 493: see "Methods for Chemical Analysis of Water & Wastes", U.S. EPA, 600/4-79-020, rev. 1983.

Methods 601 through 625: see "Guidelines Establishing Test Procedures for the Analysis of Pollutants" U.S. EPA, 40 CFR, Part 136, rev. 1988.

Methods 1000 through 9999: see "Test Methods for Evaluating Solid Waste", U.S. EPA SW-846, 3rd edition, 1986.

SM: see "Standard Methods for the Examination of Water & Wastewater, 17th Edition, APHA, 1989.

8296

Harding Lawson Associates
7655 Redwood Boulevard
P.O. Box 578
Novato, California 94948
415/892-0821
Telecopy General: 415/892-0831
Accounting: 415/898-1052

CHAIN OF CUSTODY FORM

Lab: Net Pacific

Job Number: 20294.007.02

Name/Location: Carnation - Oakland

Project Manager: Bruce Sheibach

Samplers: Rick Erdman
Dave Evans

Recorder: Rick Erdman
(Signature Required)

Source Code	Matrix: Water	Matrix: Sediment	Matrix: Soil	Matrix: Oil	Unpres.	H_2SO_4	HNO_3	HCL	Sample No. Yr	Wk	Seq	Date Yr	Mo	Dy	Time	Station Description/Notes	EPA 601/8010	EPA 602/8020	EPA 624/8240	EPA 625/8270	ICP METALS	EPA 8015M/TPH · gas, diesel	O/G petroleum hexane 5520 E
23	X				2	1		6	91	06	2501	91	06	25	0930				X			X	X
					2	1		6			2502				1000				X			X	X
					2			3			2503				1030			X				X	
					2			3			2504				1115			X				X	
					2			3			2505				1230			X				X	
					2	1		6			2506				1315				X			X	X
					2			6			2507				1345				X			X	
					2			6			2508				1415				X			X	
					2	1		6			2509				1445				X			X	X
					2	1		6			2510				1515			X				X	X

LAB NUMBER Yr	Wk	Seq	DEPTH IN FEET	COL MTD CD	QA CODE	MISCELLANEOUS
						btxe by 8020 w/gas per Rick Erdman to Nora 6/24

CHAIN OF CUSTODY RECORD

RELINQUISHED BY: (Signature) Rick Erdman	RECEIVED BY: (Signature) David M Evans	DATE/TIME 6-25-91 1635
RELINQUISHED BY: (Signature) David M Evans	RECEIVED BY: (Signature)	DATE/TIME
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
DISPATCHED BY: (Signature) David M Evans — DATE/TIME 6-25-91 1752	RECEIVED FOR LAB BY: (Signature) [signature]	DATE/TIME 6/25/91 1752

METHOD OF SHIPMENT: Hand delivered

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CHAIN OF CUSTODY FORM

(8329)

Lab: Net Pacific

Job Number: 20294.007.02

Name/Location: Carnation - Oakland

Project Manager: Bruce Sheibach

Samplers: Rick Erdman
Dave Evans

Recorder: Rick Erdman
(Signature Required)

Source Code	Matrix: Water	Sediment	Soil	Oil	#Containers & Preserv.: Unpres.	H_2SO_4	HNO_3	HCl	Sample Number or Lab Number: Yr	Wk	Seq	Date: Yr	Mo	Dy	Time	Station Description/Notes	EPA 601/8010	EPA 602/8020	EPA 624/8240	EPA 625/8270	ICP Metals	EPA 8015M/TPH-gas diesel	O&G [illegible] 5520 D+F
23	X				2			3	91	06	2601	91	06	26	0815			X				X	
					2	1		6			2602				0840				X			X	X
					2			3			2603				0920			X				X	
					2	1		6			2604				0950				X			X	X
					2	1		3			2605				1015			X				X	X
					2	1		3			2606				1040			X				X	X
					2			3			2607				1145			X				X	
					2	1		6			2608				1210	*			X			X	X
					2	1		6			2609				1230	*			X			X	X
					2			3			2610				1300			X				X	
					2	1		6			2611				1330			X	X			X	X

Lab Number: Yr	Wk	Seq	Depth in Feet	Col Mtd Cd	QA Code	Miscellaneous
						* no HCL due to reaction w/ H_2O
						Also need 2 VOAs marked "Trip Blank" not on COC 6/26
						analyze ~~[illegible]~~ gas/BTXE per Don Craig 6/28 ...

CHAIN OF CUSTODY RECORD

Relinquished by: (Signature)	Received by: (Signature)	Date/Time
Rick Erdman	Dave McEwan	6-26-91 1426
Dave McEwan		

Dispatched by: (Signature)	Date/Time	Received for lab by: (Signature)	Date/Time
Dave McEwan	6-26-91 1610	[illegible]	6/26/91 1610

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CHAIN OF CUSTODY FORM

8296

Lab: Net Pacific

Job Number: 20294-007.02

Name/Location: Carnation - Oakland

Project Manager: Bruce Sheibach

Samplers: Rick Erdman
Dave Evans

Recorder: Rick Erdman
(Signature Required)

SOURCE CODE	MATRIX: Water	Sediment	Soil	Oil	#CONTAINERS & PRESERV.: Unpres.	H_2SO_4	HNO_3	HCL	SAMPLE NUMBER OR LAB NUMBER: Yr	Wk	Seq	DATE: Yr	Mo	Dy	Time	STATION DESCRIPTION/ NOTES	EPA 601/8010	EPA 602/8020	EPA 624/8240	EPA 625/8270	ICP METALS	EPA 8015M/TPH gas, diesel	D's la gale? naupla 503
23	x				2	1		6	91	06	2511	91	06	25	1530			X	X			X	X
↓	↓				2			3	↓		2512	↓			1600		X					X	
					2	1		3			2513				1630							X	X

LAB NUMBER: Yr	Wk	Seq	DEPTH IN FEET	COL MTD CD	QA CODE	MISCELLANEOUS

CHAIN OF CUSTODY RECORD

RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
Rick Erdman	David Mavrans	6-25-91 1635
RELINQUISHED BY: (Signature) David Mavrans	RECEIVED BY: (Signature)	DATE/TIME
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME

DISPATCHED BY: (Signature)	DATE/TIME	RECEIVED FOR LAB BY: (Signature)	DATE/TIME
David Mavrans	6-25-91 1752	[signature]	6/25/91 1752

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JUNE THROUGH AUGUST 1991
CARNATION FACILITY
OAKLAND, CALIFORNIA
September 18, 1991

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QUALITY CONTROL REVIEWER

David F. Leland

David F. Leland, P.E.
Associate Engineer