



91 SEP 24 11 9: 21

September 23, 1991

20294,003.02

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:

**Site Characterization Report
Carnation Facility
Oakland, California**

Enclosed is Harding Lawson Associates' (HLA) Site Characterization Report that describes activities conducted at the Carnation Dairy Facility at 1310 14th Street in Oakland, California. We would like to meet with you during the first week of October to discuss the results of the characterization activities. Please contact me to set up a time and date for our meeting. HLA is currently evaluating remedial alternatives for the facility.

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

Yours very truly,

HARDING LAWSON ASSOCIATES

A handwritten signature in cursive script that reads 'R. Bruce Scheibach'.

R. Bruce Scheibach
Principal Hydrogeologist

Enclosure: Site Characterization Report

A Report Prepared for

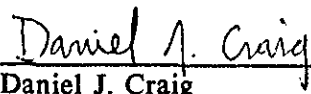
Carnation Company
800 North Brand Boulevard
Glendale, California 91203

**SITE CHARACTERIZATION REPORT
CARNATION FACILITY
OAKLAND, CALIFORNIA**


HLA Job No. 20294,011.02

9-17-91

by



Daniel J. Craig
Senior Hydrogeologist



R. Bruce Scheibach
Principal Hydrogeologist

Harding Lawson Associates
7655 Redwood Boulevard
P.O. Box 578
Novato, California 94948
415/892-0821

September 17, 1991

TABLE OF CONTENTS

LIST OF TABLES.....		iv
LIST OF ILLUSTRATIONS		v
1.0 INTRODUCTION.....		1
1.1 Report Organization.....		2
1.2 Site Background.....		2
1.2.1 Physical Setting		2
1.2.2 Surface Features.....		2
1.2.3 Meteorology.....		3
1.2.4 Geology and Hydrogeology.....		3
1.2.5 Facility History		3
1.2.6 Previous Investigations		4
1.2.7 Interim Remedial Measures.....		4
2.0 SITE CHARACTERIZATION.....		6
2.1 Environmental Site Assessment.....		6
2.2 Soil Investigations.....		10
2.2.1 Soil Borings		10
2.2.2 Excavated Soil Pile Sampling.....		11
2.3 Groundwater and Free-Phase Petroleum Product Investigations.....		12
2.3.1 Water-Level Elevation and Free-Phase Petroleum Product Measurement.....		12
2.3.2 Well Redevelopment		13
2.3.3 Aquifer Testing.....		13
2.3.4 Groundwater Chemistry Monitoring		14
2.4 Soil and Groundwater Microbiology.....		15
3.0 RESULTS OF INVESTIGATIONS.....		16
3.1 Site Geology.....		16
3.2 Results of Soil Sampling		17
3.2.1 Distribution of Petroleum Hydrocarbons in Soil.....		17
3.2.2 Distribution of Animal Fats in Soil.....		18
3.2.3 Distribution of PCBs in Soil		19
3.2.4 Volume of Chemical-Bearing Soil.....		19
3.3 Groundwater Elevations and Flow.....		20
3.4 Distribution of Free Product.....		21
3.5 Well Redevelopment.....		23
3.6 Aquifer Testing		24
3.7 Results of Groundwater Chemistry Sampling.....		25
3.7.1 Distribution of Petroleum Hydrocarbons in Groundwater.....		25

TABLE OF CONTENTS
(continued)

3.7.2	Distribution of Chlorinated Hydrocarbons in Groundwater.....	26
3.7.3	Distribution of Animal Fats in Groundwater.....	26
3.7.4	Groundwater QA/QC Data	26
3.8	Microbiological Evaluation	28
4.0	SUMMARY AND CONCLUSIONS	29
4.1	Soil Chemistry.....	29
4.2	Groundwater Flow	29
4.3	Fate and Transport of Free-Phase Petroleum Product and Dissolved Hydrocarbons	29
5.0	REFERENCES.....	31

TABLES

ILLUSTRATIONS

Appendices

- A AGE BORING LOGS AND WELL COMPLETION DETAILS
- B HLA BORING LOGS
- C SOIL CHEMISTRY LABORATORY RESULTS AND CHAIN OF CUSTODY FORMS
- D GROUNDWATER CHEMISTRY LABORATORY RESULTS AND CHAIN OF CUSTODY FORMS
- E MICROBIOLOGICAL EVALUATION

DISTRIBUTION

LIST OF TABLES

Table 1	Monitoring and Product Recovery Well Completion Details
Table 2	Petroleum Hydrocarbon Concentrations in Soil Samples
Table 3	PCB Concentrations in Soil and Product Samples
Table 4	Groundwater Elevations and Free-Phase Petroleum Product Thicknesses
Table 5	Product Thicknesses Before and After Well Redevelopment
Table 6	Aquifer Test Results
Table 7	Petroleum Hydrocarbon Concentrations in Groundwater Samples

LIST OF ILLUSTRATIONS

Plate 1	Site Location Map
Plate 2	Well Location Map
Plate 3	Site Vicinity Map and Listed Environmental Properties
Plate 4	Locations of Soil Borings
Plate 5	Locations of Geologic Cross Sections
Plate 6	Geologic Cross Section A-A'
Plate 7	Geologic Cross Section B-B'
Plate 8	Geologic Cross Section C-C'
Plate 9	TPH in Soil at Approximately 5 Feet
Plate 10	TPH in Soil at Approximately 10 Feet
Plate 11	TPH in Soil at Approximately 12.5 Feet
Plate 12	TPH in Soil at Approximately 15 Feet
Plate 13	TPH in Soil at Approximately 20 Feet
Plate 14	TPH in Soil with Depth
Plate 15	Groundwater Elevations, July 9, 1991
Plate 16	Apparent Thickness of Free-Phase Petroleum Product, July 9, 1991
Plate 17	Drawdown Over Time, Pumping Well MW-13
Plate 18	Drawdown Over Time, Observation Well MW-2
Plate 19	Residual Drawdown Over Time, Pumping Well MW-13
Plate 20	Residual Drawdown Over Time, Observation Well MW-2
Plate 21	Groundwater Chemistry, June 25-26, 1991

1.0 INTRODUCTION

From 1929 to 1991, Carnation Company (Carnation) operated a dairy production facility at 1310 14th Street, Oakland, California. In January 1989, Carnation excavated an underground waste oil tank, two underground gasoline tanks, and two underground diesel storage tanks. During removal of the tanks, gasoline and diesel were observed to be present as a separate phase floating on groundwater in the excavations. Carnation investigated the extent of the contamination and implemented several interim remedial measures to address the gasoline and diesel problems. 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 (*Anania Geologic Engineering, 1989a,b*). 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 December 1990, Carnation retained Harding Lawson Associates (HLA) to review the existing site characterization and remediation data, to conduct additional site investigations, and to perform an engineering analysis of remediation alternatives. This report presents the results of the site characterization investigations conducted to date and assesses the extent of soil and groundwater contamination. The engineering analysis of remedial alternatives will be presented in a separate report.

1.1 Report Organization

The following sections describe the site setting, facility history, previous investigations, interim remedial measures, nature and extent of chemicals present in soils and groundwater, and fate and transport of these chemicals.

Section 2.0 describes the components of the site investigation. Results of the investigations are presented in Section 3.0. Discussion of the results and conclusions are presented in Section 4.0.

1.2 Site Background

1.2.1 Physical Setting

Carnation's dairy facility covers two city blocks bounded by 14th, 16th, Poplar, and Cypress streets (Plate 1) in Oakland, California. Former 15th Street and abandoned Kirkham Street run through the center of the facility. The topography at the facility generally slopes very gently to the west, toward San Francisco Bay. Land use in the vicinity is predominantly light industrial, with a few residential and commercial tracts east of the facility.

1.2.2 Surface Features

The entire site is covered with concrete or asphalt. An "L" shaped building consisting of a warehouse with four vehicle service bays occupies the northern and western sides of the site (Plate 2). An aboveground freezer unit exists south of the vehicle service bays. Four underground fuel tanks were buried adjacent to the vehicle service bays, and a waste oil tank was located beneath the warehouse. These underground tanks were removed in 1989. The Cypress Structure of Interstate Highway 880 (I-880), a former elevated freeway structure, existed west of the facility (Plate 2) and was extensively damaged during the October 17, 1989, Loma Prieta earthquake. This portion of I-880 was subsequently demolished.

1.2.3 Meteorology

Climatic conditions in this region are moderate with mild, wet winters and warm, dry summers. Representative mean high/low temperature and wind conditions are summarized below.

	<u>January</u>	<u>April</u>	<u>July</u>	<u>October</u>	<u>Annual</u>
1990 Average temperature (°F)	52.3	61.5	66.0	65.5	60.9
Average wind speed (mph) (long term average)	7.4	9.7	9.7	7.3	8.6
Average wind direction (long term average)	SE	W	NW	W	W
1990 Rainfall (in)	4.41	0.24	0.00	0.35	14.27

Wind data are long term averages from the California Air Resources Board (1984) for the Oakland International Airport Station, and temperature and rainfall data are from the National Oceanic and Atmospheric Administration (1990) for the Oakland Museum Station.

1.2.4 Geology and Hydrogeology

Previous investigations in this area indicate that the facility is underlain by a series of sand and silt deposits known as Merritt Sands. The thickness of these deposits beneath the facility is not known. Groundwater exists at a depth of approximately 10 feet below ground surface (bgs) at the facility. Regional groundwater flow is generally to the west-northwest toward San Francisco Bay.

1.2.5 Facility History

The facility was originally constructed by American Creamery in 1915. Carnation purchased the facility in 1929 and made additions and improvements to the buildings between 1946 and 1973 for dairy product processing and distribution. A maintenance yard for vehicles used in the distribution of dairy products operated at the facility and included underground fuel and waste oil storage tanks. Carnation ceased operations at the facility in March 1991.

1.2.6 Previous Investigations

During excavation and removal of the four underground fuel storage tanks in January 1989, gasoline and diesel were observed to be present as a separate phase floating layer in the excavation. Carnation retained the services of Anania Geological Engineering (AGE), to conduct site characterization activities and to implement several interim remedial measures to address the gasoline and diesel identified. These measures included installation of 33 groundwater monitoring wells (Plate 2 and Table 1). Monitoring Wells MW-17 through MW-21 have since been abandoned. Much of the preliminary site characterization and interim remedial measures information presented below was obtained from the following AGE reports: *Preliminary Site Characterization Report (1989a)*, *Summary Report for the Period of April through July 1989 (1989b)*, *Preliminary Assessment of the Source of PCB Contamination (1989c)*, and the *Results of the Offsite Investigation (1990)*.

1.2.7 Interim Remedial Measures

Carnation implemented a number of interim remedial measures, including excavation and removal of the underground storage tanks and associated soil; bioremediation of the excavated soil; installation of product recovery wells and removal of petroleum product floating on the groundwater table; operation of a groundwater extraction and carbon adsorption treatment system; in situ bioremediation of soil and groundwater; and installation and operation of a soil vapor extraction and treatment system.

During removal of the underground storage tanks, approximately 60 cubic yards (cy) of soil were excavated and stockpiled onsite. This soil was partially bioremediated by applying nutrients to the soil. Carnation also installed 103 2-inch diameter product recovery wells (Plate 2 and Table 1). Pumpage from these wells resulted in recovery of

approximately 5,000 gallons of gasoline and diesel from soil and groundwater.

Approximately 1.5 million gallons of groundwater were also pumped and treated by carbon adsorption, prior to discharge under permit from the East Bay Municipal Utility District (EBMUD). Carnation also conducted pilot-testing of a soil vapor extraction system. Additionally, Carnation attempted in situ groundwater bioremediation by injecting nutrients through the product recovery wells into the aquifer.

2.0 SITE CHARACTERIZATION

Between April and August 1991, HLA conducted the following additional site characterization activities:

- o Environmental site assessment
- o Drilling of 20 soil borings and collection and chemical analysis of 89 soil samples
- o Sampling of previously excavated soil
- o Monthly water-level and free-phase product measurements
- o Redevelopment of 4 wells
- o Aquifer testing and analysis
- o Sampling of 20 monitoring wells and analysis of groundwater samples for quarterly groundwater monitoring

All field work was conducted in accordance with the Quality Assurance/Quality Control Project Plan (QA/QC Plan) contained in the Carnation Facility Work Plan (HLA, 1991a).

The following sections describe the specific investigation tasks performed.

2.1 Environmental Site Assessment

Because there is a possibility that other offsite hazardous material source areas may have contributed to groundwater contamination in the area, HLA reviewed and evaluated published regulatory agency lists of sites within a 0.25-mile radius surrounding the property (Plate 3) to identify adjacent or nearby properties having hazardous materials/waste problems.

The following regulatory agency lists were reviewed:

- o U.S. Environmental Protection Agency (U.S. EPA) National Priorities List (NPL) for Uncontrolled Hazardous Waste Sites, February 1991

The NPL is a list of federal Superfund sites. There are no properties in the study area on the NPL.

- **U.S. EPA Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS), March 14, 1991**

CERCLIS provides information about businesses or properties identified as potential federal Superfund sites. There are no properties in the study area on the CERCLIS list.

- **Expenditure Plan for the Hazardous Substance Cleanup Bond Act of 1984 (State Bond Expenditure Plan), January 1991**

The State Bond Expenditure Plan list compiled by the California Department of Health Services (DHS) identifies hazardous waste sites in the state that have been targeted for cleanup by responsible parties, the DHS, or the U.S. EPA for the next five fiscal years. There are no properties in the study area on the State Bond Expenditure Plan List.

- **DHS Abandoned Sites Lists, February 4, 1991**

The DHS Abandoned Sites List provides information concerning past and present potential hazardous waste sites that could be considered potential State Bond Expenditure Plan sites. There are no properties in the study area considered active by the DHS and no properties in the study area on the DHS Abandoned Sites Lists.

- **California Regional Water Quality Control Board (RWQCB) Toxics Cases, March 5, 1991**

The RWQCB Toxics List provides a list of cases included in the RWQCB Site Management System for Alameda County. There are no properties in the study area listed as RWQCB Toxics Cases.

- **Hazardous Waste and Substances Site List (Cortese List), November 1990**

The Cortese List, compiled by the California State Office of Planning and Research, provides information concerning identified hazardous waste/substance sites within the state. Three properties in the study area are on the Cortese List.

The following properties are listed on the Cortese List and discussed in the RWQCB Fuel Leaks List for Alameda County:

- City of Oakland Housing Authority
935 Union Street
Oakland, California
- Nabisco Brands, Inc.
1267 14th Street
Oakland, California

- Carnation
1310 14th Street
Oakland, California

o **RWQCB Fuel Leaks List for Alameda County, March 1, 1991**

The RWQCB Fuel Leaks List for Alameda County lists site names, addresses and types of reported fuel leaks from underground storage tanks. Five properties (including Carnation) in the study area are included on the RWQCB Fuel Leaks List (Plate 3).

The following properties were further investigated by reviewing the regulatory agency files:

1) **City of Oakland Housing Authority**
935 Union Street
Oakland, California

This property is approximately 0.25-mile south of the site. The file indicates that one 600-gallon steel gasoline tank was removed in July 1988; no holes were observed in the tank when it was removed. Soil samples from the excavation were collected and analyzed. TPH as gasoline was not detected at concentrations above the detection limit (10 milligrams per kilogram [mg/kg]). Toluene was detected at 64 micrograms per kilogram ($\mu\text{g}/\text{kg}$). No other petroleum analytes were detected.

Because of the distance of this property from the site and the minor concentrations detected, the potential for this property to adversely affect the Carnation site is minimal.

2) **Nabisco Brands, Inc.**
1267 14th Street
Oakland, California

This property is across Poplar Street from the site and approximately 600 feet from the former underground tank locations at Carnation. In July 1989, when two 10,000-gallon underground No. 5 fuel oil tanks were removed at Nabisco, soil contamination was reported along the north side of the excavation. The soil sample collected at this location contained 170 mg/kg oil and grease. Approximately 88 cy of material were excavated from the bottom and sides of the tank pit and disposed offsite. A site investigation and assessment was required by the Alameda County Department of Environmental Health (ACDEH). Eleven soil borings were drilled and three monitoring wells were installed. Groundwater samples were collected and analyzed for benzene, toluene, ethylbenzene, and xylenes (BTEX); TPH as diesel; and oil and grease. None of the water samples had petroleum hydrocarbons above the level of detection. Groundwater flow was reported to be toward the northwest.

Because no petroleum hydrocarbons were detected in the groundwater at this facility, it does not appear that it is contributing to the hydrocarbon contamination observed at the Carnation facility.

3) **Cademartori Trucking**
1833 Peralta
Oakland, California

In July 1990, a 10,000-gallon diesel tank, a 1,000-gallon leaded gasoline tank, and a 5,000-gallon waste oil tank were excavated at the site. During tank removal, additional petroleum-stained soil was excavated and stockpiled onsite. Elevated concentrations of TPH as diesel (4,800 mg/kg) were detected in the stockpiled soil; 7.7 mg/l TPH as diesel was found in a groundwater sample from the fuel tank excavation; and 3.2 mg/l TPH as gasoline was found in groundwater from the waste oil tank excavation. A work plan to further investigate the site was submitted in October 1990, but there is no indication that any additional work has been conducted.

Because this site is approximately 0.25-mile north of the Carnation facility, it is unlikely that it is contributing to the groundwater contamination identified at Carnation; however, no wells have been installed to assess groundwater chemistry or flow direction.

4) **Mr. David Doyle**
1518 E. 12th Street
Oakland, California

The owner of this property removed two underground gasoline tanks without a permit and subsequently was required to conduct a site investigation. Six borings were drilled at the former tank location to characterize the area, with soil samples collected at a uniform depth of 11.5 feet below ground surface (bgs). The results indicated that TPH as gasoline was present at up to 646 mg/kg. In November 1989, the tank area was re-excavated to a depth of 11.5 feet bgs, where a consistent clay layer was encountered. The sides of the excavation were slightly over-excavated, sampled, and the samples analyzed for BTEX and TPH as gasoline. Low concentrations of BTEX were detected, but TPH was not present above the level of detection. No additional work has been conducted at this site.

This site is approximately 0.25-mile from the Carnation facility and is likely not contributing to the groundwater contamination identified. However, no wells were installed to assess whether groundwater had been affected by the leaking gasoline tanks.

Based on this information, adjacent hazardous materials or fuel leak sites do not appear to have contributed to the hydrocarbon contamination at the Carnation facility.

2.2 Soil Investigations

2.2.1 Soil Borings

To assess the lateral and vertical extent of petroleum hydrocarbons and PCBs in the soil, HLA drilled 20 soil borings onsite and near the site during June 1991 (Plate 4). Borehole drilling and sample collection followed protocols described in detail in the QA/QC Plan (HLA, 1991a). Nine of these borings were continuously cored to better define subsurface conditions. Fifteen of these borings were drilled to assess the distribution of petroleum hydrocarbons and animal fats in the soils; the remaining 5 borings (SB-3, SB-7, SB-8, SB-9, and SB-11) were used to assess the extent of PCBs in soils.

The borings were drilled using a truck-mounted hollow-stem auger rig. Soil samples were obtained using split-barrel and continuous coring equipment. Five soil samples from each of the 15 petroleum hydrocarbon borings were collected at the following intervals: one sample from above the main zone of hydrocarbons (at approximately 5 feet bgs); three from within the main zone of hydrocarbons (at approximately 10, 12.5, and 15 feet bgs); and one below the main zone of hydrocarbons (at approximately 20 feet bgs). The total depths of the borings were approximately 20 feet. The soil samples were collected in stainless-steel tubes, sealed with Teflon discs and plastic end caps, and placed in a cooler for delivery under chain of custody to National Environmental Testing (NET) laboratory, a state-certified analytical laboratory, in Santa Rosa, California. The soil samples were analyzed for TPH as gasoline, TPH as diesel, and TPH as motor oil using EPA Test Method 8015.

Soil samples collected from 10 of the borings were also analyzed for polar and nonpolar oil and grease, using EPA Test Methods 503D and E. This information was used to assess the distribution of animal fats in the soil.

AGE (1989c) reported that low concentrations of PCBs were detected in soil and product samples collected from product recovery Wells PR-12, PR-71, PR-72, and PR-85, located southwest of the freezer (Plate 2). Borings SB-3, SB-7, SB-8, SB-9, and SB-11 were drilled to assess the distribution of PCBs in this area. Three soil samples from each of these borings (at approximately 5, 10, and 15 feet bgs) were analyzed for PCBs using EPA Test Method 8080. The 10-foot bgs sample from Boring SB-6 was also analyzed using EPA Test Method 8080.

A lithologic log of each boring was prepared using the Unified Soil Classification System (USCS - Appendix B). After drilling, the boreholes were grouted using a cement-bentonite mixture. The soils generated during drilling were covered and stored onsite and will be disposed offsite.

2.2.2 Excavated Soil Pile Sampling

Approximately 60 cy of soil that was excavated when the underground tanks were removed are stockpiled onsite. This soil was bioremediated in 1989 by AGE; HLA sampled and analyzed the soil to assess residual chemical levels and disposal options. The sampling protocol involved dividing the soil pile into two 30-cy sections and collecting four soil samples 6 inches below the soil surface from each 30-cy section. The soil samples were collected in stainless-steel tubes, sealed with Teflon discs and plastic end caps, and placed in a cooler for delivery to NET laboratory under chain of custody. The four tubes from each 30-cy section were composited at the laboratory and then analyzed for TPH as gasoline and diesel using EPA Test Method 8015, for BTEX using EPA Test Method 8020, for polar and nonpolar total oil and grease using EPA Test Methods 503D and E, and for total lead using EPA Test Method 6010.

2.3 Groundwater and Free-Phase Petroleum Product Investigations

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

As discussed in Section 1.2.7, Carnation implemented several interim remedial measures, including operation of a free-phase petroleum removal system, a groundwater extraction and treatment system, and in situ bioremediation. These remedial actions continued until August 1990 and resulted in removal of approximately 5,000 gallons of free-phase product and 1.5 million gallons of groundwater. At that time, AGE reported that all free-phase product had been recovered.

In April 1991, HLA performed water-level measurements at the site and detected free-phase petroleum product in several monitoring and product recovery wells. The reappearance of free-phase petroleum product after the apparent removal of all available product in 1990 may be due to: 1) the slow rate at which free-phase petroleum product flows into the wells, and/or 2) remobilization and concentration of free-phase petroleum product as a result of the recent (Spring 1991) rise in the groundwater table.

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).

2.3.2 Well Redevelopment

HLA redeveloped several monitoring wells and product recovery wells where free-phase product is present. It was reported that AGE had injected microbial nutrients into monitoring and product recovery wells, which may have caused growth and buildup of biomass in the areas immediately around the wells. Well redevelopment allows assessment as to whether unrestricted entry of free-phase product into the wells is occurring and allows accurate determination of apparent free-phase product thicknesses. On June 24, 1991, Wells MW-7, MW-22, PR-20, and PR-53 (Plate 2) were redeveloped by repeatedly pumping the floating product from each well and surging each well approximately 100 times with a surge block. These wells were selected for redevelopment because they contain over 1 foot of product. Free-phase product thickness was remeasured 2 days, 14 days, and 52 days after redevelopment of the wells.

2.3.3 Aquifer Testing

A constant-rate aquifer test was conducted at the facility between July 31 and August 1, 1991, to evaluate aquifer hydraulic parameters. The testing consisted of a 24-hour continuous rate test and a recovery test. Existing Monitoring Well MW-13 (Plate 2) was used as the pumping well for the aquifer test. This well is located southeast (upgradient) of the main area of free-phase petroleum product. Wells MW-2, MW-12 and PR-59 were used as observation wells. A 0.5-horsepower submersible pump was installed in Well MW-13 to conduct the tests. During the tests, the pumping rate (2.0 gallons per minute) and water-level decline in the pumping well and observation wells were monitored on a regular basis. After pumping for approximately 24 hours, water-level recovery was monitored for approximately 8 hours, until water levels recovered to approximately pre-pumping levels. The groundwater generated

during the aquifer test was held in a Baker tank onsite and subsequently discharged to the storm sewer after approval had been received from the RWQCB.

The data collected were analyzed to assess the transmissivity, hydraulic conductivity and storage coefficient of the aquifer. These results will be used to assess remedial alternatives for soil and groundwater cleanup.

2.3.4 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 NET laboratory. 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 sampled were analyzed for BTEX using EPA Test Method 8020. Also, samples from 10 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 subsequently discharged to the sanitary sewer after obtaining a discharge permit from the EBMUD.

2.4 Soil and Groundwater Microbiology

Phase I laboratory treatability studies and Phase II bench-scale simulations were performed to evaluate the feasibility of an in situ bioremediation system. The biotreatability studies were performed using soil and groundwater samples collected from Borings SB-1, SB-4, SB-6, SB-12, SB-15, SB-16, and SB-17 and Wells MW-3, MW-25, and MW-26. Detailed discussion of the biotreatability studies is presented in Appendix E.

3.0 RESULTS OF INVESTIGATIONS

3.1 Site Geology

Lithologic logs were prepared for existing AGE and all HLA boring logs. These logs are contained in Appendices A and B, respectively. A key to the Unified Soil Classification System is also contained in Appendix B. Lithologic data obtained from the borings indicate the site is underlain by a series of gray, yellow, and brown colored sand, silty and clayey sand, and silt layers. The cleaner sand deposits (USCS Classifications SW and SP) are generally fine- to medium-grained, and are occasionally poorly-graded. The majority of the sediments beneath the site have been logged as silty or clayey sands (USCS Classifications SM and SC). A few lenses of low plasticity silts (USCS Classifications ML) are also present.

Plates 5 through 8 present a series of geologic cross sections showing the lithologies encountered in the borings. Cross Section A-A' (Plate 6) trends southwest to northeast, or roughly perpendicular to groundwater flow. Several lenses of poorly-graded sand were logged in Boring MW-4, and a lens of well-graded was logged in Boring SB-6. Unsaturated silts were observed in Borings SB-6, SB-14, and SB-18, and a thicker saturated silt was logged in Boring MW-5. However, the majority of the aquifer materials encountered in each boring on Cross Section A-A' consists of silty and clayey sands (Plate 6).

Cross Section B-B' (Plate 7) trends northwest to southeast, or roughly in the direction of groundwater flow. More heterogeneous lithologic materials are observed on Cross Section B-B'. Silts were logged in Borings MW-16, MW-3, SB-6, SB-7, and SB-9. The silts appear to thicken to the northwest. Clean sands were logged in Borings SB-6, SB-7, SB-8, and MW-12. These data suggest that the aquifer materials

upgradient (southeast) of the main zone of contamination are of higher permeability than the materials downgradient (northwest) of the contaminated zone.

Cross Section C-C' (Plate 8) trends south to north. A few lenses of clean sand were logged in borings SB-2, SB-6, SB-7, and MW-7; however, the vast majority of the lithologic deposits shown on Cross Section C-C' are clayey and silty sands.

The maximum depth characterized at the facility is approximately 45 feet (the approximate depths of Borings MW-1 and MW-4). Sandy deposits were logged from ground surface to this depth in both borings (Plate 6 and Appendix A).

3.2 Results of Soil Sampling

Chemical results for the soil samples collected and analyzed in June 1991 are summarized in Tables 2 and 3 and on Plates 9 through 13. Laboratory data sheets are contained in Appendix C.

3.2.1 Distribution of Petroleum Hydrocarbons in Soil

Plates 9 through 13 present TPH as gasoline and as diesel concentrations detected in soil at depths of approximately 5, 10, 12.5, 15, and 20 feet bgs, respectively. These data are also shown in Table 2. Plate 14 presents a three-dimensional representation of the distribution of the sum of TPH as gasoline and TPH as diesel with depth. Examination of the plates reveals that the highest concentrations and greatest areal distribution of TPH in soil is found at a depth of approximately 10 feet bgs, or near the groundwater table. This distribution is consistent with the nature of the petroleum hydrocarbons, because they are less dense than water and tend to pool and spread on the water table. Note that chemicals detected in soil samples collected below the water table (10-feet bgs and lower) reflect petroleum hydrocarbons in both soil and groundwater.

TPH was detected above reporting limits at a depth of 5 feet bgs in the area of Borings SB-1, SB-6, SB-10, SB-13, SB-14, SB-16, SB-17 and SB-20; the maximum concentration found at 5 feet bgs was 2,500 mg/kg of TPH as gasoline found in the sample from SB-14. At 10 feet bgs, samples from Borings SB-6, SB-10, SB-14, SB-15, SB-16, SB-17, and SB-20 contained detectable TPH, with a maximum concentration of 10,000 mg/kg TPH as gasoline detected in the sample from SB-17. At 12.5 feet bgs, samples from Borings SB-6, SB-13, SB-14, SB-16, and SB-17 contained detectable TPH, with a maximum concentration of 350 mg/kg TPH as gasoline detected in the sample from SB-6. At 15 feet bgs, samples from Borings SB-6, SB-13, SB-14, SB-16, and SB-17 contained detectable TPH, with a maximum concentration of 1,900 mg/kg TPH as gasoline detected in the sample from SB-16. At 20 feet bgs, only samples from Borings SB-6 and SB-16 contained detectable TPH, with a maximum concentration of 260 mg/kg TPH as gasoline detected in the sample from SB-16.

In general, the areal distribution and maximum concentrations of TPH as gasoline are greater than the areal distribution and maximum concentrations of TPH as diesel. The maximum TPH as diesel concentration in soil was 940 mg/kg in the sample from 10 feet bgs at Boring SB-16. Heavier molecular weight petroleum hydrocarbons were also detected in a lesser number of the soil samples and were quantified by the analytical laboratory as motor oil (Table 2). The maximum TPH as motor oil concentration in soil was 280 mg/kg in the sample from 10 feet bgs at Boring SB-16.

3.2.2 Distribution of Animal Fats in Soil

AGE reported the presence of large amounts of animal fats in soils and groundwater at the facility (AGE, 1989a). To quantify the volume of animal fats present in soils, the 5- and 10-foot bgs samples from 10 soil borings were analyzed for total and non-polar oil and grease (Table 2). Analysis of total oil and grease quantifies the

sum of both polar compounds, such as animal fats, and non-polar compounds, such as petroleum hydrocarbons. In general, the vast majority of oil and grease detected in the samples was non-polar (Table 2). The highest total oil and grease and non-polar oil and grease concentrations were 330 and 250 mg/kg, respectively, found in the 10-foot bgs sample from Boring SB-6. The highest polar oil and grease concentration was 130 mg/kg, found in the 11-foot sample from Boring SB-11. The generally low polar oil and grease concentrations suggest that the animal fats in soils reported by AGE are not widespread, and/or the animal fats previously reported are degrading over time.

3.2.3 Distribution of PCBs in Soil

Samples from Borings SB-3, SB-7, SB-8, SB-9, and SB-11 at depths of 5, 10, and 15 feet bgs were analyzed to evaluate the distribution of PCBs in soil. A sample from Boring SB-6 at 10 feet bgs was also analyzed for PCBs. Analysis by EPA Test Method 8080 provides quantification of the following PCB mixtures: Aroclor 1016, Aroclor 1221, Aroclor 1232, Aroclor 1242, Aroclor 1248, Aroclor 1254, and Aroclor 1260. Table 3 presents the results of the PCB analyses. The only PCB compound detected in the samples was Aroclor 1254, which was found in the 10 feet bgs sample from SB-6, and the 5, 10, and 15 feet bgs samples from Boring SB-8 at concentrations of 100, 55, 130, and 260 $\mu\text{g}/\text{kg}$, respectively. An oily liquid was observed in the soil samples and downhole sampling equipment from Boring SB-8. A sample of the liquid was obtained from the borehole and analyzed for PCBs; Aroclor 1254 was found at a concentration of 49,000 $\mu\text{g}/\text{kg}$. Based on these data, PCBs exist south of the warehouse and vehicle service bays and west of the freezer (Plate 4).

3.2.4 Volume of Chemical-Bearing Soil

Plate 14 shows the distribution of TPH concentrations in soil. The plate presents oblique views of the sum of TPH as gasoline and TPH as diesel at depths of

approximately 5, 10, 12.5, 15, and 20 feet bgs. These isoconcentration contours for each depth interval were used to estimate the total volumes of hydrocarbon-bearing soil at concentrations greater than 1.0 mg/kg and 100 mg/kg total TPH. The calculations were performed by determining the areas within the 1.0 and 100 mg/kg contour lines for each depth interval. The calculated areas were then multiplied by a representative thickness value for each depth. The areas calculated for the 5-foot bgs depth were multiplied by 7.5 feet, the depth from the ground surface to one-half the distance between the 5- to 10-foot bgs datum. Similarly, the areas calculated for the 10, 12.5, and 15-foot bgs depths were multiplied by thicknesses of 3.75, 2.5 and 3.75 feet, respectively (the half-distances between the respective depth planes). The areas calculated for the 20-foot bgs depth were multiplied by 2.5 feet, an assumed representative thickness.

The calculations yielded volumes of 23,000 and 10,000 cy of soil at concentrations greater than 1.0 and 100 mg/kg respectively. These volumes were used in the evaluation of remedial alternatives (*HLA, 1991b*).

PCBs were detected in soil samples from Borings SB-6 and SB-8. Due to its limited distribution, the volume of soil containing PCBs was not calculated.

3.3 Groundwater Elevations and Flow

Table 4 contains the groundwater elevation data collected on April 16, May 24, July 9, and August 15, 1991. In general, all accessible monitoring wells and selected product recovery wells were used to monitor the groundwater elevations and free-phase petroleum product thicknesses.

Plate 15 presents a groundwater elevation contour map using data collected on July 9, 1991. Note that in Table 4 and on Plate 14, 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 southwest beneath the northern portion of the site (Plate 15). 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, and 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 15). These data contradict the historical groundwater elevation data collected by AGE, who reported a generally north-northwest flow, offsite onto 16th Street. Wells MW-25 through MW-29 were installed by AGE to monitor offsite flow and transport; however, the groundwater elevation data collected in April, May, July, and August 1991 indicate flow is to the south from 16th Street onto the site.

3.4 Distribution of Free Product

Table 4 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 16. 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 16). However, product was not and has not historically been observed in the five offsite wells (MW-25 through MW-29), all of which are located relatively close to the Carnation warehouse. Wells MW-25 through MW-29 were installed by AGE to monitor offsite migration under the assumption that

flow and transport were to the north. Groundwater elevations indicate flow is south in this area, from the street to the site. 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.

The presence of free-phase petroleum product "floating on the water table" is indicated by the existence of product in the wells. The apparent hydrocarbon thickness in the wells is a measure of the hydrocarbon thickness in the formation itself; however, analysis of the impact of capillary forces in the aquifer formation surrounding the well shows that the apparent thickness measured in the well is not the same as the thickness in the formation (*Kemblowski and Chiang, 1990*). In fact, calculations and laboratory experiments have established that light petroleum product does not form a distinct layer floating on top of groundwater. The transition zone between the unsaturated and saturated groundwater zones is known as the capillary fringe. The capillary fringe is the zone overlying the zone of saturation containing capillary pores, some or all of which are filled with water that is continuous with water in the saturated zone, but is held above the saturated zone by capillary (surface tension) forces acting against gravity. When product is present, it exists in capillary pores above and within the zone of water saturation. However, only in cases where a large volume of the product is present does the product fully saturate the capillary pores. Generally, the product exists in a series of zones consisting of an upper zone containing water, product, and air; a middle saturated zone containing both water and product; and a lower saturated zone consisting of pores filled with water only. Theoretical, field, and laboratory studies have shown that the actual integrated thickness of product in the formation (the volume of product per unit area) is generally only 20 to 30 percent of the apparent thickness in the wells (for

gasoline and diesel in a sandy aquifer). More detailed discussions of the existence and distribution of free-phase petroleum product in aquifers can be found in Kemblowski and Chiang (1990) and Farr et al. (1990).

The approximate volume of free-phase petroleum product present in the aquifer was calculated by determining the areas between the product thickness contours (Plate 16), multiplying the areas by mean thickness values (0.5 feet for the area between the 0- and 1-foot contours, 1.5 feet for the area between the 1- and 2-feet contours, etc.), and multiplying the resulting volume by a correction factor of 0.25. These calculations yield a volume of 25,000 gallons of free-phase product beneath the facility in July 1991.

3.5 Well Redevelopment

Table 5 summarizes the apparent free-phase petroleum product thicknesses in Wells MW-7, MW-22, PR-20, and PR-53 before and after well redevelopment. Prior to well redevelopment, free-phase petroleum product was measured on April 16, May 24, and June 24, 1991. Product thickness was then measured 2, 15, and 52 days after redevelopment. These data reveal that after redevelopment, the product thickness in Well MW-22 recovered to approximately predevelopment thicknesses. The product thickness in Wells MW-7, PR-20, and PR-53 recovered to 70 and 90 percent of predevelopment thicknesses. These data suggest that, under natural gradient conditions, flow of product into the wells occurs at relatively low rates (as evidenced by the data collected 2 and 15 days after redevelopment), but that all the wells had recovered to 70 to 100 percent of predevelopment levels within 52 days.

3.6 Aquifer Testing

Aquifer test results are presented on Plates 17 through 20 and summarized in Table 6. Pumping Well MW-13 was able to sustain a constant discharge of 2.0 gallons per minute for 24 hours, without the water level dropping to the pump intake.

The drawdown in the pumping well after 24 hours was approximately 5.6 feet (Plate 17). The drawdown in Observation Well MW-2, located at a radial distance of 57.2 feet from the pumping well, was approximately 0.30 feet after 24 hours (Plate 18). Observation Wells MW-12 and PR-59 did not show significant drawdown response; data from these wells were not analyzed. Residual drawdown (recovery) data for MW-13 and MW-2 are presented on Plates 19 and 20, respectively. The observation well drawdown and recovery data (Plates 18 and 20) showed a considerable amount of "noise". The cause of this noise is unknown, but it may be related to the large amount of heavy commercial vehicle traffic onsite and in the immediate area and/or the presence of other nearby pumping wells.

Two methods were used to analyze the aquifer test data. The classical Theis (1935) method was used to analyze the drawdown data, and the residual drawdown method (*Theis, 1935*) was used to analyze the recovery data. Both methods assume homogeneous, isotropic aquifer conditions, and a fully penetrating pumping well discharging at a constant rate.

Table 6 summarizes the results of the analyses. Aquifer transmissivities derived from the pumping and observation well drawdown data were 24 and 280 square feet per day (ft^2/day), respectively. The transmissivity value derived from the pumping well is considered to be less reliable because of possible well losses.

The aquifer transmissivity values derived from the pumping and observation well recovery data were 230 and 220 ft^2/day , respectively (Table 6). The average aquifer

transmissivity for the observation well drawdown, pumping well recovery, and observation well recovery data is 240 ft²/day.

Hydraulic conductivities calculated for the pumping and observation well drawdown and recovery data were 3.4, 40, 32, and 31 feet/day (Table 6), respectively, with an average hydraulic conductivity of 34 feet/day, excluding the pumping well data. A storage coefficient of 1.1×10^{-4} was calculated for the observation well drawdown data (Table 6). These data are consistent with the types of lithologic materials (silty sands) logged in Wells MW-2 and MW-13.

Using Darcy's Law, the range of hydraulic gradients, and the average hydraulic conductivity value, and assuming an effective porosity of 0.2 for sand, pore-water velocities range from 0.17 to 1.3 feet per day.

3.7 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 7 and presented on Plate 21. Laboratory data sheets are contained in Appendix D.

3.7.1 Distribution of Petroleum Hydrocarbons in Groundwater

Of the 20 wells sampled (22 total samples), TPH as gasoline, TPH as diesel, and TPH as motor oil were detected in samples from only 3, 1, and 1 of the wells, respectively (Table 7). 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 in only 1 of 14 samples tested (Well MW-26) above the reporting limit. 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 to

non-detectable concentrations by 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, or offsite Wells MW-29, and MW-28; only 0.8 and 1.8 $\mu\text{g/l}$ benzene were detected in offsite Wells MW-25 and MW-27, respectively. These data suggest that a dissolved hydrocarbon plume has not been transported significantly offsite. Possible reasons for the limited extent of the dissolved hydrocarbon plume are discussed in Section 4.3.

3.7.2 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 $\mu\text{g/l}$, respectively), and in the sample from onsite Well MW-32 (at 14 $\mu\text{g/l}$). Since 1,2-DCA was detected in samples from only 2 of the 9 wells analyzed using EPA Test Method 8240, these data do not necessarily indicate a source of 1,2-DCA at the facility; HLA recommends continued monitoring of these two wells and analysis of samples for chlorinated hydrocarbons to verify the presence of this compound.

3.7.3 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 $\mu\text{g/l}$, respectively. Oil and grease were not detected in the duplicate sample from Well MW-26 above the reporting limit of 5,000 $\mu\text{g/l}$ (Table 7).

3.7.4 Groundwater OA/OC 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 D.

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 D. In general, surrogate recoveries and blank spike recoveries were all close to 100 percent.

3.8 Microbiological Evaluation

The results of the biodegradation treatability studies indicate that enhancement of the indigenous microorganisms (by providing nutrients) is effective in degrading petroleum hydrocarbons in soil and groundwater at the facility. A detailed discussion of the biotreatability study results is presented in Appendix E.

4.0 SUMMARY AND CONCLUSIONS

4.1 Soil Chemistry

Data obtained from the soil boring program indicate the areal distribution of petroleum hydrocarbons in soil is generally limited to the onsite area and the offsite area near Boring SB-20. The depth of the hydrocarbon contamination in soil appears to be just over 20 feet bgs. The estimated volumes of soil containing petroleum hydrocarbons at concentrations greater than 1.0 and 100 mg/kg are 23,000 and 10,000 cy, respectively.

Relatively low concentrations of polar oil and grease, assumed to be animal fats, were detected in a few soil samples. Due to the relatively low concentrations and limited areal distribution, the animal fats do not pose a threat to human health or water quality.

A relatively small volume of soil, located south of the warehouse and west of the freezer, was found to contain the PCB Aroclor 1254.

4.2 Groundwater Flow

Based on groundwater elevation data collected in April, May, July, and August 1991, groundwater flow directions are variable across the site. Flow beneath the southern portion of the site is to the northwest, while flow beneath the northern portion of the site is to the southwest. Calculated pore-water velocities range from 0.17 to 1.3 feet per day.

4.3 Fate and Transport of Free-Phase Petroleum Product and Dissolved Hydrocarbons

As discussed in Sections 3.4 and 3.7, the distribution of free product appears to be limited to the onsite area, just south of and beneath the warehouse and vehicle service bays. The estimated volume of free-phase petroleum product present beneath the facility in July 1991 was 25,000 gallons.

Dissolved hydrocarbons also appear to be limited to the onsite and nearsite area. These findings are somewhat surprising, given the age and history of the facility and the calculated groundwater velocities. However, the migration of dissolved hydrocarbon constituents and their dissolved concentrations in groundwater is known to be reduced by a number of physical, chemical, and biological processes. These processes include volatilization into air, adsorption onto soil, and chemical and biological degradation. The extent to which each of these processes occurs depends on the physical and chemical properties of the air, soil, groundwater, and the dissolved constituents themselves. However, it has been HLA's experience that the lateral extent of dissolved petroleum hydrocarbons downgradient of source areas in the Merritt Sands can be limited by one or more of these natural processes (see *Investigation Plan, Chinatown Redevelopment Project Area, Oakland, California; HLA, 1990*). The Carnation groundwater chemistry data suggest that one or more of the processes listed above have acted to limit the migration of dissolved hydrocarbons offsite. However, continued groundwater sampling will be performed to monitor hydrocarbon distribution over time.

5.0 REFERENCES

- Anania Geologic Engineering, 1989a. *Preliminary Site Characterization Report, Carnation Dairy Facility, Oakland, California.* April.
- _____, 1989b. *Summary Report for the Period of April through July 1989, Carnation Dairy Facility, Oakland, California.* October.
- _____, 1989c. *Preliminary Assessment of the Source of PCB Contamination, Carnation Dairy Facility, Oakland, California..* October.
- _____, 1990. *Results of Offsite Investigation, Carnation Dairy Facility, Oakland, California.* January.
- California Air Resources Board, 1984. *California Surface Wind Climatology.* June.
- Farr, A.M., Houghtalen, R.J., and McWhorter, D.B., 1990. *Volume Estimation of Light Nonaqueous Phase Liquids in Porous Media.* Groundwater, Volume 28, No. 1.
- Harding Lawson Associates, 1991a. *Work Plan, Carnation Facility, Oakland, California.* May.
- _____, 1991b. *Engineering Evaluation, Carnation Facility, Oakland, California.* September.
- _____, 1990. *Investigation Plan, Chinatown Redevelopment Project Area, Oakland, California.* June.
- Kemblowski, M.W., and Chiang, C.Y., 1990. *Hydrocarbon Thickness Fluctuations in Monitoring Wells.* Groundwater, Volume 28, No. 3.
- National Oceanic and Atmospheric Administration, 1990. *Climatological Data Annual Summary, California.* Vol. 94, No. 13.
- National Environmental Testing Laboratories, 1991. Written communication regarding analysis of soil samples.
- Theis, C.V., 1935. *The Relationship Between the Lowering of the Piezometric Surface and the Rate and Duration of Discharge of a Well Using Ground-Water Storage.* American Geophysical Union Transcripts, v. 16, p. 519-524.

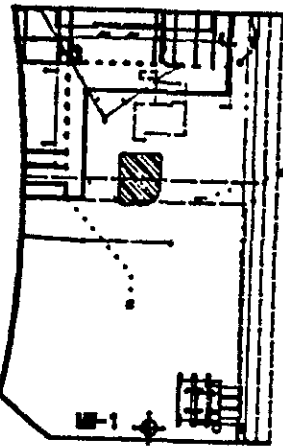
Appendix A

AGE BORING LOGS AND WELL COMPLETION DETAILS

ANANIA GEOLOGIC ENGINEERING

BORING LOG

LOCATION OF BORING



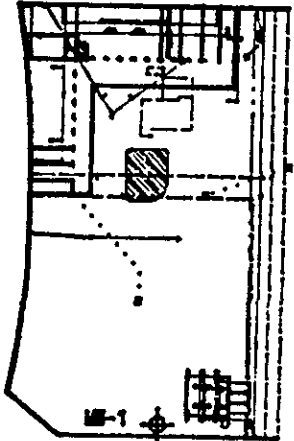
SITE/LOCATION		CARPENTON/OAKLAND				BORING NO.	
PROJECT NO.		004-88-060				MW-1	
WATER LEVEL ELEVATION	8.55	8.80	8.54	8.28	SHEET 1		
TIME					OF 3		
DATE	4-28-88	6-7-88	7-5-88	7-31-88	DRILLER		
CASING DEPTH ESTIMATED					START	FINISH	
DRILLING CONTRACTOR	PC EXPLORATION				TIME	TIME	
DRILLER	W.D.C. MOORE				6:30	11:50	
DRILLING METHOD	HOLLOW STEM AUGER				DATE	DATE	
SAMPLING METHOD	140# HAMMER 30" DROP, MODIFIED CALIFORNIA SAMPLER				3-15-88	3-15-88	
LOGGER	ERIC HOLM						
N/S	N 2227.7		E/W		E 3067.1		
					ELEV. 10.82		
BORING DIAMETER:	10 INCHES			WELL CASING DIAMETER: 4 INCHES			
REVIEWED BY:	M.A.M.				DATE 7-6-88		

DIST. FROM SURF.	WELL CONST.			LEND	T.V. READING	SAMPLE NO.	RECOVERY	BLOWS PER 6 IN.	USCS	LOG OF MATERIAL
	CASING	ANNULUS								
1		4# BENTONITE CEMENT SLURRY					X	8	GP	ASPHALTIC CONCRETE
2					0		X	8	GP	SANDY GRAVEL - BLACK-BROWN, DRY TO MOIST, CLASTS ARE ANGULAR 3/4" GRAY QUARTZ, MAFICS, MEDIUM DENSE, NO HYDROCARBON ODOR.
3					0		X	7	SM	
4		3/8" BENT. PELLETS					X	8		
5					0	3640	X	8		SILTY SAND - RED-BROWN, MOIST, MEDIUM DENSE, AREAS OF OXIDATION. QUARTZ, MAFICS, NO HYDROCARBON ODOR.
6					0		X	7		
7							X	8		
8							X	8		
9							X	10		
10					0	3650	X	8		NO HYDROCARBON ODOR.
11							X	10		
12							X	10		
13							X	15		
14							X	9		GRADES - WET, NO HYDROCARBON ODOR.
15							X	11		
16							X	14		
17							X	8		
18							X	7		
19							X	7		
20							X	8		
21							X	8		
22							X	7		
23							X	7		
24							X	8		
25							X	8		
26							X	7		
27							X	7		
28							X	8		
29							X	8		
30							X	8		

ANANIA GEOLOGIC ENGINEERING

BORING LOG

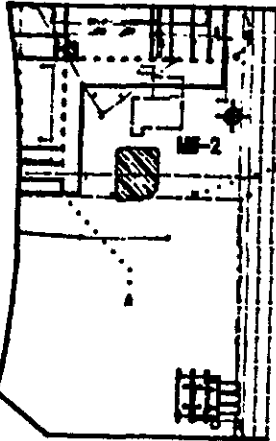
LOCATION OF BORING



SITE/LOCATION		CARBATION/DANLAND				BORING NO.	
PROJECT NO.		004-88-088				MW-1	
WATER LEVEL ELEVATION		8.88	8.80	8.54	8.28	SHEET 2	
TIME						OF 3	
DATE		4-25-88	6-7-88	7-5-88	7-31-88	DRILLER	
CASING DEPTH ESTIMATED						START	FINISH
DRILLING CONTRACTOR		PC EXPLORATION				8:50	11:50
DRILLER		MIKE MOORE				DATE	DATE
DRILLING METHOD		HOLLOW STEM AUGER				5-15-88	3-15-88
SAMPLING METHOD		140# HAMMER 30' DROP, MODIFIED CALIFORNIA SAMPLER					
LOGGER		ERIC HOLM					
N/S		M 2227.7		E/W		E 3067.1	
						ELEV. 19.82	
BORING DIAMETER:		10 INCHES			WELL CASING DIAMETER: 4 INCHES		
REVIEWED BY:		M.A.M.				DATE 7-5-88	

DIST. FROM SURF.	WELL CONST.		LEGEND	TLV READING	SAMPLE NO.	RECOVERY	BLOWS PER 6 IN.	USCS	LOG OF MATERIAL	
	CASING	ANNULUS								
21			[Pattern: Dotted]			X	18	SP	SAND- GREEN-BROWN, WET, DENSE, MEDIUM TO COARSE GRAINED WITH TRACE SILT, AREAS OF OXIDATION, QUARTZ, MAFICS, NO HYDROCARBON ODOOR.	
						X	19			
								20		
22							X	20	SM	SILTY SAND- LIGHT BROWN, WET, DENSE, AREAS OF OXIDATION, QUARTZ, MAFICS, NO HYDROCARBON ODOOR.
							X	25		
							X	20		
23							X	21		
							X	27		
							X	20		
24							X	20		
							X	20		
25							X	20		
							X	21		
26							X	23		
							X	25		
27							X	30		
							X	30		
28							X	30		
							X	32		
29							X	33		
							X	33		
30							X	32	SP	SAND- BROWN, WET, VERY DENSE, MEDIUM GRAINED WITH SOME SILT, QUARTZ, MAFICS, NO HYDROCARBON ODOOR.
							X	33		
31							X	36	SM	SILTY SAND- LIGHT BROWN, WET, VERY DENSE, QUARTZ & MAFICS, NO HYDROCARBON ODOOR.
							X	36		
							X	33		
32							X	36		
							X	30		
33							X	31		
								32		
								28		
34							X	32		
							X	34		
35						X	28			
						X	22			
36						X	29			
						X	30			
37						X	30			
						X	31			
38						X	32			
						X	30			
39						X	30			
						X	31			
40						X	30	NO HYDROCARBON ODOOR.		

LOCATION OF BORING



SITE/LOCATION		CARNATION/OAKLAND			BORING NO.	
PROJECT NO.		004-88-068			MW-2	
WATER LEVEL ELEVATION		6.36	6.57	6.26	SHEET 1	
TIME					OF 2	
DATE		4-25-88	6-7-88	7-5-88	DRILLER	
CASING DEPTH					START	FINISH
DRILLING CONTRACTOR		PC EXPLORATION			TIME	TIME
DRILLER		MIKE MOORE			7:30	12:00
DRILLING METHOD		HOLLOW STEM AUGER			DATE	DATE
SAMPLING METHOD		140# HAMMER 30' DROP, MODIFIED CALIFORNIA SAMPLER			3-17-88	3-17-88
LOGGER		ERIC HELM				
N/S		M 2500.9	E/W	E 3233.9	ELEV. 16.82	
BORING DIAMETER:		10 INCHES		WELL CASING DIAMETER: 4 INCHES		
REVIEWED BY: M.A.M.				DATE 7-5-88		

DIST. FROM SURF.	WELL CONST.		LEGEND	TLY READING	SAMPLE NO.	RECOVERY	BLOWS PER 6 IN.	USCS	LOG OF MATERIAL
	CASING	ANNULUS							
1			4" BENTONITE CEMENT SLURRY					GP	ASPHALTIC CONCRETE
2					120	X	5		SM
3			BLANK			X	4		
4						X	5		
5			3/8" BENT. FELL.			X	6		
6					320	3636	X	6	
7			65 SAND			X	7		
8						X	10		
9						X	11		
10					140	X	14		
11						X	8		
12						X	9		
13					180	X	9		
14						3636	X	10	
15						X	11		
16					70	X	12		
17					X	8			
18					X	9			
19				80	X	9			
20					X	8			
21					X	8			
22				80	X	7			
23					X	7			
24					X	7			
25				150	X	7			
26					X	7			
27					X	7			
28				20	X	8			
29					X	8			
30					X	8			
31				20	X	8			
32					X	8			
33					X	8			
34				25	X	9			
35					X	9			
36					X	9			
37					X	9			
38					X	9			
39					X	9			
40					X	9			

LOG OF MATERIAL

ASPHALTIC CONCRETE

SANDY GRAVEL - BROWN, MOIST, MEDIUM DENSE

SILTY SAND - GREENISH GRAY, DRY TO MOIST, SLIGHT HYDROCARBON ODOR WITH QUARTZ AND MAFICS, GRADES MEDIUM DENSE WITH VEINS OF GRAY CLAY VEINS OF GRAY CLAY, ORGANICS (?) CENTER OF VEINS, CLAY VEINS ARE VERTICAL.

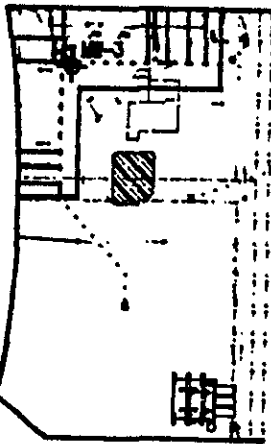
COLOR CHANGE TO REDDISH BROWN, HYDROCARBON ODOR.

GRADES WITH LENSES OF GRAY SAND; AREAS OF OXIDATION.

REDDISH BROWN, NO HYDROCARBON ODOR.

NO HYDROCARBON ODOR.

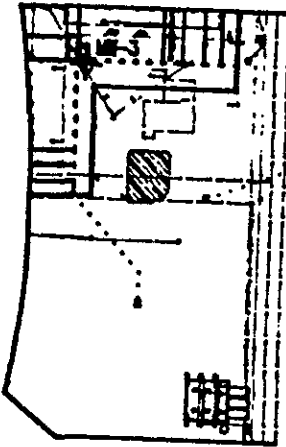
LOCATION OF BORING



SITE/LOCATION		CARRIATION/OAKLAND		BORING NO.	
PROJECT NO.		004-88-088		MW-3	
WATER LEVEL ELEVATION		4.22	4.75	SHEET 1	
TIME				OF 2	
DATE		7-5-89	7-31-89	DRILLER	
CASING DEPTH				START	FINISH
DRILLING CONTRACTOR		PC EXPLORATION		TIME	TIME
DRILLER		MIKE MOORE		1:15	4:20
DRILLING METHOD		HOLLOW STEM AUGER		DATE	DATE
SAMPLING METHOD		140# HAMMER 30' DROP, MODIFIED CALIFORNIA SAMPLER		3-21-89	3-21-89
LOGGER		ERIC HOLM			
N/S	N28°3.2	E/W	E31°14.7	ELEV. 14.86	
BORING DIAMETER: 10 INCHES		WELL CASING DIAMETER: 4 INCHES			
REVIEWED BY: W.A.M.				DATE: 7-10-89	

DIST. FROM SURF.	WELL CONST.			TLV READING	SAMPLE NO.	RECOVERY	BLOWS PER 6 IN.	USCS	LOG OF MATERIAL
	CASING	ANNULUS	LEGEND						
1								GM	ASPHALTIC CONCRETE
2								GM	SILTY GRAVEL- GRAY, MOIST, MEDIUM DENSE.
3							8		
4	BLANK			150	3829	X	8		SILTY SAND- GREENISH GRAY, SLIGHTLY MOIST, MEDIUM DENSE WITH MAFICS, QUARTZ, HYDROCARBON ODOR.
5					3830	X	8		
6				220	3831-	X	7	SM	
7					3832-	X	7	SM	COLOR CHANGES TO REDDISH BROWN
8									HYDROCARBON ODOR
9						X	8		
10				880	3833	X	8	ML	SANDY SILT- MOTTLED AND REDDISH BROWN, GRAY, MOIST, MEDIUM STIFF, HYDROCARBON ODOR.
11					3834	X	9	ML	
12									
13									
14						X	8		
15				45	3836	X	8		SILTY SAND- RED BROWN, WET, MEDIUM DENSE WITH MINOR LAMINATIONS, MAFICS, NO HYDROCARBON ODOR.
16					3837	X	8		
17						X	7	SM	
18						X	7	SM	
19				10		X	8		
20						X	8		NO HYDROCARBON ODOR.

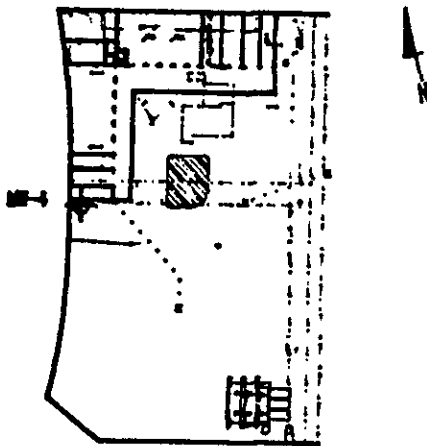
LOCATION OF BORING



SITE/LOCATION		CARRATON/OAKLAND		BORING NO.	
PROJECT NO.		004-88-068		MW-3	
WATER LEVEL ELEVATION		4.22	4.76	SHEET 2	
TIME				OF 2	
DATE		7-8-88	7-31-88	DRILLER	
CASING DEPTH				START	FINISH
DRILLING CONTRACTOR		PG EXPLORATION		TIME	TIME
DRILLER		MIKE MOORE		1:15	4:20
DRILLING METHOD		HOLLOW STEM AUGER		DATE	DATE
SAMPLING METHOD		140' HAMMER 30' DROP, MODIFIED CALIFORNIA SAMPLER		3-21-88	3-21-88
LOGGER		ERIC HOLM			
N/S	N 28° 53.2	E/W	E 314.7	ELEV. 14.88	
BORING DIAMETER: 10 INCHES		BORING DIAMETER: 4 INCHES			
REVIEWED BY: W.A.M.		DATE: 7-10-88			

DIST. FROM SURF.	WELL CONST.		LEGEND	TLY. READING	SAMPLE NO.	RECOVERY	BLOWS PER 6 IN.	USCS	LOG OF MATERIAL
	CASING	ANNULUS							
21			[Dotted pattern]					SM	WITH MINOR LAMINATIONS, MAFICS & QUARTZ, NO HYDROCARBON ODOR. TEST BORING TERMINATED @ 28'
22									
23									
24						X	5		
25					X	5			
26				4	X	6		TD	MATERIALS: 7 1/2 BAGS OF #3 SAND 1 1/2 BAGS OF CEMENT 1 5 GALLON BUCKET OF BENTONITE
27									
28									
29									
30									
31									
32									
33									
34									
35									

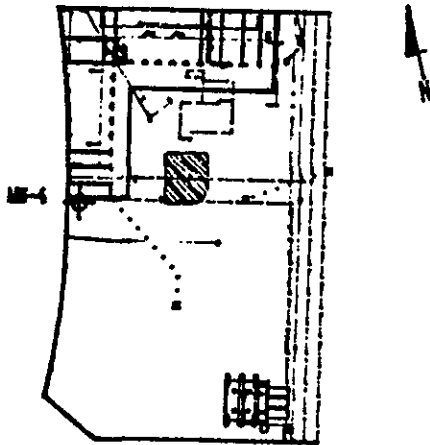
LOCATION OF BORING



SITE/LOCATION				CARNATION/OAKLAND				BORING NO.	
PROJECT NO.				004-88-059				MW-4	
WATER LEVEL ELEVATION		6.29	5.57	5.37	4.92	SHEET 1			
TIME						OF 3			
DATE		4-25-89	6-7-89	7-6-89	7-31-89	DRILLER			
CASINO DEPTH ESTIMATED						START	FINISH		
DRILLING CONTRACTOR		PC EXPLORATION				TIME	TIME		
DRILLER		MIKE MOORE				7:30	4:20		
DRILLING METHOD		HOLLOW STEM AUGER				DATE	DATE		
SAMPLING METHOD		140# HAMMER 30" DROP, MODIFIED CALIFORNIA SAMPLER				3-15-89	3-15-89		
LOGGER		ERIC HOLM							
N/S		N 2484.9		E/W		E 3023.1		ELEV. 14.84	
BORING DIAMETER:		10 INCHES		WELL CASINO DIAMETER:		4 INCHES			
REVIEWED BY:				M.A.M.				DATE: 8-15-89	

DIST. FROM SURF.	WELL CONST.			TLV READING	SAMPLE NO.	RECOVERY	BLOWS PER 6 IN.	USCS	LOG OF MATERIAL
	CASINO	ANALLIS	LEGEND						
1			4# BENTONITE CEMENT SLURRY			X		GM	ASPHALTIC CONCRETE
2						X	7		SANDY GRAVEL- MOIST, MEDIUM DENSE WITH DEBRIS (CERAMIC PIPE PIECES) FILL.
3						X	7		
4					25	3681	X		9
5			3/8" BENT. PELLETS			X	7	SM	SILTY SAND- RED BROWN, DRY TO MOIST, MEDIUM DENSE WITH ORGANICS, QUARTZ, MAFICS, NO HYDROCARBON ODOOR.
6						X	8		
7			#3 SAND			X	7	SM-SC	
8						X	8		
9						X	8		
10						X	10		
11						X	7		
12						X	8		
13						X	8		
14						X	7		
15						X	8		
16						X	8		
17					X	7			
18					X	7			
19					X	8			
20					X	8			

LOCATION OF BORING



SITE/LOCATION				CARNATION/OAKLAND		BORING NO.	
PROJECT NO.				004-88-068		MW-4	
WATER LEVEL ELEVATION		0.29	0.57	0.57	4.32	SHEET 2	
TIME						OF 3	
DATE		4-25-88	6-7-88	7-6-88	7-31-88	DRILLER	
CASING DEPTH ESTIMATED						START	FINISH
DRILLING CONTRACTOR		PC EXPLORATION				TIME	TIME
DRILLER		MIKE MOORE				7:30	4:00
DRILLING METHOD		HOLLOW STEM AUGER				DATE	DATE
SAMPLING METHOD		140# HAMMER 30" DROP, MODIFIED CALIFORNIA SAMPLER				3-20-88	3-20-88
LOGGER		ERIC HOLM					
N/S		N 2484.8		E/W		E 3023.1	
BORING DIAMETER:		10 INCHES		WELL CASING DIAMETER:		4 INCHES	
REVIEWED BY:		M.A.M.		DATE:		7-10-88	

DIST. FROM SURF.	WELL CONST.		LEGEND	TLY READING	SAMPLE NO.	RECOVERY	BLOWS PER 6 IN.	USCS	LOG OF MATERIAL		
	CASING	ANNULUS									
21			[Dotted pattern]			X	8	SP			
						X	9				
						X	9				
22						X	10		SM		
						X	11				
23					3	X	9				
						X	8				
24						X	7				
					8	X	9				
25								10		SP	
								8			
26						X	8				
						X	8				
27						X	8				
					2	X	8				
28								8			
								8			
29						X	8				
						X	8				
30						X	7				
						X	8				
31						X	7				
						X	8				
32								8		SM	
						X	8				
33						X	8				
						X	8				
34						X	8				
								8			
35								8		SM	
							8				
36					X	8					
					X	8					
37					X	8					
					X	8					
38							8		SM		
							8				
39					X	8					
					X	8					
40							8				
							8				
41					7	X	8				
						X	8				
42							8				
							8				

0.500 INCHES
LATE

10 SVD

SILTY SAND- RED BROWN, WET, MEDIUM DENSE WITH AREAS OF OXIDATION, QUARTZ, MAFICS, NO HYDROCARBON ODOR.

SAND- RED BROWN, WET, MEDIUM DENSE, MEDIUM GRAINED WITH LENSES OF GREEN GRAY SAND, QUARTZ, MAFICS, NO HYDROCARBON ODOR.

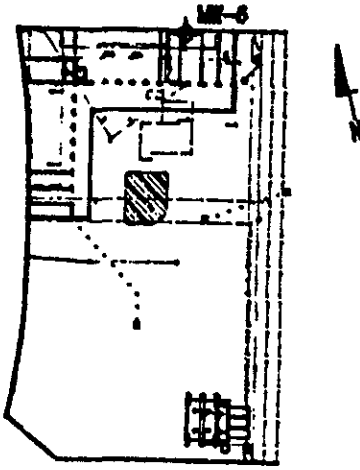
SILTY SAND- RED BROWN, WET, LOOSE TO MEDIUM DENSE, AREAS OF OXIDATION, QUARTZ, MAFICS, NO HYDROCARBON ODOR.

GRADES WITH TRACE OF SMALL GRAVEL

SILTY SAND- GREEN GRAY, WET, MEDIUM DENSE, FINE GRAINED WITH AREAS OF OXIDATION, QUARTZ, MAFICS, NO HYDROCARBON ODOR.

NO HYDROCARBON ODOR.

LOCATION OF BORING



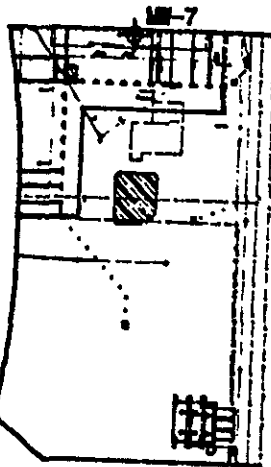
SITE/LOCATION		CARRINGTON/OAKLAND			BORING NO.	
PROJECT NO.		004-06-060			MW-6	
WATER LEVEL ELEVATION	0.07	****	****	4.00	SHEET 1	
TIME					OF 1	
DATE	4-25-00	6-7-00	7-6-00	7-31-00	DRILLER	
CASING DEPTH					START	FINISH
DRILLING CONTRACTOR					ENSCO SERVICES	TIME
DRILLER					J R	TIME
DRILLING METHOD					HOLLOW STEM AUGER	DATE
SAMPLING METHOD					140# HAMMER 30' DROP, MODIFIED CALIFORNIA SAMPLER	DATE
LOGGER					NICK COFFEY	
N/S	N 2434.0	E/W	E 3250.1	ELEV.	14.70	
BORING DIAMETER:			6 INCHES	WELL CASING DIAMETER:		
				2 INCHES		
REVIEWED BY:					M.A.M.	DATE:
						6-17-00

DIST. FROM BLUFF	WELL CONST.	WELL CONST.	LENSID	TYL READING	SAMPLE NO.	RECOVERY	BLOWS PER 6 IN.	USCS	LOG OF MATERIAL
1	CASING	ANNULUS							PORTLAND CEMENT CONCRETE
2		4# BENTONITE CEMENT SLURRY						SP	SAND- OLIVE, MOIST, LOOSE, VERY FINE GRAINED, ANGULAR TO SUB-ANGULAR GRAINS, OILY ODOR.
3	BLANK								
4		3/8" BENT. PELLET					6	SM	SILTY SAND- OLIVE, MOIST, MEDIUM DENSE, FINE GRAINED WITH LITTLE SILT, SUB-ANGULAR TO SUB-ROUNDED SAND.
5					3184		11		3 1/2" - 4 2" : OILY ODOR.
6								SC	CLAYEY SAND- BLACK, MOIST, MEDIUM DENSE WITH OILY ODOR.
7									5 0" - APPROX. 6 0" : WITH OILY ODOR.
8								SP	
9							6	SM	SAND- OLIVE, VERY FINE TO FINE GRAINED, SUB-ANGULAR TO SUB-ROUNDED, TRACE SILT.
10					3185		11		
11	0.020 INCH SLOTT								SILTY SAND- MOTTLED LIGHT YELLOW BROWN AND OLIVE, WET, LOOSE WITH LITTLE SILT, SUB-ROUNDED TO ROUNDED SAND, LITTLE TO NO HYDROCARBON ODOR.
12									
13									
14									
15									
16					3186		3		LITTLE TO NO ODOR, OXIDIZED ZONES 1/4" X 1/8"-1/32".
17							6		
							6		
									TEST BORING TERMINATED @ 17' ON 3-17-00
									MATERIALS: 4 BAGS OF #3 SAND
									1 BAG OF CEMENT
									2/3-5 GALLON BUCKET OF BENTONITE
									**** WATER LEVEL NOT MEASURED, WELL CONTAINED FREE PRODUCT.

ANANIA GEOLOGIC ENGINEERING

BORING LOG

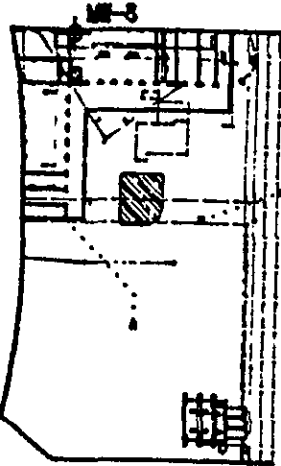
LOCATION OF BORING



SITE/LOCATION		OWNERS/DRAWN		BORING NO.	
PROJECT NO.		004-88-088		MW-7	
WATER LEVEL ELEVATION		****	****	SHEET 2	
TIME				OF 2	
DATE		4-25-88	6-7-88	DRILLER	
CASING DEPTH				START	FINISH
DRILLING CONTRACTOR		ENSCO SERVICES		TIME	TIME
DRILLER		J R		13:00	13:00
DRILLING METHOD		HOLLOW STEM AUGER		DATE	DATE
SAMPLING METHOD		140# HAMMER 30" DROP, MODIFIED CALIFORNIA SAMPLER		3-18-88	3-18-88
LOGGER		NICK COFFEY			
N/S	N 2880.0	E/W	E 3188.2	ELEV. 14.74	
BORING DIAMETER: 6 INCHES			WELL CASING DIAMETER: 2 INCHES		
REVIEWED BY: M.A.M.			DATE: 8-17-88		

DIST. FROM SURF.	WELL CONST.		LENSID	TLV READING	SAMPLE NO.	RECOVERY	BLOWS PER 6 IN.	USCS	LOG OF MATERIAL
	CASING	ANNULIS							
21								SC	CLAYEY SAND- YELLOW BROWN, WET, MEDIUM DENSE.
22					3158			SP	SAND- LIGHT YELLOW BROWN, WET, MEDIUM DENSE, FINE GRAINED WITH TRACE SILT.
								TD	TEST BORING TERMINATED @ 22' ON 3-18-88
									MATERIALS: 4 BAGS OF #3 SAND 1 BAG OF CEMENT 2/3-3 GALLON BUCKET OF BENTONITE
									**** WATER LEVEL NOT MEASURED, WELL CONTAINED FREE PRODUCT.

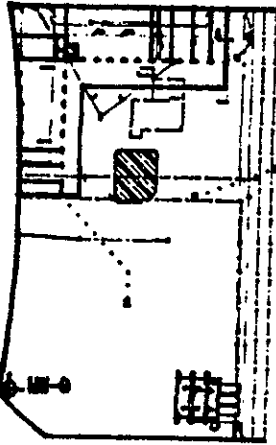
LOCATION OF BORING



SITE/LOCATION				CARNATION/OAKLAND				BORING NO.	
PROJECT NO.				004-88-008				MW-8	
WATER LEVEL ELEVATION		****		****		****		SHEET 1	
TIME		14:30						OF 1	
DATE		3-17-88		4-25-88		6-7-88		DRILLER	
CASING DEPTH		UNCASED						START FINISH	
DRILLING CONTRACTOR		ENSCO SERVICES						TIME TIME	
DRILLER		J R						13:40 14:10	
DRILLING METHOD		HOLLOW STEM AUGER						DATE DATE	
SAMPLING METHOD		140# HAMMER 30" DROP, MODIFIED CALIFORNIA SAMPLER						3-17-88 3-17-88	
LOGGER		NICK COFFEY							
N/S		N 2672.3		E/S		E 3729.8		ELEV. 14.77	
BORING DIAMETER:		6 INCHES		WELL CASING DIAMETER:		2 INCHES			
REVIEWED BY:		M.A.M.		DATE:		8-17-88			

DIST. FROM SURF.	WELL CONST.			TLY READING	SAMPLE NO.	RECOVERY	BLOBS PER 6 IN.	USCS	LOG OF MATERIAL			
	CASING	ANNULUS	LEAD									
1	BLANK	AN ANHYDRITE CEMENT SLURRY	[Hatched pattern]					ML	PORTLAND CEMENT CONCRETE			
2									SANDY SILT DARK RED BROWN, MOIST, LOOSE WITH FINE ANGLAR TO SUB-ANGLAR SAND FRAGMENTS.			
3										CLAYEY SAND- GREEN-BROWN, MOIST, LOOSE WITH LITTLE SUB-ROUNDED GRAVELS TO 1 1/2" DIAMETER.		
4												
5	0.400 INCH SLAT	[Dotted pattern]	[Dotted pattern]		3101		6	SP	SAND- OLIVE, MOIST, LOOSE, VERY FINE GRAINED.			
6						8						
7						7						
8										SC	CLAYEY SAND- LIGHT YELLOW BROWN, MOIST, MEDIUM DENSE, SUB-ANGLAR TO SUB-ROUNDED SAND.	
9												
10							10.000	3102	12		SM	SILTY SAND- LIGHT YELLOW BROWN, MOIST, MEDIUM DENSE, SUB-ROUNDED SAND WITH TRACE CLAY, GASOLINE OOR.
11									18			
12									23			
13											SC	CLAYEY SAND- MOTTLED LIGHT YELLOW BROWN AND OLIVE, WET, LOOSE WITH SOME SILT, SLIGHT HYDROCARBON OOR.
14												
15												
16								3103		4		
17										8		
							8					
									TEST BORING TERMINATED @ 17' ON 3-17-88			
									**** WATER LEVEL NOT MEASURED, WELL CONTAINED FREE PRODUCT.			

LOCATION OF BORING



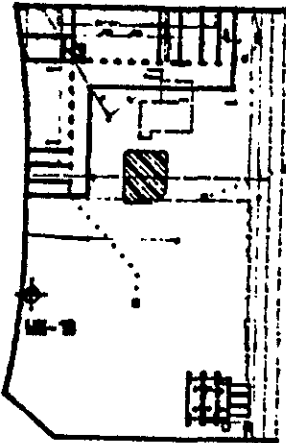
SITE/LOCATION				CARBATION/OAKLAND		BORING NO.	
PROJECT NO.				004-88-068		MW-9	
WATER LEVEL ELEVATION		6.4	5.88			SHEET 1	
TIME						OF 2	
DATE		4-25-88	6-7-88	7-5-88	7-31-88	DRILLER	
CASING DEPTH						START	FINISH
DRILLING CONTRACTOR		PC EXPLORATION				TIME	TIME
DRILLER		MIKE MOORE				7:30	12:00
DRILLING METHOD		HOLLOW STEM AUGER				DATE	DATE
SAMPLING METHOD		140# HAMMER 30" DROP, MODIFIED CALIFORNIA SAMPLER				3-17-88	3-17-88
LOGGER		ERIC HOLM					
N/S		N 2289.9	E/W	E 2868.1	ELEV. 15.77		
BORING DIAMETER:		10 INCHES		WELL CASING DIAMETER: 4 INCHES			
REVIEWED BY: M.A.M.				DATE: 8-18-88			

DIST. FROM SURF.	WELL CONST.			TLV READING	SAMPLE NO.	RECOVERY	BLOWS PER 6 IN.	UBCS	LOG OF MATERIAL
	CASING	ANNULUS	LEGEND						
1								SM	ASPHALTIC CONCRETE
2									SILTY SAND- RED BROWN, MOIST, MEDIUM DENSE WITH AREAS OF OXIDATION, QUARTZ, MAFICS, NO HYDROCARBON OOR.
3									
4	BLANK						7		
5							8		
6					3061		9		
7									
8							9		
9					3062		10	SP	SAND- RED BROWN, MOIST, MEDIUM GRAINED WITH SOME SILT, AREAS OF OXIDATION, QUARTZ, MAFICS, NO HYDROCARBON OOR.
10									
11									
12									
13							10		
14							12		
15							13		NO HYDROCARBON OOR.
16									
17									
18									
19							9		
20							11		
21							11		NO HYDROCARBON OOR.

<p>LOCATION OF BORING</p>	SITE/LOCATION ORDNANCE/DAYLAND				BORING NO.		
	PROJECT NO. 004-88-069				MW-9		
WATER LEVEL ELEVATION			6.4	5.88	SHEET 2		
TIME			OF 2				
DRILLER							
DATE		4-25-89	6-7-89	7-5-89	7-31-89	START	
CASING DEPTH						FINISH	
DRILLING CONTRACTOR		PC EXPLORATION				TIME	
DRILLER		MIKE MOORE				TIME	
DRILLING METHOD		HOLLOW STEM AUGER				7:30	
SAMPLING METHOD		140# HAMMER 30' DROP, MODIFIED CALIFORNIA SAMPLER				12:00	
LOGGER		ERIC HOLM				DATE	
N/S		N 2289.9		E/W		DATE	
		E 2956.1		ELEV.		3-17-89	
				18.77			
BORING DIAMETER:			10 INCHES		WELL CASING DIAMETER:		
					4 INCHES		
REVIEWED BY:				M.A.M.		DATE:	
						6-18-89	

DIST. FROM SURF.	WELL CONST.			TLV READING	SAMPLE NO.	RECOVERY	BLOWS PER 6" IN.	USCS	LOG OF MATERIAL
	CASING	ANNULIS	LEGEND						
21								SP	NO HYDROCARBON ODDR.
22		#3 SAND	[Pattern]						
23									
24	BLANK					X	7		
24				X	9				
25				0	X	9		TD	TEST BORING TERMINATED @ 25' ON 3-17-89
									MATERIALS: 7 BAGS OF #3 SAND
									1 1/2 BAGS OF CEMENT
									1-5 GALLON BUCKET OF BENTONITE

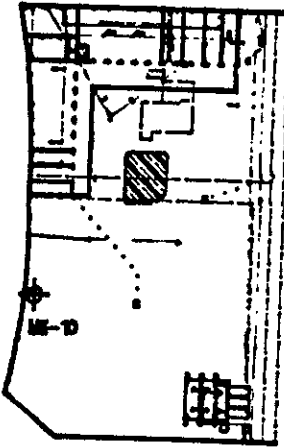
LOCATION OF BORING



SITE/LOCATION		OPERATION/ONLAND		BORING NO.	
PROJECT NO.		004-88-000		MW-10	
WATER LEVEL ELEVATION		6.41	6.80	6.23	6.06
TIME					
DATE		4-25-88	6-7-88	7-6-88	7-31-88
CASING DEPTH					
DRILLING CONTRACTOR		PC EXPLORATION		START	FINISH
DRILLER		M D & MOORE		TIME	TIME
DRILLING METHOD		HOLLOW STEM AUGER		1245	940
SAMPLING METHOD		140# HAMMER 30" DROP, MODIFIED CALIFORNIA SAMPLER		DATE	DATE
LOGGER		ERIC HOLM		3-16-88	3-16-88
N/S		N 2373.8	E/W	E 2833.8	ELEV. 19.04
BORING DIAMETER:		10 INCHES		WELL CASING DIAMETER: 4 INCHES	
REVIEWED BY:		M.A.M.		DATE: 8-17-88	

DIST. FROM SURF.	WELL CONST.		LEGEND	TLV READING	SAMPLE NO.	RECOVERY	BLDG PER 6 IN.	UBCS	LOG OF MATERIAL
	CASING	ANNULUS							
1								GP	ARTIFICIAL GROUND
2								GP	GRAVELLY SAND- GRAY BROWN, DRY TO MOIST WITH MAFICS, GRAVEL ANGULAR 1/2" TO 1 1/2" QUARTZ, MEDIUM DENSE, SOME ORGANICS, NO HYDROCARBON ODOR, (FILL)
3								GP	
4	BLANK					X	8	GP	BRICK PIECES
5						X	7	GP	
6		3/8" BENTONITE CEMENT SLURRY		0	3867	X	7	SM	SILTY SAND- LIGHT BROWN, MOIST, MEDIUM DENSE WITH SOME GRAVEL, QUARTZ MAFICS, NO HYDROCARBON ODOR.
7								SM	
8								SM	
9						X	5	SM	
10						X	6	SM	SAND- SOME SILT, BROWN, MOIST, MEDIUM DENSE, WITH TRACE OF QUARTZ, MAFICS, LAMINATIONS-HORIZONTAL, NO HYDROCARBON ODOR.
11								SM	
12								SM	
13								SM	
14	0.400 INCH SLOT					X	8	SM	SILTY SAND- GRAY AND BROWN, WET, MEDIUM DENSE, AREAS OF OXIDATION, QUARTZ, MAFICS, NO HYDROCARBON ODOR.
15						X	8	SM	
16						X	8	SM	
17								SM	
18						X	5	SM	
19						X	5	SM	
20						X	7	SM	NO HYDROCARBON ODOR.

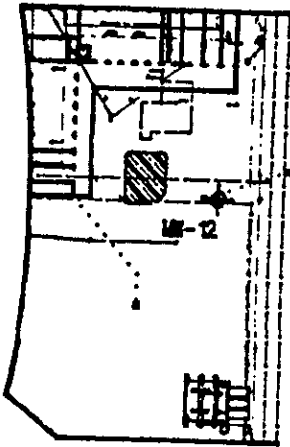
LOCATION OF BORING



SITE/LOCATION		ORINATION/OAKLAND				BORING NO.	
PROJECT NO.		004-88-058				MW-10	
WATER LEVEL ELEVATION		6.41	6.80	6.23	6.08	SHEET 2	
TIME						OF 2	
DATE		6-25-88	6-7-88	7-5-88	7-31-88	DRILLER	
CASING DEPTH						START	FINISH
DRILLING CONTRACTOR		PC EXPLORATION				TIME	TIME
DRILLER		MIKE MOORE				1245	348
DRILLING METHOD		HOLLOW STEM AUGER				DATE	DATE
SAMPLING METHOD		140# HAMMER 30" DROP, MODIFIED CALIFORNIA SAMPLER				3-16-89	3-16-89
LOGGER		ERIC HOLM					
N/S		N 2373.8		E/W		E 2083.8	
		ELEV. 10.04					
BORING DIAMETER:		10 INCHES		WELL CASING DIAMETER:		4 INCHES	
REVIEWED BY:		M.A.M.				DATE: 8-17-88	

DIST. FROM SURF.	WELL CONST.			TLV READING	SAMPLE NO.	RECOVERY	BLOBS PER 6 IN.	USCS	LOG OF MATERIAL		
	CASING	ANNULUS	LEGEND								
21	0.400 INCH SLIT	#3 SAND	[Dotted Pattern]					SM			
22											
23											
24									X	7	
25					X	8					
26					X	8					
								TD	NO HYDROCARBON ODOR		
									TEST BORING TERMINATED AT 27'		
									MATERIALS: 7 1/2 BAGS OF #3 SAND		
									1 1/4 BAGS OF CEMENT		
									1-5 GALLON BUCKET OF BENTONITE		

LOCATION OF BORING



SITE/LOCATION CARBATION/DANLAND				BORING NO. MW-12
PROJECT NO. 804-88-008				SHEET 1 OF 2
WATER LEVEL ELEVATION	6.48	8.88	8.28	8.74
TIME				
DATE	4-25-88	6-7-88	7-8-88	7-31-88
CASING DEPTH				
DRILLING CONTRACTOR PC EXPLORATION				DRILLER
DRILLER MIKE MOORE				DRILLING METHOD
DRILLING METHOD HOLLOW STEM AUGER				SAMPLING METHOD
SAMPLING METHOD 140# HAMMER 30' DROP, MODIFIED CALIFORNIA SAMPLER				LOGGER
LOGGER ERIC HOLM				
N/S	N 2450.8	E/W	E 3230.8	ELEV. 16.70
BORING DIAMETER: 10 INCHES		WELL CASING DIAMETER: 4 INCHES		
REVIEWED BY: M.A.M.				DATE: 8-17-88

DIST. FROM SURF.	WELL CONST.			TLV READING	SAMPLE NO.	RECOVERY	BLOBS PER 6 IN.	USCS	LOG OF MATERIAL
	CASING	ANNULUS	LEGEND						
1									ASPHALTIC CONCRETE
2									SILTY GRAVEL- MDIST MEDIUM DENSE.
3									
4	BLANK	4in BENTONITE CEMENT SLURRY				X	8		
5		3/4" REIN. BENT. PELL.				X	8		
6				11	3678	X	8		SILTY SAND- RED BROWN, MDIST, LOOSE WITH AREAS OF OXIDATION, QUARTZ, MAFICS, NO HYDROCARBON ODOR.
7						X	8		
8						X	7		
9						X	8		NO HYDROCARBON ODOR.
10						X	8		
11					9	3680	X	9	NO HYDROCARBON ODOR.
12									
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									
25									
26									

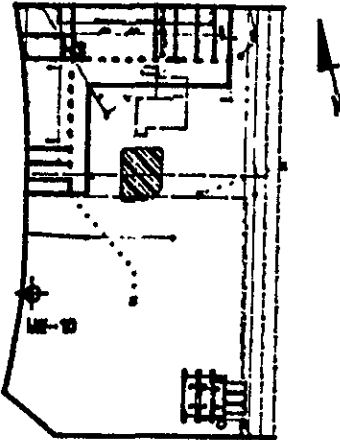
GM

SM

SP

* NO SAMPLE RECOVERED.

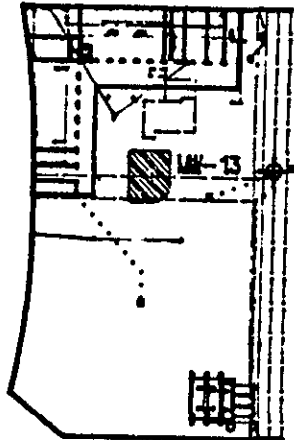
LOCATION OF BORING



SITE/LOCATION				CONVENTION/OAKLAND		BORING NO.	
PROJECT NO.				004-08-008		MW-12	
WATER LEVEL ELEVATION		6.48	6.7	3.72	8.07	SHEET 2	
TIME						OF 2	
DATE		4-25-00	6-7-00	7-5-00	7-31-00	DRILLER	
CASING DEPTH						START	FINISH
DRILLING CONTRACTOR		PG EXPLORATION				TIME	TIME
DRILLER		MIKE MOORE				1040	1200
DRILLING METHOD		HOLLOW STEM AUGER				DATE	DATE
SAMPLING METHOD		140# HAMMER 30' DROP, MODIFIED CALIFORNIA SAMPLER				3-21-09	2-21-09
LOGGER		ERIC HELM					
N/S		N 2480.8	E/W	E 3230.8	ELEV. 18.70		
BORING DIAMETER:		8 INCHES		WELL CASING DIAMETER: 4 INCHES			
REVIEWED BY: N.A.M.				DATE: 6-17-00			

DIST. FROM SURF.	WELL CONST.		LEND	T.V. READING	SAMPLE NO.	RECOVERY	BLOWS PER 6 IN.	UNCS	LOG OF MATERIAL	
	CASING	WALLS								
21	0.250 INCH SLAT	#3 SAND	[Pattern]					SM		
22										
23										
24								X	8	SP
25				7		X	9			
						X	9	TD	TEST BORING TERMINATED AT 25'	
									MATERIALS: 7 1/2 BAGS OF #3 SAND	
									1 1/2 BAGS OF CEMENT	
									1-5 GALLON BUCKET OF BENTONITE	

LOCATION OF BORING

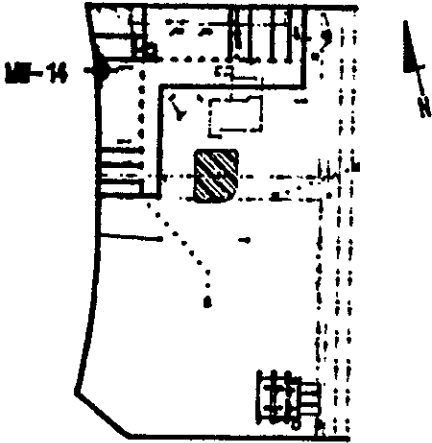


SITE/LOCATION				CORVATH/DANLAND		BORING NO.	
PROJECT NO.				004-00-000		MW-13	
WATER LEVEL ELEVATION		0.30	0.31	0.3	0.22	SHEET 1	
TIME						OF 2	
DATE		4-25-80	6-7-80	7-6-80	7-31-80	DRILLER	
CASING DEPTH						START	FINISH
DRILLING CONTRACTOR		ENSCO SERVICES				TIME	TIME
DRILLER		FRANK BARTOLYICH				11:45	10:50
DRILLING METHOD		HOLLOW STEM AUGER				DATE	DATE
SAMPLING METHOD		140# HAMMER 30' DROP, MODIFIED CALIFORNIA SAMPLER				3-21-80	3-21-80
LOGGER		KARL ANANIA					
N/S		N 2400.7	E/W	E 3200.0	ELEV.	16.48	
BORING DIAMETER:		10 INCHES		WELL CASING DIAMETER:		4 INCHES	
REVIEWED BY:		M.A.M.				DATE: 8-17-80	

DIST. FROM SURF.	WELL CONST.			TLV READING	SAMPLE NO.	RECOVERY	BLOBS PER 6 IN.	USCS	LOG OF MATERIAL
	CASING	ANNULUS	LENDG						
1									ASPHALTIC CONCRETE
2									AGGREGATE BASEROCK
3									ASPHALTIC CONCRETE
4									AGGREGATE BASEROCK
5									ASPHALTIC CONCRETE
6								GM	SILTY GRAVEL- GRAY, MOIST, MEDIUM DENSE.
7								SC	SILTY SAND- MOTTLED YELLOW BROWN TO DARK BROWN, MOIST TO WET, MEDIUM DENSE, FINE GRAINED WITH TRACE OF CLAY.
8									
9					3600		6		
10							7		
11							8		
12							24		
13							28		GRADES DENSE
14					3670		40		
15									
16									
17							6		
18							7		
19							13		
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									
31									
32									
33									
34									
35									
36									
37									
38									
39									
40									
41									
42									
43									
44									
45									
46									
47									
48									
49									
50									
51									
52									
53									
54									
55									
56									
57									
58									
59									
60									
61									
62									
63									
64									
65									
66									
67									
68									
69									
70									
71									
72									
73									
74									
75									
76									
77									
78									
79									
80									
81									
82									
83									
84									
85									
86									
87									
88									
89									
90									
91									
92									
93									
94									
95									
96									
97									
98									
99									
100									

ML

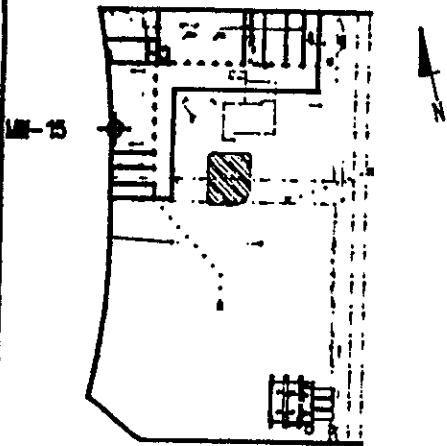
LOCATION OF BORING



SITE/LOCATION				CARNATION/OAKLAND		BORING NO.	
PROJECT NO.				004-88-059		MW-14	
WATER LEVEL ELEVATION		5.38	4.82	4.86	SHEET 1		
TIME					OF 2		
DATE		4-25-89	6-7-89	7-6-89	DRILLER		
CASING DEPTH					START	FINISH	
DRILLING CONTRACTOR		ENSICO SERVICES				TIME	TIME
DRILLER		J R				07:50	08:30
DRILLING METHOD		HOLLOW STEM AUGER				DATE	DATE
SAMPLING METHOD		140# HAMMER 30' DROP, MODIFIED CALIFORNIA SAMPLER				3-17-89	3-17-89
LOGGER		NICK COFFEY					
N/S		N 28 19.1	E/W	E 3055.0	ELEV. 14.80		
BORING DIAMETER:		6 INCHES		WELL CASING DIAMETER: 2 INCHES			
REVIEWED BY: M.A.M.				DATE: 8-18-89			

DIST. FROM SURF.	WELL CONST.			TLV READING	SAMPLE NO.	RECOVERY	BLDS PER 6 IN.	USCS	LOG OF MATERIAL
	CASING	ANNULUS	LEGEND						
1								SC	PORTLAND CEMENT CONCRETE
2								SC	CLAYEY SAND- GRAY, MOIST, LOOSE, FINE TO MEDIUM GRAINED.
3								SC	
4								SC	
5								SC	COLOR CHANGE TO YELLOW BROWN WITH INCREASING CLAY CONTENT.
6					3149	0	4	SC	
7								SC	
8								SC	
9								SC	
10					3150	0	25	SP	SAND- MOTTLED RED BROWN TO GRAY, MOTTLING IN 1/4"-1/2" OVALS, MOIST, DENSE, FINE TO MEDIUM SAND WITH TRACE CLAY.
11								SP	
12								SP	
13					3151	0	10	SM-ML	SILTY SAND- MOTTLED RED BROWN, WET MEDIUM DENSE, FINE TO COARSE GRAINED WITH TRACE CLAY.
14								SM-ML	
15								SM-ML	
16								SM-ML	
17								SM-ML	
18								SM-ML	
19								SP	
20								SP	SAND- RED BROWN WITH GRAY INCLUSIONS (OVAL UP TO 2" IN DIAMETER) WET, VERY DENSE WITH TRACE SILT AND CLAY.

LOCATION OF BORING



SITE/LOCATION				CARNATION/OAKLAND		BORING NO.	
PROJECT NO.				004-88-069		MW-15	
WATER LEVEL ELEVATION		6.13	5.44	5.09	4.73	SHEET 1	
TIME						OF 2	
DATE		4-25-89	6-7-89	7-6-89	7-31-89	DRILLER	
CASING DEPTH						START	FINISH
DRILLING CONTRACTOR		ENSCO SERVICES				TIME	TIME
DRILLER		J R				09:00	10:00
DRILLING METHOD		HOLLOW STEM AUGER				DATE	DATE
SAMPLING METHOD		140# HAMMER 30" DROP, MODIFIED CALIFORNIA SAMPLER				3-17-89	3-17-89
LOGGER		NICK COFFEY					
N/S		N 2565.3		E/W		E 3041.5	
						ELEV. 14.82	
BORING DIAMETER:		8 INCHES		WELL CASING DIAMETER:		2 INCHES	
REVIEWED BY:				M.A.M.			
				DATE: 8-17-89			

DIST. FROM SURF.	WELL CONST.		LEGEND	TLV READING	SAMPLE NO.	RECOVERY	BLOWS PER 6 IN.	USCS	LOG OF MATERIAL
	CASING	ANNULUS							
1									PORTLAND CEMENT CONCRETE
2								ML	SANDY SILT- DARK RED BROWN, MOIST, SOFT, VERY FINE GRAINED WITH SUBANGULAR SAND.
3									
4	BLANK							CL	CLAY- GREY, SOFT, MOIST WITH TRACE SILT.
5		3/8" BENT PELLET			3157	8	11		SAND- YELLOW BROWN, DRY, LOOSE TO MEDIUM DENSE, FINE GRAINED ANGULAR TO SUB-ANGULAR.
6						8	12		
7								SP	COLOR CHANGE TO RED-BROWN.
8									GRADES WITH INCREASING CLAY CONTENT.
9									GRADING TO CLAYEY SAND, 10-20% CLAY.
10									
11						8	11		
12					3158	8	21		COLOR CHANGE TO MOTTLED YELLOW BROWN AND LIGHT OLIVE WITH SOME INTERBEDDED SILTY SAND AND CLAYEY SAND LAYERS 4" TO 6" IN THICKNESS.
13					3159	8	17		
14									
15									
16									
17									
18									
19									
20							13		GRADES, WET, VERY DENSE.
							21		

DATE STARTED: 8/23/89

DATE COMPLETED: 8/23/89

TIME STARTED: 10:25

TIME COMPLETED:

DRILLING EQUIPMENT: Hollow Stem Auger

SURFACE CONDITIONS: Asphaltic Concrete

SURFACE ELEVATION: 13.25

COORDINATES: N 2,694.8 E 3,150.6

GROUNDWATER CONDITIONS: Free Groundwater Encountered at 14 feet during drilling

DRILLING CONTRACTOR: Accubore

SLOT SIZE: 0.020 inch

BORING DIAMETER: 10 inches

BORING DEPTH: 22.5 feet

CASING DIAMETER: 4 inches

CASING DEPTH: 22.5 feet

LOGGED BY: Jim Wallace

FILTER PACK: #2/16 sand

REMARKS	SAMP. NO.	TLV READ	BLOWS / 6"	SOIL TYPE	WELL CONST	DEPTH (FT.)	USCS CLASS.	SOIL DESCRIPTION
								Asphaltic Concrete
								Portland Cement Concrete
		400						Aggregate Baserock
	2089	750				2	SM	
		80						
	2090	220				4	SM	SILTY SAND(SM) Dark Gray, dry to moist, medium dense,
Hydrocarbon Odor		240						
		100						
	2091	45				6	SC	CLAYEY SAND(SC) Dark Gray to Black, (diesel staining), wet, medium dense
		95					SM	
No Hydrocarbon Odor	2092	95	4			8		SILTY SAND(SM) Dark Gray, dry to moist, medium dense
	2093		5					color change to Light Gray
			7					
			5					
	2094	180	7			10		color change to Mottled Red Brown
			13					
			5					
No Hydrocarbon Odor	2095	160	5			12		grades moist, with trace clay
			5					
			8					
	2096	48	5			14		Free Groundwater Encountered at 14 feet during drilling
			5					
			9					

AGE

ANANIA GEOLOGIC ENGINEERING

PROJECT NO. 004-88-059

Carnation Dairy Facility
1310 14th St., Oakland, Ca.

LOG OF MW-OS25

Sheet 1 of 2

REMARKS	SAMP. NO.	TLV READ	BLOWS / 6"	SAMP TYPE	WELL CONST	DEPTH (FT.)	USCS CLASS.	SOIL DESCRIPTION
						20 22 24 26 28 30 32 34 36 38 40 42		
								Boring Terminated at 22.5 feet on 8-23-89

AGE
ANANIA GEOLOGIC ENGINEERING
 PROJECT NO. 004-88-059

Carnation Dairy Facility
1310 14th St., Oakland, Ca.
LOG OF MW-OS25

Sheet 2 of 2


DATE STARTED: 8/24/89
 DATE COMPLETED: 8/24/89
 TIME STARTED:
 TIME COMPLETED:
 DRILLING EQUIPMENT: Hollow Stem Auger

SURFACE CONDITIONS: Asphaltic
 Concrete
 SURFACE ELEVATION: 13.55
 COORDINATES: N 2,676.8 E 3,206.4
 GROUNDWATER CONDITIONS: Free
 Groundwater Encountered at 17 feet during
 drilling

DRILLING CONTRACTOR: Accubore
 BORING DIAMETER: 10 inches
 CASING DIAMETER: 4 inches
 LOGGED BY: Robyn McKinney

SLOT SIZE: 0.02 inch
 BORING DEPTH: 25.0 feet
 CASING DEPTH: 25 feet
 FILTER PACK: #2/16 sand

REMARKS	SAMP. NO.	TLV READ	BLOWS / 6"	SAMP TYPE	WELL CONST	DEPTH (FT.)	USCS CLASS.	SOIL DESCRIPTION
								Asphaltic Concrete
	2097	75 100				2	SM	Portland Cement Concrete
	2098	110 110						Aggregate Baserock, does not appear to be stained
Hydrocarbon Odor	2099	130 230				4		Silty SAND(SM) Dark Gray to Black, dry to moist, medium dense, color change to Black color change to Light Gray grades moist color change to Green Gray, grades with some clay color change to Green Gray, slightly moist
Slight Hydrocarbon Odor	2100	150						
Hydrocarbon Odor	2101	180						
	2103	5500	5 7 12			8		
Hydrocarbon Odor	2109		3 12					color change to Red, grades moist
Pulled auger to ream with plug	2104	500	10			10		
		600				14		grades with increasing clay content
		600				16		
						17		Free Water Encountered at 17 feet during drilling

REMARKS	SAMP. NO.	TLU READ	BLOWS / 6"	SAMP TYPE	WELL CONST	DEPTH (FT.)	USCS CLASS.	SOIL DESCRIPTION
						20 22 24 26 28 30 32 34 36 38 40 42		
								Boring Terminated at 25 feet on 8-24-89
AGE ANANIA GEOLOGIC ENGINEERING PROJECT NO. 004-88-059					Carnation Dairy Facility 1310 14th St., Oakland, Ca. LOG OF MW-OS26			Sheet 2 of 2

DATE STARTED: 8/28/89

DATE COMPLETED: 8/28/89

TIME STARTED:

TIME COMPLETED:

DRILLING EQUIPMENT: Hollow Stem Auger

SURFACE CONDITIONS: Asphaltic Concrete

SURFACE ELEVATION: 14.33

COORDINATES: N 2,666.4 E 3,271.2

GROUNDWATER CONDITIONS: Free Groundwater Encountered at 14 feet during drilling

DRILLING CONTRACTOR: Accubore

SLOT SIZE: .020 inch

BORING DIAMETER: 10 inches

BORING DEPTH: 24.5 feet

CASING DIAMETER: 4 inch

CASING DEPTH: 24 feet

LOGGED BY: Robyn McKinney

FILTER PACK: #2/16 sand

REMARKS	SAMP. NO.	TLV READ	BLOWS / 6"	SAMP TYPE	WELL CONST	DEPTH (FT.)	USCS CLASS.	SOIL DESCRIPTION
								Asphaltic Concrete
	1172	400	7 10 15			2 4 6	SM	SILTY SAND(SM) Gray, dry-to-moist, medium dense with some clay
	1173	200	7 9 20			8 10 12		grades with increasing sand, color change to Gray-Brown
TLV reading 70ppm at well head						14		color change to Red-Brown, grades wet, grades with increasing clay content

AGE




ANANIA GEOLOGIC ENGINEERING

PROJECT NO. 004-88-059

Carnation Dairy Facility
1310 14th St., Oakland, Ca.

LOG OF MW-OS27

Sheet 1 of 2

REMARKS	SAMP. NO.	TLU READ	BLOWS / 6"	SAMP TYPE	WELL CONST	DEPTH (FT.)	USCS CLASS.	SOIL DESCRIPTION
No Hydrocarbon Odor						20		color change to brown
						22		

DATE STARTED: 8/29/89
 DATE COMPLETED: 8/29/89
 TIME STARTED:
 TIME COMPLETED:
 DRILLING EQUIPMENT: Hollow Stem Auger

SURFACE CONDITIONS: Asphaltic Concrete
 SURFACE ELEVATION: 13.90
 COORDINATES: N 2,704.7 E 3,220.1
 GROUNDWATER CONDITIONS: Free
 Groundwater Encountered at 14 feet during drilling

DRILLING CONTRACTOR: Accubore
 BORING DIAMETER: 10 inches
 CASING DIAMETER: 4 inch
 LOGGED BY: Robyn McKinney




SLOT SIZE: 0.02 inch
 BORING DEPTH: 27.0 feet
 CASING DEPTH: 27 feet
 FILTER PACK: #2/16 Sand

REMARKS	SAMP. NO.	TLU READ	BLOWS / 6"	SAMP TYPE	WELL CONST	DEPTH (FT.)	USCS CLASS.	SOIL DESCRIPTION
							SM	Asphaltic Concrete
						2		Aggregate Baserock
Hydrocarbon Odor	1176					4		SILTY SAND(SM) Dark Gray to Black, dry-to-moist, medium dense grades moist
	1177							
	1178					6	SC	CLAYEY SAND(SC) Blue Gray, moist-to-wet, medium dense
			7				SM	
Hydrocarbon Odor	1179	100	12			8		SILTY SAND(SM) Brown, dry-to-moist, medium dense color change to Mottled Gray Brown
Hydrocarbon Odor	1180		5			10		
		70	5					
No Hydrocarbon Odor		70	9			12		grades moist to wet
						14		Free Groundwater Encountered at 14 feet during drilling
No Hydrocarbon Odor		80				16		

AGE _____
 ANANIA GEOLOGIC ENGINEERING
 PROJECT NO. 004-88-059

Carnation Dairy Facility
 1310 14th St., Oakland, Ca.
 LOG OF MW-OS28

Sheet 1 of 2

REMARKS	SAMP. NO.	TLU READ	BLOWS / 6"	SAMP TYPE	WELL CONST	DEPTH (FT.)	USCS CLASS.	SOIL DESCRIPTION
No Hydrocarbon Odor								<p data-bbox="992 779 1414 810">Boring Terminated at 27 feet on 8-29-89</p>
<p data-bbox="386 1881 467 1913">AGE _____</p> <p data-bbox="175 1927 678 1959">ANANIA GEOLOGIC ENGINEERING</p> <p data-bbox="147 1976 532 2007">PROJECT NO. 004-88-059</p>					<p data-bbox="813 1875 1187 1944">Carnation Dairy Facility 1310 14th St., Oakland, Ca.</p> <p data-bbox="829 1965 1170 1997">LOG OF MW-OS28</p>			<p data-bbox="1300 1927 1463 1959">Sheet 2 of 2</p>

DATE STARTED: 8/29/89
 DATE COMPLETED: 8/30/89
 TIME STARTED:
 TIME COMPLETED:
 DRILLING EQUIPMENT: Hollow Stem Auger

SURFACE CONDITIONS: Asphaltic Concrete
 SURFACE ELEVATION: 13.38
 COORDINATES: N 2,729.2 E 3,146.2
 GROUNDWATER CONDITIONS: Free Groundwater Encountered at 12 feet during drilling

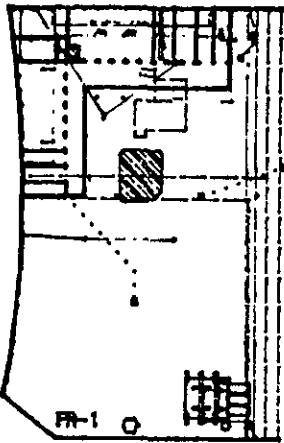
DRILLING CONTRACTOR: Accubore
 BORING DIAMETER: 10 inches
 CASING DIAMETER: 4 inches
 LOGGED BY: J R and R Mc

SLOT SIZE: 0.02 inch
 BORING DEPTH: 25.0 feet
 CASING DEPTH: 25 feet
 FILTER PACK: #2/16 Sand

REMARKS	SAMP. NO.	TLV READ	BLOWS / 6"	SAMP. TYPE	WELL CONST (FT.)	DEPTH (FT.)	USCS CLASS.	SOIL DESCRIPTION
								Asphaltic Concrete
						2	SM	Aggregate Baserock
						4		SILTY SAND(SM) Dark Brown, dry-to-moist, medium dense
Abandoned 4" clay pipe						6		
						6 1/2	SC	clayey SAND(SM) lense between 6 1/2 and 7 feet
						7	SM	
		60				8		
			7			10		
	1277		7			12		Free Groundwater Encountered at 12 feet during drilling
No Hydrocarbon Odor			12			14		grades moist, medium dense with trace clay
						16		grades wet

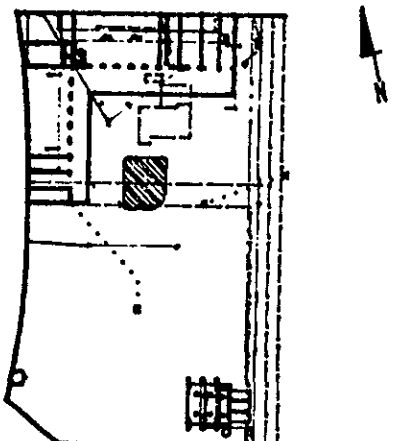
REMARKS	SAMP. NO.	TLU READ	BLOMS / 6"	SAMP TYPE	WELL CONST	DEPTH (FT.)	USCS CLASS.	SOIL DESCRIPTION
						20 22 24		
		90						Boring Terminated at 25 feet on 8-30-89
						26 28 30 32 34 36 38 40 42		

LOCATION OF BORING



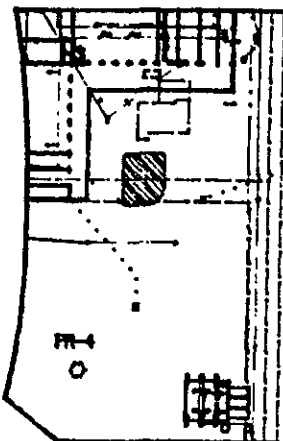
SITE/LOCATION		CARNATION/DAKLAND		BORING NO.	
PROJECT NO.		804-08-059		PR-1	
WATER LEVEL ELEVATION	5.86			SHEET 1	
TIME	1208			OF 1	
DATE	2/28/09			DRILLER	
CASING DEPTH				START	FINISH
DRILLING CONTRACTOR	PC EXPLORATION			TIME	TIME
DRILLER				0-48	1045
DRILLING METHOD	HOLLOW STEM AUGER			DATE	DATE
SAMPLING METHOD	MPS			2/28/09	2/28/09
LOGGER	ERIC HOLM				
N/S	2216.9	E/V	3056.0	ELEV. 1673	
BORING DIAMETER	6 INCHES		CASING DIAMETER	2 INCHES	
REVIEWED BY: N.A.M.			DATE: 0-16-09		

DIST. FROM SURF.	WELL CONST.			TLV READING	SAMPLE NO.	RECOVERY	BLDYS PER 6 IN.	USCS	LOG OF MATERIAL
	CASING	MANIFOLD	LEGEND						
1			42 BENTONITE CEMENT SLURRY					SM	SILTY SAND- RED BROWN, MOIST, MEDIUM DENSE WITH AREAS OF OXIDATION NO HYDROCARBON ODOR.
2									
3			3/8" BENT. PELLETS					SM	SILTY SAND- RED BROWN, MOIST, MEDIUM DENSE WITH AREAS OF OXIDATION NO HYDROCARBON ODOR.
4	BLANK						7		
5			COARSE ANGLAKUM SAND	12		X	7	SM	SILTY SAND- RED BROWN, MOIST, MEDIUM DENSE WITH AREAS OF OXIDATION NO HYDROCARBON ODOR.
6						X	9		
7			COARSE ANGLAKUM SAND					SM	SILTY SAND- RED BROWN, MOIST, MEDIUM DENSE WITH AREAS OF OXIDATION NO HYDROCARBON ODOR.
8									
9			COARSE ANGLAKUM SAND				9	SM	SILTY SAND- RED BROWN, MOIST, MEDIUM DENSE WITH AREAS OF OXIDATION NO HYDROCARBON ODOR.
10						X	12		
11			COARSE ANGLAKUM SAND	12		X	12	SM	SILTY SAND- RED BROWN, MOIST, MEDIUM DENSE WITH AREAS OF OXIDATION NO HYDROCARBON ODOR.
12									
13			COARSE ANGLAKUM SAND					SM	SILTY SAND- RED BROWN, MOIST, MEDIUM DENSE WITH AREAS OF OXIDATION NO HYDROCARBON ODOR.
14							9		
15			COARSE ANGLAKUM SAND	16		X	9	SM	SILTY SAND- RED BROWN, MOIST, MEDIUM DENSE WITH AREAS OF OXIDATION NO HYDROCARBON ODOR.
16						X	7		
17									GRADES, WET WITH QUARTZ, MAFICS, NO HYDROCARBON ODOR.
18									TEST BORING TERMINATED @ 15' ON 2-28-09
19									MATERIALS: 1 1/2 BAGS OF SAND
20									2/3 5 GALLON BUCKET OF BENTONITE

LOCATION OF BORING 	SITE/LOCATION CARNATION/DARLAND		BORING NO. PR-3	
	PROJECT NO. 004-00-009		SHEET 1 OF 1	
	WATER LEVEL ELEVATION 323		DRILLER	
	TIME 7:55		START	FINISH
	DATE 2/22/89		TIME	TIME
	CASING DEPTH		6:58	8:28
	DRILLING CONTRACTOR PC EXPLORATION		DATE	DATE
	DRILLER		2/22/89	2/22/89
	DRILLING METHOD HOLLOW STEM AUGER		SAMPLING METHOD NPS	
	SAMPLING METHOD NPS		LOGGER ERIC HELM	
M/S 2284		E/V 29601		
ELEV. 13.90		BORING DIAMETER 6 INCHES		
CASING DIAMETER 2 INCHES		REVIEWED BY: NAM		
DATE 8-17-89				

DIST. FROM SURF.	WELL CONST.		LEGEND	T.V. READING	SAMPLE NO.	RECOVERY	BLOYS PER 6 IN.	USCS	LOG OF MATERIAL
	CASING	ANNULUS							
1								SM	SILTY SAND- RED BROWN, MOIST, MEDIUM DENSE, QUARTZ WITH NAFTICS, NO HYDROCARBON ODOR.
2									
3									
4	BLANK	42 BENTONITE CEMENT SLURRY				X	7		
5		3/4" BENT. PELLETS				X	9		
6				4		X	9		
7									
8									
9							10		
10						X	11		
11									
12				4		X	14		NO HYDROCARBON ODOR.
13									
14									
15						X	5		
16						X	5		
17				0		X	6		COLOR CHANGE TO GREEN BROWN, VET, NO HYDROCARBON ODOR.
18									TEST BORING TERMINATED @ 15 1/2' ON 2-22-89
19									MATERIALS 1 1/2 BAGS OF SAND
20									2/3 5 GALLON BUCKET OF BENTONITE

LOCATION OF BORING

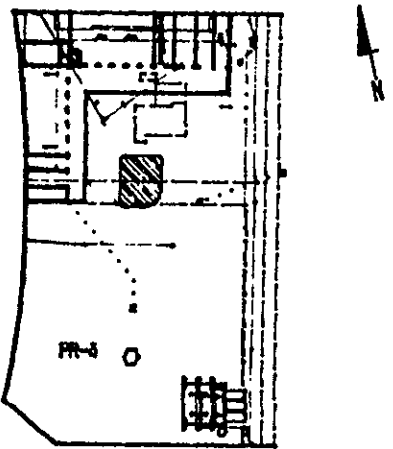





SITE/LOCATION		CARNATION/DALAND		BORING NO.	
PROJECT NO.		884-88-039		PR-4	
WATER LEVEL ELEVATION	3.75			SHEET 1	
TIME	12:05			OF 1	
DATE	2/22/89			DRILLER	
CASING DEPTH				START	FINISH
DRILLING CONTRACTOR				12:00	12:30
DRILLER				DATE	DATE
DRILLING METHOD				2/22/89	2/22/89
SAMPLING METHOD					
LOGGER					
N/S 2297.4		E/W 3027.7		ELEV. 1634	
BORING DIAMETER		6 INCHES		CASING DIAMETER	
				2 INCHES	
REVIEWED BY: MAM.				DATE 8-16-89	

DIST. FROM SURF.	WELL CONST.			TLV READING	SAMPLE NO.	RECOVERY	BLDS PER 6 BL.	USCS	LOG OF MATERIAL
	CASING	ANNULUS	LEGEND						
1								SP	SAND- BROWN, MOIST, MEDIUM DENSE WITH QUARTZ CLASTS, MEDIUM GRAINED.
2									
3									
4	BLANK	42 BENTONITE CEMENT SLURRY				X	6		
5		3/8" BENT. PELLETS				X	7		NO HYDROCARBON ODOR.
6									
7									
8									
9						X	18		
10						X	22		
11				4		X	19		NO HYDROCARBON ODOR.
12									
13								SM	SILTY SAND- BROWN, VET, MEDIUM DENSE WITH CLASTS OF QUARTZ MAFICS, VET, NO HYDROCARBON ODOR.
14									
15									
16									
17						X	5		
18						X	5		
19						X	6		
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									
31									
32									
33									
34									
35									
36									
37									
38									
39									
40									
41									
42									
43									
44									
45									
46									
47									
48									
49									
50									
51									
52									
53									
54									
55									
56									
57									
58									
59									
60									
61									
62									
63									
64									
65									
66									
67									
68									
69									
70									
71									
72									
73									
74									
75									
76									
77									
78									
79									
80									
81									
82									
83									
84									
85									
86									
87									
88									
89									
90									
91									
92									
93									
94									
95									
96									
97									
98									
99									
100									

TEST BORING TERMINATED @ 15 1/2' ON 2-22-89

MATERIALS: 1 2/3 BAGS OF SAND
2/3 5 GALLON BUCKET OF BENTONITE

LOCATION OF BORING 	SITE/LOCATION CARNATION/OAKLAND			BORING NO. PR-5	
	PROJECT NO. 884-88-839			SHEET 1 OF 1	
	WATER LEVEL ELEVATION	4.6		DRILLER	
	TIME	8:48		START TIME 1:00	FINISH TIME 3:45
	DATE	2/22/89		DATE 2/22/89	DATE 2/22/89
	CASING DEPTH				
	DRILLING CONTRACTOR PC EXPLORATION				
	DRILLER				
	DRILLING METHOD HOLLOW STEM AUGER				
	SAMPLING METHOD NPS				
LOGGER ERIC HOLK					
N/S 22946	E/V 30944	ELEV. 16.64			
BORING DIAMETER 6 INCHES		CASING DIAMETER 2 INCHES			
REVIEWED BY: MAM.			DATE 8-16-89		

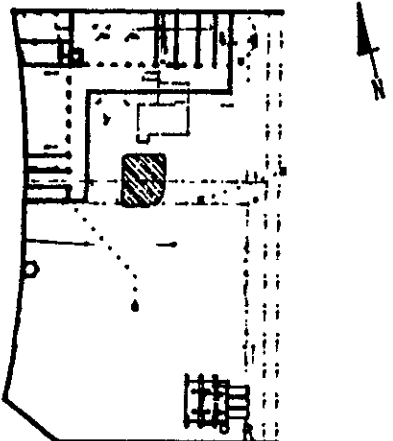
DIST. FROM SURF.	WELL CONST.			TLV READING	SAMPLE NO.	RECOVERY	BLDS PER 6 BL	USCS	LOG OF MATERIAL	
	CASING	ANNULUS	LEGEND							
1								SM	SILTY SAND- RED BROWN, DRY TO MOIST, LOOSE TO MEDIUM DENSE, FINE TO MEDIUM GRAINED WITH AREAS OF OXIDATION, NO HYDROCARBON.	
2										
3										
4	BLANK						4			
5					X	5				
6						X	7			
7										
8										
9						X	7			
10						X	8			
11										
12										
13										
14							X	4		
15							X	4		
16							X	5		
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										
31										
32										
33										
34										
35										
36										
37										
38										
39										
40										
41										
42										
43										
44										
45										
46										
47										
48										
49										
50										
51										
52										
53										
54										
55										
56										
57										
58										
59										
60										
61										
62										
63										
64										
65										
66										
67										
68										
69										
70										
71										
72										
73										
74										
75										
76										
77										
78										
79										
80										
81										
82										
83										
84										
85										
86										
87										
88										
89										
90										
91										
92										
93										
94										
95										
96										
97										
98										
99										
100										

NO HYDROCARBON ODOR.

COLOR CHANGE TO LIGHT BROWN, GRADES LOOSE WITH INCREASING SILT CONTENT, NO HYDROCARBON ODOR.

TEST BORING TERMINATED @ 13 1/2' ON 2-22-89

MATERIALS: 1 1/2 BAGS OF SAND
2/3 5 GALLON BUCKET OF BENTONITE

LOCATION OF BORING 	SITE/LOCATION CARNATION/OAKLAND		BORING NO. PR-6	
	PROJECT NO. 004-88-059		SHEET 1 OF 1	
	WATER LEVEL ELEVATION	1.80	DRILLER	
	TIME	4:40	START	FINISH
	DATE	2/22/89	TIME	TIME
	CASING DEPTH		3:40	3:45
	DRILLING CONTRACTOR PC EXPLORATION		DATE	DATE
	DRILLER		2/22/89	2/22/89
	DRILLING METHOD HOLLOW STEM AUGER			
	SAMPLING METHOD MPS			
LOGGER ERIC HOLM				
N/S 2424.5	E/W 3002.0	ELEV. 15.33		
BORING DIAMETER 6 INCHES		CASING DIAMETER 2 INCHES		
REVIEWED BY: MAM		DATE: 8-17-89		

DIST. FROM SURF.	WELL CONST.			TLV READING	SAMPLE NO.	RECOVERY	BLOWS PER 6 IN.	USCS	LOG OF MATERIAL
	CASING	ANNULUS	LEGEND						
1		4% BENTONITE CEMENT SLURRY						SM	SILTY SAND- RED BROWN, MOIST, ORGANICS, AREAS OF OXIDATION, NAFTCS. NO HYDROCARBON ODOUR.
2									
3									
4	BLANK								
5		3/8" BENT. PELLETS		0		X	5	NO HYDROCARBON ODOUR.	
6									
7		COARSE AQUICLUD SAND						NO HYDROCARBON ODOUR.	
8									
9							X		10
10							X		10
11						0			X
12	LEAKY SLIT							NO HYDROCARBON ODOUR.	
13									
14							7		
15				0		X	9	COLOR CHANGE TO LIGHT BROWN, GRADES, VET, NO HYDROCARBON ODOUR.	
16							9		
TEST BORING TERMINATED @ 15 1/2' ON 2-22-89									
MATERIALS: 1 1/2 BAGS OF SAND									
2/3 5 GALLON BUCKET OF BENTONITE									

PR-7
NOT DRILLED

LOCATION OF BORING		SITE/LOCATION CARNATION/DARLAND			BORING NO.		
		PROJECT NO. 804-88-059			PR-8		
		WATER LEVEL ELEVATION 2.5 (APPROX)			SHEET 1 OF 1		
TIME 1050		DATE 2/23/89			DRILLER		
CASING DEPTH		DRILLING CONTRACTOR PC EXPLORATION			START TIME 340	FINISH TIME 545	
DRILLING METHOD HOLLOW STEM AUGER		DRILLER			DATE 2/23/89	DATE 2/23/89	
SAMPLING METHOD NPS		LOGGING METHOD					
LOGGER ERIC HOLM		N/S #			E/V #		
BORING DIAMETER 6 INCHES		CASING DIAMETER 2 INCHES			ELEV. #		
REVIEWED BY MAM		DATE 8-17-89					

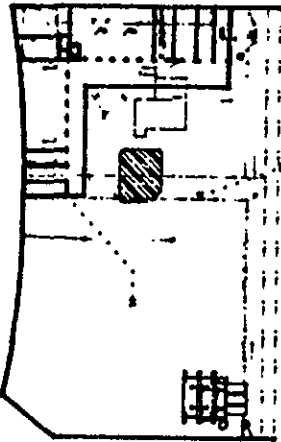
DIST. FROM SURF.	VELL. CONST.		LEGEND	TLV READING	SAMPLE NO.	RECOVERY	BLDYS PER 6 IN.	USCS	LOG OF MATERIAL
	CASING	ANNULUS							
1			42 BENTONITE CEMENT SLURRY					SM	SILTY SAND- RED BROWN, LOOSE TO MEDIUM DENSE, DRY TO MOIST WITH AREAS OF OXIDATION, QUARTZ, NO HYDROCARBON ODOR.
2									
3									
4	BLANK						6		
5		3/8" BENT. PELLETS		12		X	6		NO HYDROCARBON ODOR.
6									
7									
8									
9							9		
10									
11									
12				27		X	18		GRADES WITH AND SOME PIECES OF 1/4" ANGULAR GRAVEL, NO HYDROCARBON ODOR.
13									
14									
15							5		
16							6		
17							8		
18									
19									
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									
31									
32									
33									
34									
35									
36									
37									
38									
39									
40									
41									
42									
43									
44									
45									
46									
47									
48									
49									
50									
51									
52									
53									
54									
55									
56									
57									
58									
59									
60									
61									
62									
63									
64									
65									
66									
67									
68									
69									
70									
71									
72									
73									
74									
75									
76									
77									
78									
79									
80									
81									
82									
83									
84									
85									
86									
87									
88									
89									
90									
91									
92									
93									
94									
95									
96									
97									
98									
99									
100									

TEST BORING TERMINATED @ 15 1/2' ON 2-23-89

MATERIALS: 1 2/3 BAGS OF SAND
2/3 5 GALLON BUCKET OF BENTONITE

■ AREA COVERED BY SOIL PILE, COULD NOT BE SURVEYED

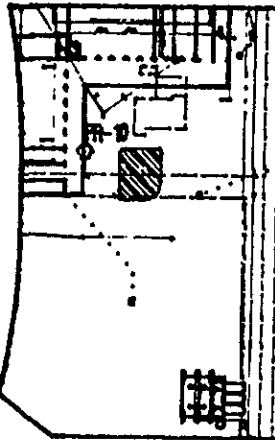
LOCATION OF BORING



SITE/LOCATION		CARNATION/OAKLAND		BORING NO.	
PROJECT NO.		004-88-859		PR-9	
WATER LEVEL ELEVATION	2.36			SHEET 1	
TIME	1:30			OF 1	
DATE	2/21/89			DRILLER	
CASING DEPTH				START TIME	FINISH TIME
DRILLING CONTRACTOR		PC EXPLORATION		1445	1500
DRILLER				DATE	DATE
DRILLING METHOD		HOLLOW STEM AUGER		2/21/89	2/21/89
SAMPLING METHOD		MPS			
LOGGER		ERIC HOLM			
N/S 24248	E/V 33256	ELEV. 15.99			
BORING DIAMETER		6 INCHES	CASING DIAMETER		2 INCHES
REVIEWED BY: MAM			DATE: 8-16-89		

DIST. FROM SURF.	WELL CONST.			TLV READING	SAMPLE NO.	RECOVERY	BLDS PER 6 IN.	USCS	LOG OF MATERIAL
	CASING	ANNULUS	LEGEND						
1								SM	ASPHALTIC CONCRETE
2		42 BENTONITE CEMENT SLURRY							SILTY SAND- GRAY BROWN, DRY TO MOIST, MEDIUM DENSE WITH AREAS OF OXIDATION, QUARTZ, MAFICS, NO HYDROCARBON ODOR.
3									
4	BLANK						18		
5		3/8" BENT. PELL.		42		X	18		
6									
7									
8									
9						X	18		
10				60	3138	X	12		
11						X	14		
12									NO HYDROCARBON ODOR.
13									
14						X	7		
15				60		X	7		
						X	7		
								NO HYDROCARBON ODOR.	
								TEST BORING TERMINATED @ 15' ON 2-21-89	
								MATERIALS: 1 2/3 BAGS OF SAND	
								2/3 5 GALLON BUCKET OF BENTONITE	

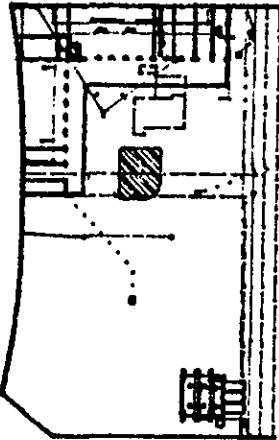
LOCATION OF BORING



SITE/LOCATION		CARNATION/DANLAND		BORING NO.	
PROJECT NO.		884-88-839		PR-10	
WATER LEVEL ELEVATION		173		SHEET 1	
TIME		1058		OF 1	
DATE		2/21/89		DRILLER	
CASING DEPTH				START	FINISH
DRILLING CONTRACTOR		PC EXPLORATION		TIME	TIME
DRILLER				1043	1158
DRILLING METHOD		HELLOW STEM AUGER		DATE	DATE
SAMPLING METHOD		NPS		2/21/89	2/21/89
LOGGER		ERIC HOLM			
N/S 8492.8		E/V 38847	ELEV. 1457		
BORING DIAMETER		6 INCHES	CASING DIAMETER	2 INCHES	
REVIEWED BY		NAM		DATE 8-18-89	

DIST. FROM SURF.	WELL CONST.			TLV READING	SAMPLE NO.	RECOVERY	BLOWS PER 6 IN.	USCS	LOG OF MATERIAL
	CASING	ANNULUS	LEBING						
1								SP	SAND- RED BROWN, MOIST, MEDIUM DENSE, MEDIUM TO COARSE GRAINED WITH AREAS OF OXIDATION, TRACES OF MAFICS, QUARTZ, SLIGHT HYDROCARBON ODO.
2		42 BENTONITE CEMENT SLURRY							
3									
4	BLANK					X	9	SM	GRADES, VET, NO HYDROCARBON ODO.
5		3/8" BENT. PELLETS		140		X	10		
6									
7								SM	GRADES, LOOSE, NO HYDROCARBON ODO.
8						X	10		
9						X	11		
10						X	14	SM	TEST BORING TERMINATED @ 15 1/2' ON 2-21-89
11									
12									
13								SM	MATERIALS 2 BAGS OF SAND 2/3 5 GALLON BUCKET OF BENTONITE
14						X	3		
15						X	3		
16						X	3		

LOCATION OF BORING



SITE/LOCATION		CARNATION/DAKLAND		BORING NO.	
PROJECT NO.		004-00-039		PR-11	
WATER LEVEL ELEVATION	12.68'	■ BELYV GRU SURFACE		SHEET 1	
TIME	12:40			OF 1	
DATE	2/21/89			DRILLER	
CASING DEPTH				START	FINISH
DRILLING CONTRACTOR				PC EXPLORATION	
DRILLER					
DRILLING METHOD				HOLLOW STEM AUGER	
SAMPLING METHOD				MPS	
LOGGER					
M/S		E/V		ELEV.	
BORING DIAMETER		6 INCHES		CASING DIAMETER	
				2 INCHES	
REVIEWED BY:				DATE:	
MAN				8-18-89	

TEST FROM SURF.	WELL CONST.			TLV READING	SAMPLE NO.	RECOVERY	BLI/S PER 6 IN.	USCS	LOG OF MATERIAL
	CASING	MANIFOLD	LEGEND						
1			42 BENTONITE CEMENT SLURRY					SP	SAND- RED BROWN, MIST, MEDIUM DENSE, MEDIUM TO COARSE GRAINED WITH MAFICS, QUARTZ, SLIGHT HYDROCARBON ODOR.
2									
3									
4	BLANK		3/8" BENT. PELLETS			X	8	SM	SILTY SAND- RED BROWN, MIST TO VET, MEDIUM DENSE WITH AREAS OF OXIDATION, MAFICS, QUARTZ, SLIGHT HYDROCARBON ODOR.
5				32	X	12			
6					X	14			
7			COARSE AQUICLUS SAND						
8								7	
9								7	
10				34				8	
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									
31									
32									
33									
34									
35									
36									
37									
38									
39									
40									
41									
42									
43									
44									
45									
46									
47									
48									
49									
50									
51									
52									
53									
54									
55									
56									
57									
58									
59									
60									
61									
62									
63									
64									
65									
66									
67									
68									
69									
70									
71									
72									
73									
74									
75									
76									
77									
78									
79									
80									
81									
82									
83									
84									
85									
86									
87									
88									
89									
90									
91									
92									
93									
94									
95									
96									
97									
98									
99									
100									

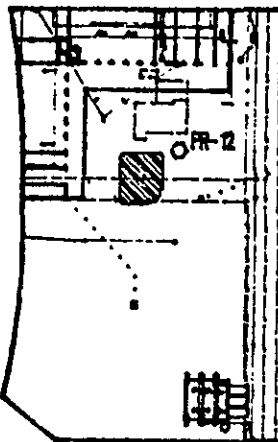
TEST BORING TERMINATED @ 13 1/2' ON 2-21-89

MATERIALS: 1 1/2 BAGS OF SAND
2/3 5 GALLON BUCKET OF BENTONITE

■ AREAS COVERED BY SOIL STOCKPILE

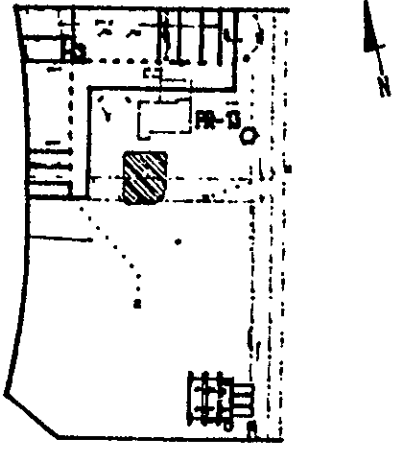
NO PRODUCT IN BAILER, SEAPY TYPE BUBBLES NOTED.

LOCATION OF BORING



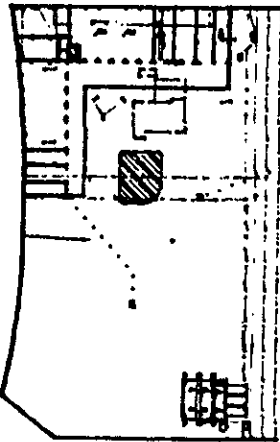
SITE/LOCATION		CARNATION/DAKLAND		BORING NO.	
PROJECT NO.		004-00-059		PR-12	
WATER LEVEL ELEVATION		214		SHEET 1	
TIME		9:50		OF 1	
DATE		2/21/89		DRILLER	
CASING DEPTH ESTIMATES				START	FINISH
DRILLING CONTRACTOR		PC EXPLORATION		TIME	TIME
DRILLER				2:15	3:50
DRILLING METHOD		HOLLOW STEM AUGER		DATE	DATE
SAMPLING METHOD		MPS		2/21/89	2/21/89
LOGGER		ERIC HOLM			
N/S 24964		E/V 31099		ELEV. 1524	
BORING DIAMETER		6 INCHES		CASING DIAMETER	
				2 INCHES	
REVIEWED BY: MAM				DATE: 0-16-89	

DIST. FROM SURF.	WELL CONST.			TLV READING	SAMPLE NO.	RECOVERY	BLOWS PER 6 IN.	USCS	LOG OF MATERIAL
	CASING	ANNULUS	LEGEND						
1		42 PORTLAND CEMENT SLURRY							SILTY SAND- GREEN GRAY, MOIST, MEDIUM DENSE, FINE TO MEDIUM GRAINED WITH SOME ORGANICS, STRONG HYDROCARBON ODOR.
2									
3									
4	BLANK						9		
4		3/4" BENT. PELLETS		110		X	9		STRONG HYDROCARBON ODOR.
6									
7									
8								SM	
9						X	10		
10						X	10		
10		COURSE AQUARIUM SAND		1000		X	13		STRONG HYDROCARBON ODOR.
11									
12									
13									
14							9		
15				15			6		
15							7		GRADES, WET, LOOSE TO MEDIUM DENSE, STRONG HYDROCARBON ODOR.
									TEST BORING TERMINATED @ 15 1/2' ON 2-21-89
									MATERIALS: 1 3/4 BAGS OF SAND
									2/3 5 GALLON BUCKET OF BENTONITE
									PRODUCT ON BOTTOM OF THE AUGER WHEN PULLED OUT 1000 ON 2-21-89.

LOCATION OF BORING 	SITE/LOCATION CARNATION/OAKLAND			BORING NO. PR-13	
	PROJECT NO. 804-88-059			SHEET 1 OF 1	
	WATER LEVEL ELEVATION 1.96			DRILLER	
	TIME 145			START TIME 1100	FINISH TIME 1940
	DATE 3/28/89			DATE 3/28/89	DATE 3/28/89
	CASING DEPTH				
	DRILLING CONTRACTOR PC EXPLORATION				
	DRILLER				
	DRILLING METHOD HOLLOW STEM AUGER				
	SAMPLING METHOD 1480 HAMMER 30° DROP, MODIFIED CALIFORNIA SAMPLER				
LOGGER ERIC HOLM					
N/S 2488.5		E/V 3263.7	ELEV. 15.05		
BORING DIAMETER 6 INCHES		CASING DIAMETER 2 INCHES			
REVIEWED BY: MAM.			DATE 8-18-89		

DIST. FROM SURF.	WELL CONST.			TLV READING	SAMPLE NO.	RECOVERY	BLOVS PER 6 IN.	USCS	LOG OF MATERIAL
	CASING	ANNULUS	LEGEND						
1								SM	SILTY SAND- RED BROWN, DRY TO MOIST, MEDIUM DENSE WITH AREAS OF OXIDATION, QUARTZ, MAFICS, NO HYDROCARBON ODOR.
2		4% BENTONITE CEMENT SLURRY							
3									
4	BLANK				X	8			
5		3/8" BENT. PELLETS		19	X	19			
6									
7									
8									
9							7		
10							8		
11				18			10		
12									
13									
14							6		
15							6		
16				0	X	8			
								NO HYDROCARBON ODOR.	
								GRADES WITH DECREASING SILT CONTENT, VET, NO HYDROCARBON ODOR.	
								TEST BORING TERMINATED @ 15 1/2' ON 2-28-89	
								MATERIALS: 1 1/2 BAGS OF SAND	
								2/3 5 GALLON BUCKET OF BENTONITE	

LOCATION OF BORING



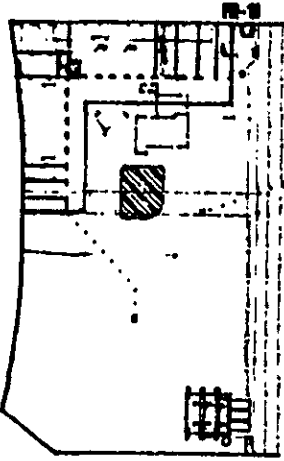
SITE/LOCATION		CARNATION/DANLAND		BORING NO.	
PROJECT NO.		884-88-859		PR-14	
WATER LEVEL ELEVATION		265		SHEET 1	
TIME		148		OF 1	
DATE		3/28/89		DRILLER	
CASING DEPTH				START	FINISH
DRILLING CONTRACTOR		PC EXPLORATION		TIME	TIME
DRILLER				120	240
DRILLING METHOD		HOLLOW STEM AUGER		DATE	DATE
SAMPLING METHOD		140# HAMMER 30" DROP, MODIFIED CALIFORNIA SAMPLER		3/28/89	3/28/89
LOGGER		ERIC HOLM			
N/S 22182		E/V 33544		ELEV. 13.35	
BORING DIAMETER		6 INCHES		CASING DIAMETER	
				2 INCHES	
REVIEWED BY: M.A.M.				DATE: 8-18-88	

DIST. FROM SURF.	VELL CONST.		LEGEND	TLV READING	SAMPLE NO.	RECOVERY	BLD'S PER 6" IN.	USCS	LOG OF MATERIAL		
	CASING	ANNULUS									
1								SM	SILTY SAND- RED BROWN, MOIST, MEDIUM DENSE, MEDIUM GRAINED WITH QUARTZ, MAFICS.		
2		42 BENTONITE CEMENT SLURRY									
3											
4	BLANK						7				
5		3" OF BENT. PELLETS			8	X	8				NO HYDROCARBON ODOUR.
6											
7											
8											
9							8				
10							9				
11					7	X	12				NO HYDROCARBON ODOUR.
12											
13											
14							5				
15					18	X	6				GRADES, VET. AREAS OF OXIDATION, NO HYDROCARBON ODOUR.
						7			TEST BORING TERMINATED @ 15 1/2' ON 2-28-89		
									MATERIALS 1 1/2 BAGS OF SAND		
									2/3 5 GALLON BUCKET OF BENTONITE		

LOCATION OF BORING		SITE/LOCATION CARNATION/OAKLAND			BORING NO.	
		PROJECT NO. 004-00-059			PR-15	
		WATER LEVEL ELEVATION 2.01			SHEET 1	
		TIME 1:43			OF 1	
		DATE 3/28/89			DRILLER	
CASING DEPTH			START	FINISH		
DRILLING CONTRACTOR PC EXPLORATION			TIME	TIME		
DRILLER			3:30	5:00		
DRILLING METHOD HOLLOW STEM AUGER			DATE	DATE		
SAMPLING METHOD 140# HAMMER 30" DROP, MODIFIED CALIFORNIA SAMPLER			3/28/89	3/28/89		
LOGGER ERIC HOLM						
N/S 25304		E/V 32525	ELEV. 1506			
BORING DIAMETER 6 INCHES		CASING DIAMETER		2 INCHES		
REVIEWED BY: M.A.M.			DATE: 6-18-89			

DIST. FROM SURF.	WELL CONST.			TLV READING	SAMPLE NO.	RECOVERY	BLDYS PER 6 IN.	USCS	LOG OF MATERIAL			
	CASING	ANNULUS	LEGEND									
1	42 BENTONITE CEMENT SLURRY	[Pattern]	[Pattern]					SM	SILTY SAND- RED BROWN, MOIST, MEDIUM DENSE WITH AREAS OF OXIDATION, QUARTZ, MAFICS, NO HYDROCARBON ODOR.			
2												
3												
4	BLANK	3/8" BENT. PELLETS	[Pattern]			X	7	SP	SAND- RED BROWN, MOIST, MEDIUM DENSE, FINE GRAINED WITH QUARTZ, MAFICS, NO HYDROCARBON ODOR.			
5							X			10		
6	COARSE AQUARIUM SAND	[Pattern]	[Pattern]						GRADES, WET, FINE TO MEDIUM GRAINED, NO HYDROCARBON ODOR.			
7												
8												
9												
10											X	10
11											X	10
12												
13												
14												5
15												8
				21		X	9					
									TEST BORING TERMINATED @ 15 1/2' ON 2-28-89			
									MATERIALS 1 3/4 BAGS OF SAND			
									2/3 5 GALLON BUCKET OF BENTONITE			

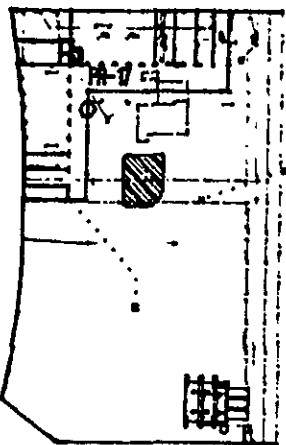
LOCATION OF BORING



SITE/LOCATION		CARNATION/OAKLAND		BORING NO.	
PROJECT NO.		064-88-059		PR-16	
WATER LEVEL ELEVATION		.99		SHEET 1	
TIME		156		OF 1	
DATE		3/28/89		DRILLER	
CASING DEPTH				START	FINISH
DRILLING CONTRACTOR		PC EXPLORATION		TIME	TIME
DRILLER				700	030
DRILLING METHOD		HOLLOW STEM AUGER		DATE	DATE
SAMPLING METHOD		140# HAMMER 30' DROP, MODIFIED CALIFORNIA SAMPLER		3/28/89	3/28/89
LOGGER		ERIC HOLM			
N/S 26194	E/V 3365.3	ELEV. 14.87			
BORING DIAMETER		6 INCHES		CASING DIAMETER	
				2 INCHES	
REVIEWED BY: M.A.M.				DATE: 8-18-89	

DIST. FROM SURF.	WELL CONST.			T.V. READING	SAMPLE NO.	RECOVERY	BLDVS PER 6 IN.	USCS	LOG OF MATERIAL
	CASING	ANNULUS	LEGEND						
1		42 BENTONITE CEMENT SLURRY						SM	SILTY SAND- RED BROWN, DRY TO MOIST, MEDIUM DENSE, MEDIUM GRAINED WITH QUARTZ, MAFICS, SLIGHT HYDROCARBON ODOR.
2									
3									
4	BLANK				X	11			
5		3/8" BENT. PELLETS		280	X	12			
6									
7									
8									
9									
10									
11									
12									
13									
14					X	5			
15				5	X	6			
									COLOR CHANGE TO GREEN GRAY AND AREAS OF BROWN, NO HYDROCARBON ODOR.
									GRADES, VET, NO HYDROCARBON ODOR.
									TEST BORING TERMINATED @ 15 1/2' ON 2-28-89.
									MATERIALS 1 2/3 BAGS OF SAND
									2/3 5 GALLON BUCKET OF BENTONITE

LOCATION OF BORING



SITE/LOCATION		CARNATION/OAKLAND		BORING NO.	
PROJECT NO.		004-00-039		PR-17	
WATER LEVEL ELEVATION	47			SHEET 1	
TIME	205			OF 1	
DATE	2/23/89			DRILLER	
CASING DEPTH				START	FINISH
DRILLING CONTRACTOR		PC EXPLORATION		TIME	TIME
DRILLER				130	300
DRILLING METHOD		HOLLOW STEM AUGER		DATE	DATE
SAMPLING METHOD		1400 HAMMER 30" DROP, MODIFIED CALIFORNIA SAMPLER		2/23/89	2/23/89
LOGGER		ERIC HOLM			
N/S 2575.2	E/W 2181.7	ELEV. 1462			
BORING DIAMETER		6 INCHES		CASING DIAMETER	
				2 INCHES	
REVIEWED BY: MAM				DATE: 8-18-89	

DIST. FROM SURF.	WELL CONST.		LEGEND	TLV READING	SAMPLE NO.	RECOVERY	BLOWS PER 6 IN.	USCS	LOG OF MATERIAL	
	CASING	ANNULUS								
1		42 MENTONITE CEMENT SLURRY						SM	SILTY SAND- RED BROWN, DRY TO MOIST, MEDIUM DENSE, COLOR CHANGE WITH AREAS OF OXIDATION, QUARTZ, MAFIC CLASTS, SLIGHT HYDROCARBON ODOR.	
2										
3										
4	BLANK						18			
5		3/8" MENT. PELLETS		25		X	13			
6						X	14			
7										
8									COLOR CHANGE TO GRAY BLACK, STRONG HYDROCARBON ODOR.	
9						X	18			
10						X	18			
11						X	13		COLOR CHANGE TO RED BROWN, NO HYDROCARBON ODOR.	
12										
13							5			
14							6			
15							20	3135	X	7
16										
17										
18									COLOR CHANGE TO RED BROWN.	
19									TEST BORING TERMINATED @ 20' ON 2-23-89	
20									MATERIALS: 1 3/4 BAGS OF SAND	
									2/3 5 GALLON BUCKET OF MENTONITE	

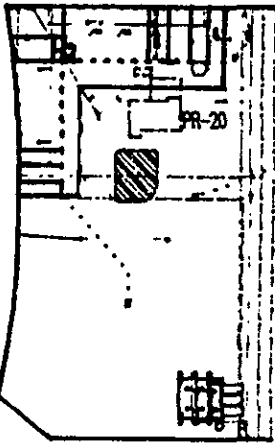
PR-18

NOT DRILLED

PR-19

NOT DRILLED

LOCATION OF BORING



SITE/LOCATION		CARNATION/DAKLAND		BORING NO.	
PROJECT NO.		004-00-039		PR-20	
PRODUCT LEVEL ELEVATION	.06			SHEET 1	
TIME	11:50			OF 1	
DATE	2/23/89			DRILLER	
CASING DEPTH				START	FINISH
DRILLING CONTRACTOR				TIME	TIME
PC EXPLORATION				11:00	12:00
DRILLER				DATE	DATE
DRILLING METHOD				2/23/89	2/23/89
SAMPLING METHOD				140# HAMMER 30" DROP, MODIFIED CALIFORNIA SAMPLER	
LOGGER					
ERIC HOLM					
N/S 25743		E/V 32434		ELEV. 1464	
BORING DIAMETER		6 INCHES		CASING DIAMETER	
				2 INCHES	
REVIEWED BY:				DATE:	
M.A.M.				8-24-89	

DIST. FROM SURF.	WELL CONST.			TLV READING	SAMPLE NO.	RECOVERY	BLD'S PER 6 DL	USCS	LOG OF MATERIAL
	CASING	ANNULUS	LEGEND						
1								SM	SILTY SAND- RED MOTTLED RED TO BROWN, MOIST, QUARTZ WITH MAFICS, MEDIUM DENSE, HYDROCARBON ODOR.
2		4% BENTONITE CEMENT SLURRY							
3									
4	BLANK					10			
5		3/8" BENT. PELLETS		1800	X	11			
6					X	10			
7									
8									
9						10			
10					X	11			
11					X	12			
12									
13									
14						7			
15					X	7			
16					X	9			
17				10,000					
18									
19									
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									
31									
32									
33									
34									
35									
36									
37									
38									
39									
40									
41									
42									
43									
44									
45									
46									
47									
48									
49									
50									
51									
52									
53									
54									
55									
56									
57									
58									
59									
60									
61									
62									
63									
64									
65									
66									
67									
68									
69									
70									
71									
72									
73									
74									
75									
76									
77									
78									
79									
80									
81									
82									
83									
84									
85									
86									
87									
88									
89									
90									
91									
92									
93									
94									
95									
96									
97									
98									
99									
100									

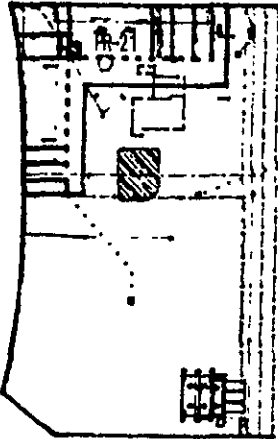
GRADES WITH INCREASING SAND, MEDIUM GRAINED, STRONG HYDROCARBON ODOR.

TEST BORING TERMINATED @ 15 1/2' ON 2-23-89

PRODUCT ENCOUNTERED

MATERIALS: 1 3/4 BAGS OF SAND
2/3 5 GALLON BUCKET OF BENTONITE

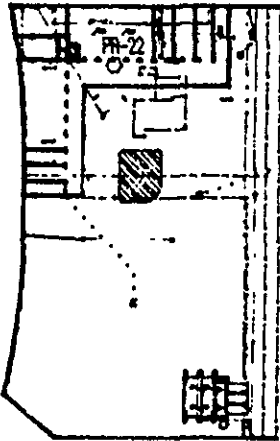
LOCATION OF BORING



SITE/LOCATION		CARNATION/OAKLAND		BORING NO.	
PROJECT NO.		004-00-059		PR-21	
PRODUCT LEVEL ELEVATION	.97			SHEET 1	
TIME	065			OF 1	
DATE	3/28/89			DRILLER	
CASING DEPTH				START	FINISH
DRILLING CONTRACTOR				TIME	TIME
PC EXPLORATION				140	315
DRILLER				DATE	DATE
DRILLING METHOD				3/28/89	3/28/89
HOLLOW STEM AUGER					
LOGGER					
ERIC HOLM					
N/S 2608.6		E/V 3140.1		ELEV. 14.60	
BORING DIAMETER		6 INCHES		CASING DIAMETER	
				2 INCHES	
REVIEWED BY: KAM.				DATE: 0-24-89	

DIST. FROM SURF.	WELL CONST.			TLV READING	SAMPLE NO.	RECOVERY	SPLITS PER 6 IN.	USCS	LOG OF MATERIAL	
	CASING	ANNULUS	LEGEND							
1								SM	SILTY SAND- RED BROWN, MOIST, MEDIUM DENSE WITH MAFICS, QUARTZ, STRONG HYDROCARBON ODR.	
2										
3										
4	BLANK					X	8			
5				6500	3136	X	9			STRONG HYDROCARBON ODR.
6										
7										
8										
9						X	8			
10				6000		X	9			STRONG HYDROCARBON ODR.
11										
12										
13										
14							9			
15				6500		X	12			STRONG HYDROCARBON ODR.
								TEST BORING TERMINATED @ 15 1/2' ON 2-22-89		
								MATERIALS: 2 BAGS OF SAND		
								2/3 5 GALLON BUCKET OF BENTONITE		

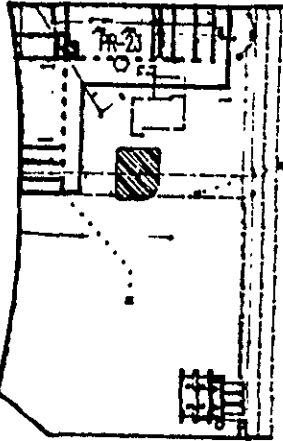
LOCATION OF BORING



SITE/LOCATION		CARBATION/OAKLAND		BORING NO.	
PROJECT NO.		004-88-059		PR-22	
PRODUCT LEVEL ELEVATION	103			SHEET 1	
TIME	210			OF 1	
				DRILLER	
DATE	3/28/89			START	FINISH
CASING DEPTH				TIME	TIME
				1145	1410
DRILLING CONTRACTOR				DATE	DATE
PC EXPLORATION				3/28/89	3/28/89
DRILLER					
DRILLING METHOD					
HOLLOW STEM AUGER					
SAMPLING METHOD: 1408 HAMMER 30" DROP, MODIFIED CALIFORNIA SAMPLER.					
LOGGER					
ERIC HELM					
N/S 2605.7	E/W 3149.7	ELEV. 1461			
BORING DIAMETER:		6 INCHES	CASING DIAMETER:		2 INCHES
REVIEWED BY: N.A.M.				DATE: 8-29-89	

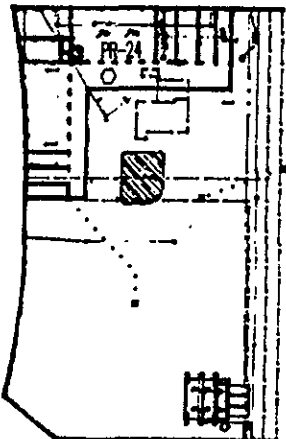
DIST. FROM SURF.	WELL CONST.			T.V. READING	SAMPLE NO.	RECOVERY	BLOWS PER 6 IN.	USCS	LOG OF MATERIAL
	CASING	ANNULUS	LEGEND						
1									STILTY SAND- RED BROWN, DRY TO MOIST, MEDIUM DENSE, MAFICS, QUARTZ, STRONG HYDROCARBON ODOR.
2									
3		42 BENTONITE CEMENT SLURRY							
4	BLANK					X	10		
5		3/8" BENT. PELLETS		2500		X	11		STRONG HYDROCARBON ODOR.
6									
7									
8								SM	
9						X	7		
10						X	9		
11				10,000		X	11		STRONG HYDROCARBON ODOR.
12									
13									
14							7		
15							7		
16				1500		X	8		GRADES WITH INCREASING SAND CONTENT, STRONG HYDROCARBON ODOR.
									TEST BORING TERMINATED @ 15 1/2' ON 2-28-89
									MATERIALS: 1 3/4 BAGS OF SAND
									2/3 5 GALLON BUCKET OF BENTONITE

LOCATION OF BORING



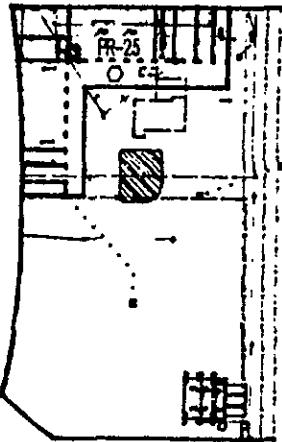
SITE/LOCATION		CARNATION/DANLAND		BORING NO.	
PROJECT NO.		004-88-039		PR-23	
PRODUCT LEVEL ELEVATION	13.40'			SHEET 1	
TIME	065			OF 1	
DATE	2/24/89			DRILLER	
CASING DEPTH				START	FINISH
DRILLING CONTRACTOR	PC EXPLORATION			TIME	TIME
DRILLER				7:05	8:00
DRILLING METHOD	HOLLOW STEM AUGER			DATE	DATE
SAMPLING METHOD	140# HAMMER 30" DROP, MODIFIED CALIFORNIA SAMPLER.			2/24/89	2/24/89
LOGGER	ERIC HELLM				
N/S	26034	E/V	31593	ELEV. 14.61	
BORING DIAMETER	6 INCHES		CASING DIAMETER	2 INCHES	
REVIEWED BY:	M.A.M.		DATE	2-28-89	

DIST. FROM SURF.	WELL CONST.			TLV READING	SAMPLE NO.	RECOVERY	BLDS PER 6 IN	USCS	LOG OF MATERIAL
	CASING	ANNULUS	LENERD						
1									
2									
3									
4	BLANK	42 BENTONITE CEMENT SLURRY				X	6		
5		3/4" BENT. PELLETS		3200		X	6		
6									SILTY SAND- RED BROWN MOIST, MEDIUM DENSE WITH AREAS OF OXIDATION. QUARTZ, MAFICS, STRONG HYDROCARBON ODDOR.
7									
8									
9						X	9	SM	
10				10,000		X	10		STRONG HYDROCARBON ODDOR.
11									
12									
13									
14							6		
15				10,000		X	9		GRADES WET, MEDIUM DENSE, STRONG HYDROCARBON ODDOR.
									TEST BORING TERMINATED @ 15 1/2' ON 2-24-89
									PRODUCT ENCOUNTERED
									MATERIALS: 1 3/4 BAGS OF SAND
									2/3 5 GALLON BUCKET OF BENTONITE

LOCATION OF BORING 	SITE/LOCATION		CARNATION/OAKLAND		BORING NO.	
	PROJECT NO.		004-00-039		TME	
	PRODUCT LEVEL ELEVATION		0.76		SHEET 1	
	TME		1000		OF 1	
	DATE		2/24/89		DRILLER	
	CASING DEPTH				START	FINISH
	DRILLING CONTRACTOR		PC EXPLORATION		TME	TME
	DRILLER				9:00	10:40
	DRILLING METHOD		HOLLOW STEM		DATE	DATE
	SAMPLING METHOD		140# HAMMER 30" DROP, MODIFIED CALIFORNIA SAMPLER.		2/24/89	2/24/89
LOGGER		ERIC HOLM				
N/S 2996.8		E/V 3137.4		ELEV. 1457		
SURFACE CONDITIONS		ASPHALT				
REVIEWED BY: MAM.				DATE 8-28-89		

DIST. FROM SURF.	WELL CONST.			TLV READING	SAMPLE NO.	RECOVERY	BLDS PER 6 IN.	USCS	LOG OF MATERIAL
	CASING	ANNULUS	LEGEND						
1			42 BENTONITE CEMENT SLURRY					SM	SILTY SAND- RED BROWN, MOIST, MEDIUM DENSE WITH QUARTZ MAFICS
2									STRONG HYDROCARBON ODOR
3									
4	BLANK					X	8		
5		3/8" BENT. PELLETS		2000	X	13			STRONG HYDROCARBON ODOR
6			COARSE AQUICLUS SAND						
7									
8									
9						X	12		
10					1800	X	11		
11									
12	QUEST SLIT								
13									
14							5		
15				19	X	6			
					X	8		GRADES WET, MODERATE HYDROCARBON ODOR	
								TEST BORING TERMINATED @ 15' ON 2-24-89	
								PRODUCT ENCOUNTERED	
								MATERIALS: 1 3/4 BAGS OF SAND	
								2/3 5 GALLON BUCKET OF BENTONITE	

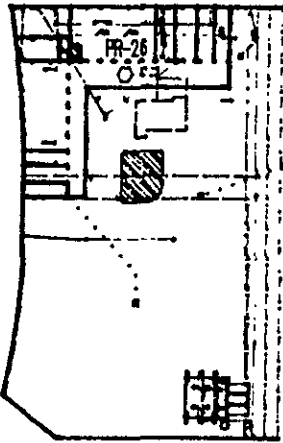
LOCATION OF BORING



SITE/LOCATION		CARNATION/DAKLAND		BORING NO.	
PROJECT NO.		004-00-039		PR-25	
PRODUCT LEVEL ELEVATION	.84			SHEET 1	
TIME	11:55			OF 1	
DATE	2/24/89			DRILLER	
CASING DEPTH				START	FINISH
DRILLING CONTRACTOR	PC EXPLORATION			TIME	TIME
DRILLER				1100	1235
DRILLING METHOD	HOLLOW STEM AUGER			DATE	DATE
SAMPLING METHOD	1400 HAMMER 30" DROP, MODIFIED CALIFORNIA SAMPLER.			2/24/89	2/24/89
LOGGER	ERIC HOLM				
N/S	2596.1	E/V	3147.0	ELEV. 1436	
BORING DIAMETER	6 INCHES	CASING DIAMETER	2 INCHES		
REVIEWED BY	MAM			DATE 8-28-89	

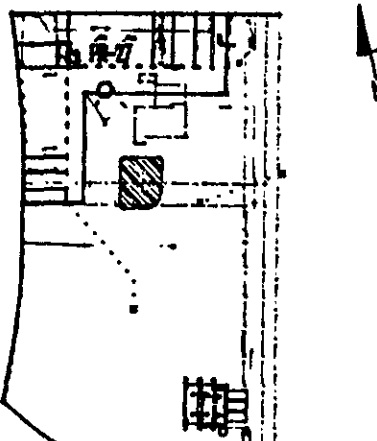
DIST. FROM SURF.	WELL CONST.			TLV READING	SAMPLE NO.	RECOVERY	BLDS PER 6 IN.	USCS	LOG OF MATERIAL
	CASING	ANNULIS	LEGEND						
1								SM	SILTY SAND- RED BROWN DRY TO MOIST, MEDIUM DENSE WITH QUARTZ, MAFICS, STRONG HYDROCARBON ODOR.
2									
3									
4	BLANK	4% BENTONITE CEMENT SLURRY					11		
5		3 1/2" BENT. PELLETS		3800		X	11		
6									STRONG HYDROCARBON ODOR.
7									
8									
9							9		
10						X	9		
11				12,000		X	9		
12									STRONG HYDROCARBON ODOR.
13									
14							10		
15							10		
16				200		X	12		
								GRADES VET, HYDROCARBON ODOR.	
								TEST BORING TERMINATED @ 17' ON 2-24-89	
								PRODUCT ENCOUNTERED	
								MATERIALS 1 3/4 BAGS OF SAND	
								2/3 5 GALLON BUCKET OF BENTONITE	

LOCATION OF BORING



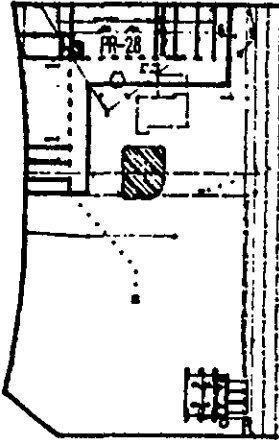
SITE/LOCATION		CARNATION/DAKLAND		BORING NO.	
PROJECT NO.		004-00-039		PR-26	
PRODUCT LEVEL	0.83			SHEET 1	
TIME	2:00			OF 1	
DATE	2/24/89			DRILLER	
CASING DEPTH				START	FINISH
DRILLING CONTRACTOR		PC EXPLORATION		TIME	TIME
DRILLER				145	240
DRILLING METHOD		HOLLOW STEM AUGER		DATE	DATE
SAMPLING METHOD		1400 HAMMER 30" DROP, MODIFIED CALIFORNIA SAMPLER.		2/24/89	2/24/89
LOGGER		ERIC HOLM			
N/S 25934	E/V 3156.8	ELEV. 1436			
BORING DIAMETER		6 INCHES		CASING DIAMETER	
				2 INCHES	
REVIEWED BY: NAAK			DATE 0-28-89		

DIST. FROM SURF.	WELL CONST.			TLV READING	SAMPLE NO.	RECOVERY	BLDS PER 6 IN.	USCS	LOG OF MATERIAL
	CASING	ANNULIS	LEGEND						
1									SILTY SAND- MOTTLED RED BROWN, MOIST, MEDIUM DENSE WITH QUARTZ, MAFICS, STRONG HYDROCARBON ODOR.
2									
3									
4	BLANK	4% BENTONITE CEMENT SLURRY					7		
5		3/8" BENT. PELLETS		10.000		X	9		STRONG HYDROCARBON ODOR.
6									
7									
8									
9						X	8		
10				4.000		X	8	SM	STRONG HYDROCARBON ODOR.
11									
12	QUARTZ SLIT	COURSE AQUICLUD SAND							
13									
14						X	9		
15				10		X	20		COLOR CHANGE TO BROWN, GRADES VET, SLIGHT HYDROCARBON ODOR.
									TEST BORING TERMINATED @ 15' ON 2-24-89.
									PRODUCT ENCOUNTERED
									MATERIALS 1 3/4 BAGS OF SAND
									2/3 5 GALLON BUCKET OF BENTONITE

LOCATION OF BORING		SITE/LOCATION CARNATION/DARLAND				BORING NO. PR-27	
		PROJECT NO. 004-80-039				SHEET 1	
		WATER LEVEL ELEVATION 672				OF 1	
		TIME 400				DRILLER	
		DATE 2/24/89				START TIME 145	FINISH TIME 240
		CASING DEPTH				DATE 2/24/89	DATE 2/24/89
		DRILLING CONTRACTOR PC EXPLORATION					
		DRILLER					
		DRILLING METHOD HOLLOW STEM AUGER					
		SAMPLING METHOD 1400 HAMMER 30" DROP, MODIFIED CALIFORNIA SAMPLER					
		LOGGER ERIC HELM					
		N/S 2089.9	E/V 3134.6	ELEV. 1456			
		BORING DIAMETER 6 INCHES		CASING DIAMETER 2 INCHES			
		REVIEWED BY: MAM				DATE 6-28-89	

DIST. FROM SURF.	WELL CONST.			TLV READING	SAMPLE NO.	RECOVERY	BLDS PER 6 IN.	USCS	LOG OF MATERIAL
	CASING	ANNULUS	LEGEND						
1								SM	SILTY SAND- RED BROWN, MOIST, MEDIUM DENSE WITH QUARTZ, MAFICS, SLIGHT HYDROCARBON ODOR.
2									STRONG HYDROCARBON ODOR.
3									
4	BLANK	42 BENTONITE CEMENT SLURRY			X	7			
5		3 3/4" BENT. PELLETS		120	X	11			SLIGHT HYDROCARBON ODOR.
6									
7									
8									
9					X	10			
10				120	X	10			SLIGHT HYDROCARBON ODOR.
11									
12									
13									
14					X	11			GRADES WITH INCREASING SCLT CONTENT, AREAS OF OXIDATION, VET, NO HYDROCARBON ODOR.
15				10	X	13			
								TEST BORING TERMINATED @ 15' ON 2-24-89	
								MATERIALS: 1 3/4 BAGS OF SAND	
								2/3 5 GALLON BUCKET OF BENTONITE	

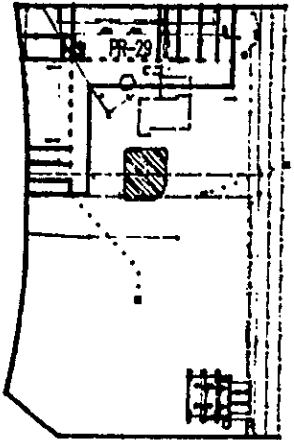
LOCATION OF BORING



SITE/LOCATION		CARNATION/OAKLAND		BORING NO.	
PROJECT NO.		004-00-039		PR-28	
WATER LEVEL ELEVATION	0.84			SHEET 1	
TIME	0:20			OF 1	
DATE	2/22/89			DRILLER	
CASING DEPTH				START	FINISH
DRILLING CONTRACTOR	PC EXPLORATION			TIME	TIME
DRILLER				7:00	9:00
DRILLING METHOD	HOLLOW STEM AUGER			DATE	DATE
SAMPLING METHOD: 1400 HAMMER 30" DROP, MODIFIED CALIFORNIA SAMPLER.					
LOGGER: ERIC HELM					
N/S 2506.5	E/V 3144.5	ELEV. 14.52			
BORING DIAMETER: 6 INCHES		CASING DIAMETER: 2 INCHES			
REVIEWED BY: MAM			DATE: 8-26-89		

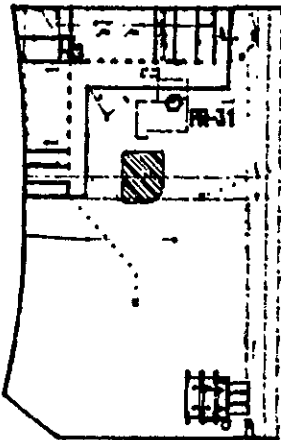
DIST. FROM SURF.	WELL CONST.			TLV READING	SAMPLE NO.	RECOVERY	BLOWS PER 6 IN.	USCS	LOG OF MATERIAL
	CASING	ANNULUS	LEGEND						
1		4% BENTONITE CEMENT SLURRY	[Pattern]					SM	SILTY SAND- RED BROWN, AREAS OF GREEN STAINING, DRY TO MOIST, MEDIUM DENSE WITH AREAS OF OXIDATION, QUARTZ, MAFICS, STRONG HYDROCARBON ODDOR.
2									
3									
4	BLANK						8		
5		3/8" BENT. PELLETS	[Pattern]	2000		X	10		STRONG HYDROCARBON ODDOR.
6									
7									
8									
9						X	9		
10						X	10		
11						X	12		STRONG HYDROCARBON ODDOR.
12									
13									
14							8		
15						X	9		GRADES VET, SLIGHT HYDROCARBON ODDOR.
16						X	9		TEST BORING TERMINATED @ 15' ON 2-22-89
17									
18									
19									
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									
31									
32									
33									
34									
35									
36									
37									
38									
39									
40									
41									
42									
43									
44									
45									
46									
47									
48									
49									
50									
51									
52									
53									
54									
55									
56									
57									
58									
59									
60									
61									
62									
63									
64									
65									
66									
67									
68									
69									
70									
71									
72									
73									
74									
75									
76									
77									
78									
79									
80									
81									
82									
83									
84									
85									
86									
87									
88									
89									
90									
91									
92									
93									
94									
95									
96									
97									
98									
99									
100									

MATERIALS: 1 3/4 BAGS OF SAND
2/3 5 GALLON BUCKET OF BENTONITE

LOCATION OF BORING		SITE/LOCATION CARNATION/DAKLAND			BORING NO. PR-29	
		PROJECT NO. 884-88-039			SHEET 1 OF 1	
		PRODUCT LEVEL ELEVATION 8.83			DRILLER	
		TIME 1000			START TIME 9:00	
		DATE 2/22/89			FINISH TIME 10:45	
		CASING DEPTH			DATE 2/22/89	
		DRILLING CONTRACTOR PC EXPLORATION			DATE 2/22/89	
		DRILLER			DATE 2/22/89	
		DRILLING METHOD HOLLOW STEM AUGER				
		SAMPLING METHOD 1400 HAMMER 30" DROP, MODIFIED CALIFORNIA SAMPLER				
		LOGGER ERIC HELM				
		N/S 2583.3	E/V 3153.3	ELEV. 1452		
		BORING DIAMETER 6 INCHES	CASING DIAMETER 2 INCHES			
		REVIEWED BY MAM			DATE 8-28-89	

DIST. FROM SURF.	WELL CONST.		LEGEND	TLV READING	SAMPLE NO.	RECOVERY	BLOYS PER 6 IN.	USCS	LOG OF MATERIAL
	CASING	ANNULUS							
1		4% BENTONITE CEMENT SLURRY	[Dotted pattern]					SM	SILTY SAND- RED BROWN, MOIST, MEDIUM DENSE WITH AREAS LF MOTTLING QUARTZ, MAFICS, STRONG HYDROCARBON ODOR.
2									
3									
4	BLANK					X	7		
5		3/8" BENT. PELLETS	[Diagonal lines]	388		X	8		STRONG HYDROCARBON ODOR.
6									
7									
8									
9							9		
10							9		
11				10.800		X	11		FLOATING GAS, STRONG HYDROCARBON ODOR.
12	BUCKET SLIT	COURSE AQUICLUD SAND	[Cross-hatch pattern]						
13									
14							3		
15				1200		X	6		GRADES VET, LOOSE, PRODUCT VISIBLE, STRONG HYDROCARBON ODOR.
									TEST BORING TERMINATED @ 15' ON 2-22-89
									MATERIALS: 1 1/2 BAGS OF SAND
									2/3 5 GALLON BUCKET OF BENTONITE

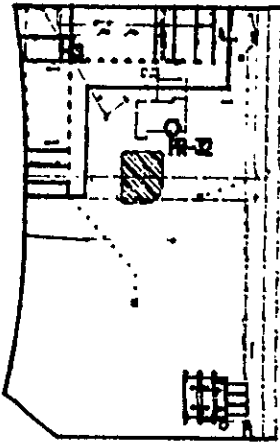
LOCATION OF BORING



SITE/LOCATION		CARNATION/DAKLAND		BORING NO.	
PROJECT NO.		004-88-039		PR-31	
PRODUCT LEVEL ELEVATION	0.88			SHEET 1	
TIME	0415			OF 1	
DATE	2/23/89			DRILLER	
CASING DEPTH				START	FINISH
DRILLING CONTRACTOR	PC EXPLORATION			TIME	TIME
DRILLER				730	945
DRILLING METHOD	HOLLOW STEM AUGER			DATE	DATE
SAMPLING METHOD	1400 HAMMER 30" DROP, MODIFIED CALIFORNIA SAMPLER.			2/23/89	2/23/89
LOGGER	ERIC HOLM				
N/S	2547.8	E/V	3282.5	ELEV. 1474	
BORING DIAMETER	6 INCHES	CASING DIAMETER	2 INCHES		
REVIEWED BY:	MAM.			DATE 8-28-89	

DIST. FROM SURF.	WELL CONST.			TLV READING	SAMPLE NO.	RECOVERY	BLOWS PER 6 IN.	USCS	LOG OF MATERIAL
	CASING	ANNULUS	LEGEND						
1									ASPHALTIC CONCRETE
2		42 BENTONITE CEMENT SLURRY						GM	SILTY GRAVEL- GRAY BROWN, MOIST, MEDIUM DENSE, ANGULAR (FILL), HYDROCARBON ODOR.
3									
4	BLANK					X	8		
5		3/8" BENT. PELLETS		90		X	9		HYDROCARBON ODOR.
6									
7									
8							7		
9							9		
10				140		X	18		HYDROCARBON ODOR.
11									
12									
13									
14							9		
15				300		X	11	SM	SILTY SAND- RED BROWN, VET. MEDIUM DENSE WITH LARGE OXIDATION DEPOSITS, QUARTZ, MAFICS, MODERATE HYDROCARBON ODOR.
									TEST BORING TERMINATED @ 15' ON 2-23-89
									PRODUCT ENCOUNTERED
									MATERIALS: 1 1/2 BAGS OF SAND
									2/3 5 GALLON BUCKET OF BENTONITE

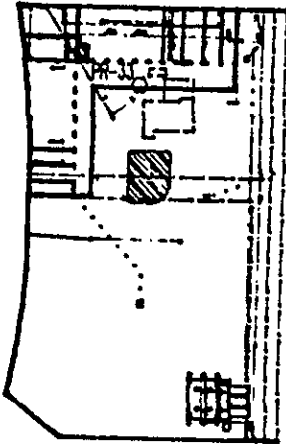
LOCATION OF BORING



SITE/LOCATION		CARNATION/DAKLAND		BORING NO.	
PROJECT NO.		804-88-059		PR-32	
PRODUCT LEVEL	137			SHEET 1	
TIME	1010			OF 1	
DATE	2/23/89			DRILLER	
CASING DEPTH				START TIME	FINISH TIME
DRILLING CONTRACTOR	PC EXPLORATION		DRILLER	925	1045
DRILLING METHOD	HOLLOW STEM AUGER		DATE	DATE	
SAMPLING METHOD	140# HAMMER 30" DROP, MODIFIED CALIFORNIA SAMPLER.				
LOGGER	CHRIS NIELSEN-CERQUONE				
N/S 2528.9	E/V 3193.8	ELEV. 15.08			
BORING DIAMETER	6 INCHES	CASING DIAMETER	2 INCHES		
REVIEWED BY:	MAX		DATE 8-28-89		

DIST. FROM SURF.	WELL CONST.			TLV READING	SAMPLE NO.	RECOVERY	BLVS PER 6 IN	USCS	LOG OF MATERIAL
	CASING	ANNULIS	LEGEND						
1									ASPHALTIC CONCRETE
2								GM	SILTY GRAVEL - GRAY BROWN, MOIST, MEDIUM DENSE, ANGULAR (FILL), HYDROCARBON ODOR.
3									
4	BLANK						7		
5		42 BENTONITE CEMENT SLURRY		150		X	8		HYDROCARBON ODOR.
6		3/8" BENT. PELLETS							
7									
8							7		
9							9		
10				300		X	9		HYDROCARBON ODOR.
11									
12									
13									
14							9		
15				800		X	10		GRADES VET, SLIGHT HYDROCARBON ODOR
									TEST BORING TERMINATED @ 15' ON 2-23-89
									PRODUCT ENCOUNTERED
									MATERIALS: 1 1/2 BAGS OF SAND 2/3 5 GALLON BUCKET OF BENTONITE

LOCATION OF BORING



SITE/LOCATION		CARNATION/DAKLAND		BORING NO.	
PROJECT NO.		004-00-009		PR-33	
PRODUCT LEVEL ELEVATION	8.91			SHEET 1	
TIME	1200			OF 1	
DATE	2/27/89			DRILLER	
CASING DEPTH				START	FINISH
DRILLING CONTRACTOR				PC EXPLORATION	
DRILLER					
DRILLING METHOD				HOLLOW STEM AUGER	
SAMPLING METHOD				1400 HAMMER 30" DROP, MODIFIED CALIFORNIA SAMPLER.	
LOGGER				CHRIS KOELSON-CERQUEINE	
N/S	2579.9	E/V	3162.2	ELEV. 1430	
BORING DIAMETER		6 INCHES	CASING DIAMETER		2 INCHES
REVIEWED BY				MAN.	DATE
					8-28-89

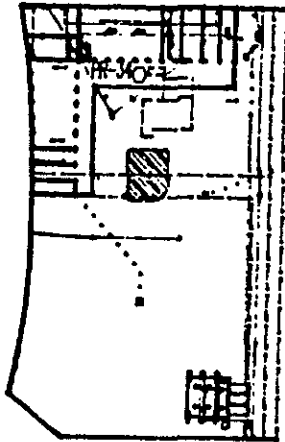
DIST. FROM SURF.	VELL. CONST.			TLV READING	SAMPLE NO.	RECOVERY	BLOWS PER 6 IN.	USCS	LOG OF MATERIAL
	CASING	ANNULUS	LEADING						
1								SM	SILTY SAND- GREEN BROWN, DRY TO MOIST, MEDIUM DENSE WITH QUARTZ, MATICS STRONG HYDROCARBON ODDOR.
2									
3									
4	BLANK	4% BENTONITE CEMENT SLURRY					9		
5		3/4" BENT. PELLETS		2500	X	X	10		
6									
7									
8									
9							7		
10					X	X	7		
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									
31									
32									
33									
34									
35									
36									
37									
38									
39									
40									
41									
42									
43									
44									
45									
46									
47									
48									
49									
50									
51									
52									
53									
54									
55									
56									
57									
58									
59									
60									
61									
62									
63									
64									
65									
66									
67									
68									
69									
70									
71									
72									
73									
74									
75									
76									
77									
78									
79									
80									
81									
82									
83									
84									
85									
86									
87									
88									
89									
90									
91									
92									
93									
94									
95									
96									
97									
98									
99									
100									

GRADES WITH AREAS OF OXIDATION, WET, STRONG HYDROCARBON ODDOR.

TEST BORING TERMINATED @ 15' ON 2-27-89

MATERIALS 1 1/2 BAGS OF SAND
2/3 5 GALLON BUCKET OF BENTONITE

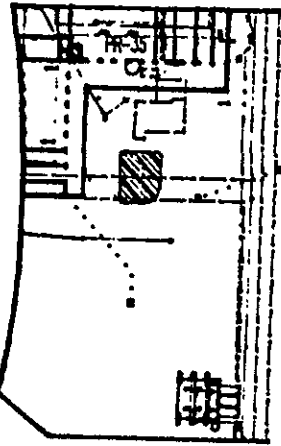
LOCATION OF BORING



SITE/LOCATION		CARNATION/DAYLAND		BORING NO.	
PROJECT NO.		004-88-039		PR-34	
PRODUCT LEVEL ELEVATION	8.93			SHEET 1	
TIME	045			OF 1	
DATE	2/27/89			DRILLER	
CASING DEPTH				START	FINISH
DRILLING CONTRACTOR	PC EXPLORATION			TIME	TIME
DRILLER				100	320
DRILLING METHOD	HOLLOW STEM AUGER			DATE	DATE
SAMPLING METHOD	1400 HAMMER 30" DROP, MODIFIED CALIFORNIA SAMPLER.			2/27/89	2/27/89
LOGGER	CHRIS WELSON-CORBUINE				
N/S 25900	E/V 31647	ELEV. 1460			
BORING DIAMETER	6 INCHES	CASING DIAMETER	2 INCHES		
REVIEWED BY	MAM		DATE 8-28-89		

FEET FROM SURF.	VELL. CONST.		LENDG	TV READING	SAMPLE NO.	RECOVERY	BLDS PER 6 IN.	USCS	LOG OF MATERIAL
	CASING	ANNULUS							
1								ML	SANDY SILT- RED BROWN, MOIST, MEDIUM DENSE WITH QUARTZ GRAFICS.
2									SLIGHT HYDROCARBON ODDR.
3									
4	BLANK						7		
5		42 BENTONITE CEMENT SLURRY					9		
6		50% BENT. PELLETS		120		X	9		
7									SLIGHT HYDROCARBON ODDR.
8									
9							11		
10						X	12		
11						X	13		
12									COLOR CHANGE TO MOTTLED GREEN GRAY, STRONG HYDROCARBON ODDR.
13									
14							6		
15							6		
16				5600		X	7		
								GRADES RED BROWN, VET, STRONG HYDROCARBON ODDR.	
								TEST BORING TERMINATED @ 15' ON 2-27-89	
								PRODUCT ENCOUNTERED	
								MATERIALS: 1 2/3 BAGS OF SAND	
								2/3 5 GALLON BUCKET OF BENTONITE	

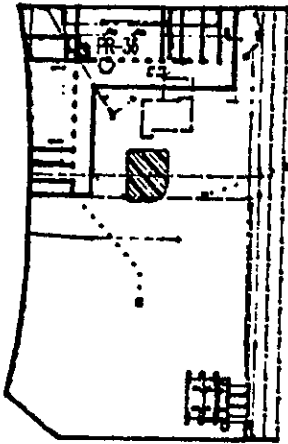
LOCATION OF BORING



SITE/LOCATION		CARNATION/OAKLAND		BORING NO.	
PROJECT NO.		884-88-039		PR-35	
PRODUCT LEVEL ELEVATION	8.99			SHEET 3	
TIME	4:20			OF 1	
DATE	2/27/89			DRILLER	
CASING DEPTH				START	FINISH
DRILLING CONTRACTOR				TIME	TIME
PC EXPLORATION				3:30	3:05
DRILLER				DATE	DATE
HOLLOW STEM AUGER				2/27/89	2/27/89
SAMPLING METHOD 1400 HAMMER 30" DROP, MODIFIED CALIFORNIA SAMPLER.					
LOGGER ERIC HOLM					
N/S 26003		E/W 31684		ELEV. 14.61	
BORING DIAMETER		6 INCHES		CASING DIAMETER	
				2 INCHES	
REVIEWED BY: H.A.M.				DATE 8-28-89	

DIST. FROM SURF.	WELL CONST.			TLV READING	SAMPLE NO.	RECOVERY	BLDS PER 6 IN.	USCS	LOG OF MATERIAL
	CASING	MANIFOLD	LEND						
1								SM	SILTY SAND- RED BROWN, DRY TO MOIST, MEDIUM DENSE WITH AREAS OF OXIDATION, QUARTZ, MAFICS, STRONG HYDROCARBON ODOR. STRONG HYDROCARBON ODOR. STRONG HYDROCARBON ODOR. COLOR CHANGE TO GREEN BROWN, GRADES WITH INCREASING SAND, VET, STRONG HYDROCARBON ODOR. TEST BORING TERMINATED @ 15' ON 2-27-89 PRODUCT ENCOUNTERED MATERIALS: 1 1/2 BAGS OF SAND 2/3 5 GALLON BUCKET OF BENTONITE
2		42 BENTONITE CEMENT SLURRY							
3									
4	BLANK					X	8		
5		3/4" BENT. PELLETS		4,000		X	9		
6									
7									
8									
9							7		
10						X	8		
11				10,000		X	20		
12									
13									
14							6		
15				300		X	21		

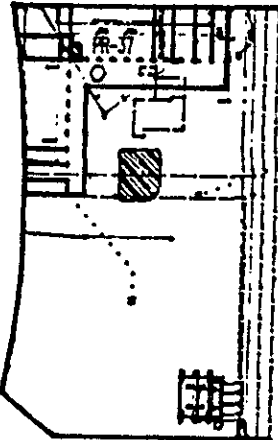
LOCATION OF BORING



SITE/LOCATION		CARNATION/DAKLAND		BORING NO.	
PROJECT NO.		004-00-039		PR-36	
PRODUCT LEVEL ELEVATION	8.00			SHEET 1	
TIME	7:45			OF 1	
DATE	3/1/89			DRILLER	
CASING DEPTH				START	FINISH
DRILLING CONTRACTOR	PC EXPLORATION			TIME	TIME
DRILLER				7:00	0:05
DRILLING METHOD	HOLLOW STEM AUGER			DATE	DATE
SAMPLING METHOD	1400 HAMMER 30° DROP, MODIFIED CALIFORNIA SAMPLER.			3/1/89	3/1/89
LOGGER	ERIC HOLM				
N/S BILLS	E/V 31264	ELEV. 14.59			
BORING DIAMETER	6 INCHES	CASING DIAMETER	2 INCHES		
REVIEWED BY	NAM			DATE 0-28-89	

DIST. FROM SURF.	WELL CONST.		LENDING	TLV READING	SAMPLE NO.	RECOVERY	BLOWS PER 6 IN.	USCS	LOG OF MATERIAL
	CASING	ANNULUS							
1								SM	SILTY SAND- RED BROWN, DRY TO MOIST, MEDIUM DENSE WITH AREAS OF OXIDATION, QUARTZ, MAFICS, STRONG HYDROCARBON ODOR.
2									
3									
4	BLANK	4% BENTONITE CEMENT SLURRY					8		
5		3/4" BENT. PELLETS		1200	X		9		
6					X		10		
7									
8									
9							10		
10				11000	X		10		
11					X		10		
12									
13									
14							8		
15				110	X		9		
16					X		11		
								GRAVEL VET WITH INCREASING SAND CONTENT, STRONG HYDROCARBON ODOR.	
								TEST BORING TERMINATED @ 15' ON 3-1-89	
								PRODUCT ENCOUNTERED	
								MATERIALS 1 1/2 BAGS OF SAND	
								2/3 5 GALLON BUCKET OF BENTONITE	

LOCATION OF BORING



SITE/LOCATION		CARNATION/DAKLAND		BORING NO.	
PROJECT NO.		884-88-039		PR-37	
PROJECT LEVEL ELEVATION	869			SHEET 1	
TDE	848			OF 1	
DATE	3/1/89			DRILLER	
CASING DEPTH				START TIME	FINISH TIME
DRILLING CONTRACTOR		PC EXPLORATION		845	900
DRILLER				DATE	DATE
DRILLING METHOD		HOLLOW STEM AUGER		3/1/89	3/1/89
SAMPLING METHOD: 1400 HAMMER 30" DROP, MODIFIED CALIFORNIA SAMPLER.					
LOGGER: ERIC HOLM					
N/S	26023	E/V	31274	ELEV. 1459	
BORING DIAMETER		6 INCHES		CASING DIAMETER	
				2 INCHES	
REVIEWED BY: NAM				DATE: 8-28-89	

DIST. FROM SURF.	VELL CONST.		LEGEND	T.V. READING	SAMPLE NO.	RECOVERY	BLOWS PER 6 IN.	USCS	LOG OF MATERIAL
	CASING	ANNULUS							
1			42% BENTONITE CEMENT SLURRY					SM	ST. SAND- RED BROWN, DRY TO MOIST, MEDIUM DENSE WITH QUARTZ, MAFICS. STRONG HYDROCARBON ODOR.
2									
3									
4	BLANK					X	5		
5		3/8" BENT. PELLETS		208		X	5		STRONG HYDROCARBON ODOR.
6									
7									
8							6		
9							7		
10				7,800		X	8		COLOR CHANGE TO GREEN GRAY, AREAS OF OXIDATION, STRONG HYDROCARBON ODOR.
11									
12									
13									
14						X	6		
15						X	8		
16				328		X	8		STRONG HYDROCARBON ODOR.
17									
18									
19									
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									
31									
32									
33									
34									
35									
36									
37									
38									
39									
40									
41									
42									
43									
44									
45									
46									
47									
48									
49									
50									
51									
52									
53									
54									
55									
56									
57									
58									
59									
60									
61									
62									
63									
64									
65									
66									
67									
68									
69									
70									
71									
72									
73									
74									
75									
76									
77									
78									
79									
80									
81									
82									
83									
84									
85									
86									
87									
88									
89									
90									
91									
92									
93									
94									
95									
96									
97									
98									
99									
100									

ST. SAND- RED BROWN, DRY TO MOIST, MEDIUM DENSE WITH QUARTZ, MAFICS. STRONG HYDROCARBON ODOR.

STRONG HYDROCARBON ODOR.

COLOR CHANGE TO GREEN GRAY, AREAS OF OXIDATION, STRONG HYDROCARBON ODOR.

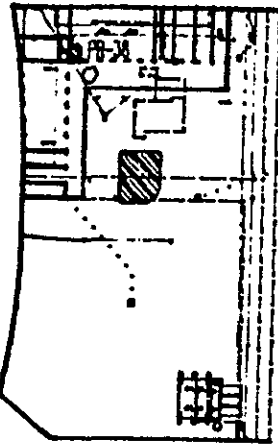
STRONG HYDROCARBON ODOR.

TEST BORING TERMINATED @ 15' ON 3-1-89

PRODUCT ENCOUNTERED

MATERIALS: 1 2/4 BAGS OF SAND
2/3 5 GALLON BUCKET OF BENTONITE

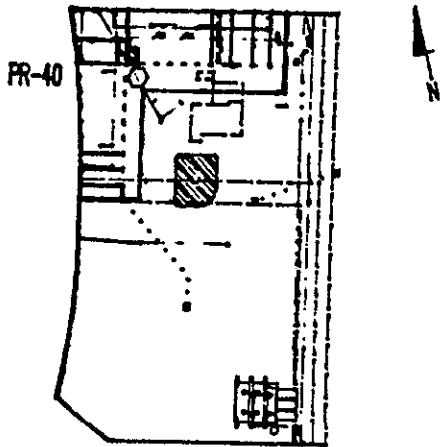
LOCATION OF BORING



SITE/LOCATION		CARNATION/DARLAND		BORING NO.	
PROJECT NO.		884-88-059		PR-38	
PROJECT LEVEL ELEVATION	889			SHEET 1	
TIME	9:30			OF 1	
DATE	2/1/89			DRILLER	
CASING DEPTH				START	FINISH
DRILLING CONTRACTOR				PC EXPLORATION	
DRILLER					
DRILLING METHOD				HOLLOW STEM AUGER	
SAMPLING METHOD				140# HAMMER 30" DROP, MODIFIED CALIFORNIA SAMPLER.	
LOGGER				ERIC HOLM	
N/S 2684.9	E/V 3818.3	ELEV. 1457			
BORING DIAMETER		6 INCHES		CASING DIAMETER	
				2 INCHES	
REVIEWED BY				MARK	
				DATE 8-20-89	

DIST. FROM SURF.	WELL CONST.		LEGEND	T.V. READING	SAMPLE NO.	RECOVERY	BLDS PER 6 IN.	USCS	LOG OF MATERIAL
	CASING	ANNULUS							
1		4% BENTONITE CEMENT SLURRY	[Pattern]					SM	SILTY SAND- MOTTLED RED BROWN AND GREEN (STAINED), MOIST, MEDIUM DENSE WITH AREAS OF OXIDATION, QUARTZ, HAFTCS, HYDROCARBON ODOR.
2									
3									
4	BLANK				X		5		
5		3 1/2" BENT. PELLETS	[Pattern]	170	X		6		
6					X		7		HYDROCARBON ODOR.
7									
8									
9							9		
10					X		10		
11				12,000	X		11		HYDROCARBON ODOR.
12		COARSE SAND	[Pattern]						
13									
14							4		
15					X		5		
16				120	X		7		STRONG HYDROCARBON ODOR.
									TEST BORING TERMINATED @ 15' ON 2-1-89.
									MATERIALS: 1 1/2 BAGS OF SAND
									2/3 5 GALLON BUCKET OF BENTONITE

LOCATION OF BORING

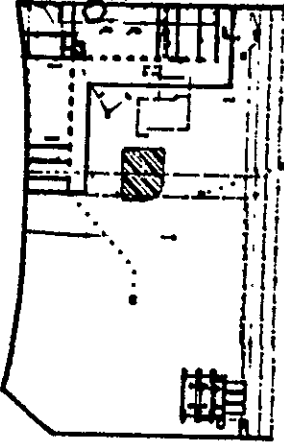


SITE/LOCATION		CARNATION/DAKLAND		BORING NO.	
PROJECT NO.		004-88-059		PR-40	
WATER LEVEL ELEVATION	8.94			SHEET 1	
TIME	11:50			OF 1	
DATE	3/1/89			DRILLER	
CASING DEPTH				START	FINISH
DRILLING CONTRACTOR				11:05	12:15
DRILLER				DATE	DATE
DRILLING METHOD				3/1/89	3/1/89
SAMPLING METHOD: 140# HAMMER 30° DROP, MODIFIED CALIFORNIA SAMPLER.					
LOGGER: ERIC HOLM					
N/S 2608.2		E/W 3108.4		ELEV. 14.65	
BORING DIAMETER		6 INCHES		CASING DIAMETER	
				2 INCHES	
REVIEWED BY: MAM				DATE: 8-28-89	

DIST. FROM SURF.	WELL CONST.			TLV READING	SAMPLE NO.	RECOVERY	BLOWS PER 6 IN.	USCS	LOG OF MATERIAL
	CASING	ANNULUS	LEGEND						
1								SM	SILTY SAND- RED BROWN DRY TO MOIST, MEDIUM DENSE WITH AREAS OF OXIDATION, QUARTZ, MAFTCS, HYDROCARBON ODOR.
2									
3									
4	BLANK	4% BENTONITE CEMENT SLURRY				X	5		
5		3/8" BENT. PELLETS		520		X	5		
6									
7									
8									
9							10		
10				100		X	10		
11									
12									
13									
14							8		
15						X	9		
				600		X	12		
									COLOR CHANGE TO GRAY GREEN, GRADES WET, HYDROCARBON ODOR.
									TEST BORING TERMINATED @ 15' ON 3-1-89
									MATERIALS: 1 3/4 BAGS OF SAND
									2/3 5 GALLON BUCKET OF BENTONITE

LOCATION OF BORING

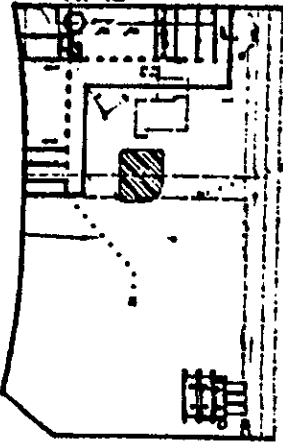
PR-41



SITE/LOCATION		CAPITATION/OAKLAND		BORING NO.		
PROJECT NO.		004-88-068		PR-41		
WATER LEVEL				SHEET 1		
TIME				OF 1		
DATE				DRILLER		
CASING DEPTH				START	FINISH	
DRILLING CONTRACTOR				TIME	TIME	
DRILLER	M DIXE MOORE			12:00	12:00	
DRILLING METHOD	HOLLOW STEM AUGER			DATE	DATE	
SAMPLING METHOD	1408 HAMMER 30" DROP, MODIFIED CALIFORNIA SAMPLER.				4-28-88	4-28-88
LOGGER	CHRIS NIELSON-CERQUONE					
N/S	2880.8	E/W	3140.0	ELEV. 14.43		
BORING DIAMETER:			WELL CASING DIAMETER:			
REVIEWED BY: M.A.M.			DATE 8-28-88			

DIST. FROM SURF.	WELL CONST.			TLY READING	SAMPLE NO.	RECOVERY	BLOWS PER 6 IN.	USCS	LOG OF MATERIAL
	CASING	ANNULUS	LENSID						
1	BLANK	4# BENTONITE CEMENT SLURRY						ML	PORTLAND CEMENT CONCRETE
2									SANDY GRAVEL
3									SANDY SILT- BLACK TO DARK BROWN, MOIST, MEDIUM STIFF WITH TRACE GRAVEL, SEWAGE ODOR.
4									
5		3/8" BENT. PELL						SM	
6				3					SILTY SAND- MOTTLED GREEN/GRAY, MOIST, MEDIUM DENSE.
7									
8									GRADES MOIST TO WET.
9									
10				36					GRADES WET
11									
12									
13									COLOR CHANGE TO YELLOW BROWN.
14									
15				1000					
									TEST BORING TERMINATED @ 15' ON 4-26-89
									MATERIALS: 2 BAGS OF SAND
									1/2 5 GALLON BUCKET OF BENTONITE

LOCATION OF BORING
PR-42

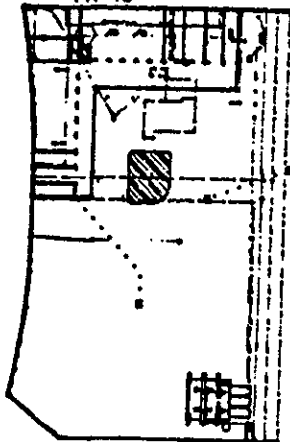


SITE/LOCATION		CARNATION/OAKLAND		BORING NO.	
PROJECT NO.		004-88-068		PR-42	
WATER LEVEL				SHEET 1	
TIME				OF 1	
DATE				DRILLER	
CASING DEPTH				START	FINISH
DRILLING CONTRACTOR				TIME	TIME
DRILLER		MIKE MOORE		13:00	13:48
DRILLING METHOD		HOLLOW STEM AUGER		DATE	DATE
SAMPLING METHOD		1488 HAMMER 30" DROP, MODIFIED CALIFORNIA SAMPLER		4-28-88	4-28-88
LOGGER		CHRIS NIELSON-CERQUE			
N/S	2882.8	E/W	3178.3	ELEV. 14.48	
BORING DIAMETER: 6 INCHES			WELL CASING DIAMETER: 2 INCHES		
REVIEWED BY: M.A.M.			DATE 8-28-88		

DIST. FROM SURF.	WELL CONST.			TLV READING	SAMPLE NO.	RECOVERY	BLOWS PER 6 IN.	USCS	LOG OF MATERIAL
	CASING	ANNULUS	LEGEND						
1		44 BENTONITE CEMENT SLURRY	[Cross-hatched pattern]					ML	PORTLAND CEMENT CONCRETE
2									SANDY GRAVEL
3	BLANK								SILTY SAND- BLACK TO DARK BROWN, MOIST, MEDIUM STIFF, SEBAGE AND HYDROCARBON ODOR.
4		3 1/2" BENTONITE CEMENT FILL	[Diagonal line pattern]					SM	SILTY SAND- GRAY TO GREEN BROWN, DRY TO MOIST, MEDIUM DENSE, HYDROCARBON ODOR.
5									
6									
7									
8									GRADES MOIST TO WET
9									GRADES WET
10	0.030 INCH SLOT								
11									
12									
13									
14									COLOR CHANGE TO YELLOW BROWN.
15							200		
16									TEST BORING TERMINATED @ 15' ON 4-28-88

LOCATION OF BORING

PR-43

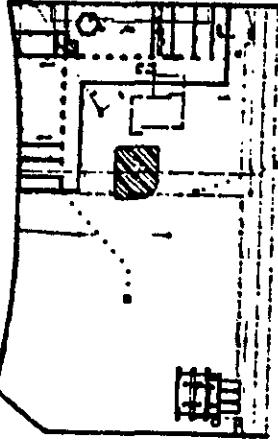


SITE/LOCATION		CARPATION/OAKLAND		BORING NO.	
PROJECT NO.		004-88-059		PR-43	
WATER LEVEL				SHEET 1	
TIME				OF 1	
DATE				DRILLER	
CASING DEPTH				START	FINISH
DRILLING CONTRACTOR				TIME	TIME
DRILLER		MIKE MOORE		14:00	16:30
DRILLING METHOD		HOLLOW STEM AUGER		DATE	DATE
SAMPLING METHOD		140# HAMMER 30" DROP, MODIFIED CALIFORNIA SAMPLER.			
LOGGER		CHRIS NIELSON-CERQUONE			
N/S	2850.8	E/W	3119.3	ELEV.	14.53
BORING DIAMETER: 6 INCHES			WELL CASING DIAMETER: 2 INCHES		
REVIEWED BY: M.A.M.				DATE 8-29-89	

DIST. FROM SURF.	WELL CONST.			TLV READING	SAMPLE NO.	RECOVERY	BLOWS PER 6 IN.	USCS	LOG OF MATERIAL
	CASING	ANNULUS	LEGEND						
1	BLANK	4# BENTONITE CEMENT SLURRY	[Cross-hatched pattern]					GP	PORTLAND CEMENT CONCRETE
2	BLANK	4# BENTONITE CEMENT SLURRY	[Cross-hatched pattern]					ML	SANDY GRAVEL
3	BLANK	4# BENTONITE CEMENT SLURRY	[Cross-hatched pattern]					ML	SANDY SILT- BLACK, MOIST, MEDIUM STIFF, SEWAGE AND HYDROCARBON ODOUR.
4	BLANK	3/8" BENT. PELL.	[Diagonal lines pattern]					SM	
5	BLANK	3/8" BENT. PELL.	[Diagonal lines pattern]				3	SM	SILTY SAND- GREEN/GRAY, MOIST, MEDIUM DENSE, STRONG SEWAGE ODOUR.
6	BLANK	3/8" BENT. PELL.	[Diagonal lines pattern]					SM	
7	BLANK	3/8" BENT. PELL.	[Diagonal lines pattern]					SM	
8	BLANK	3/8" BENT. PELL.	[Diagonal lines pattern]					SM	GRADES WET TO MOIST.
9	BLANK	3/8" BENT. PELL.	[Diagonal lines pattern]					SM	
10	BLANK	3/8" BENT. PELL.	[Diagonal lines pattern]					SM	GRADES WET
11	BLANK	3/8" BENT. PELL.	[Diagonal lines pattern]					SM	
12	BLANK	3/8" BENT. PELL.	[Diagonal lines pattern]					SM	
13	BLANK	3/8" BENT. PELL.	[Diagonal lines pattern]					SM	
14	BLANK	3/8" BENT. PELL.	[Diagonal lines pattern]					SM	COLOR CHANGE TO YELLOW BROWN.
15	BLANK	3/8" BENT. PELL.	[Diagonal lines pattern]					SM	
16	BLANK	3/8" BENT. PELL.	[Diagonal lines pattern]					SM	TEST BORING TERMINATED @ 15' ON 4-28-89

LOCATION OF BORING

PR-44

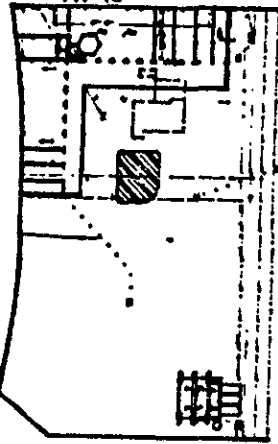


SITE/LOCATION		CANNATION/DANLAND		BORING NO.	
PROJECT NO.		004-00-000		PR-44	
WATER LEVEL				SHEET 1	
TIME				OF 1	
DATE				DRILLER	
CASING DEPTH				START	FINISH
DRILLING CONTRACTOR				TIME	TIME
DRILLER		BRYCE MOORE		7:45	8:45
DRILLING METHOD		HOLLOW STEM AUGER		DATE	DATE
SAMPLING METHOD		140# HAMMER 30" DROP, MODIFIED CALIFORNIA SAMPLER.			
LOGGER		CHRIS NIELSON-CERQUONE			
N/S	2002.2	E/W	3136.8	ELEV. 14.50	
BORING DIAMETER: 6 INCHES			WELL CASING DIAMETER: 2 INCHES		
REVIEWED BY: N.A.M.				DATE 8-29-00	

DIST. FROM SURF.	WELL CONST.			TLV READING	SAMPLE NO.	RECOVERY	BLDG PER 6 IN.	UNCS	LOG OF MATERIAL
	CASING	ANNULUS	LEGEND						
1			4" BENTONITE CEMENT SLURRY					GP	PORTLAND CEMENT CONCRETE
2								ML	SANDY GRAVEL- GRAY, MOIST, MEDIUM DENSE.
3	BLANK								SANDY SILT- BLACK TO GRAY BROWN, MOIST, MEDIUM STIFF WITH HYDROCARBON AND SEWAGE ODOR.
4		7" BENTONITE CEMENT FILL						SM	SILTY SAND- GREEN AND GRAY, MOIST, MEDIUM DENSE, HYDROCARBON ODOR.
5				10					
6									
7									
8									
9									
10	0.250 INCH SLIT								
11									COLOR CHANGE TO YELLOW BROWN, GRAYES WET.
12									
13									
14									
15				200					TEST BORING TERMINATED @ 15' ON 4-27-00

LOCATION OF BORING

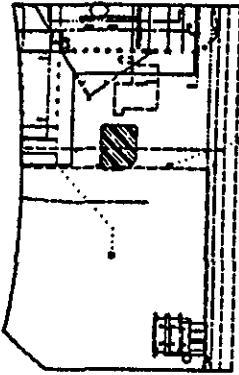
PR-45



SITE/LOCATION		CANNATION/OAKLAND		BORING NO.	
PROJECT NO.		004-88-059		PR-45	
WATER LEVEL				SHEET 1	
TIME				OF 1	
DATE				DRILLER	
CASING DEPTH				START TIME	FINISH TIME
DRILLING CONTRACTOR				DATE	DATE
DRILLER	MIKE MOORE			4-27-89	4-27-89
DRILLING METHOD	HOLLOW STEM AUGER				
SAMPLING METHOD	140# HAMMER 30" DROP, MODIFIED CALIFORNIA SAMPLER				
LOGGER	CHRIS NIELSON-GEOLGONE				
N/S	2633.3	E/W	329.7	ELEV. 14.50	
BORING DIAMETER: 6 INCHES		WELL CASING DIAMETER: 2 INCHES			
REVIEWED BY: M.A.M.				DATE 8-29-89	

DIST. FROM SURF.	WELL CONST.			TLV READING	SAMPLE NO.	RECOVERY	BLOBS PER 6 IN.	USCS	LOG OF MATERIAL
	CASING	ANNULUS	LENERD						
1								ML	PORTLAND CEMENT CONCRETE
2								ML	SANDY SILT- BLACK, DRY TO MOIST, MEDIUM STIFF, SLIGHT HYDROCARBON ODOR.
3	BLANK	4# BENTONITE CEMENT SLURRY						SM	
4		3/8" BENT. PELL						SM	SILTY SAND- GREEN TO GRAY BROWN, DRY TO MOIST, MEDIUM DENSE, HYDROCARBON ODOR.
5									
6									
7									
8									
9									
10	0.000 INCH SLUT								GRADES MOIST TO WET.
11									
12									COLOR CHANGE TO YELLOW BROWN, GRADES WET.
13									
14									
15									
									TEST BORING TERMINATED @ 15' ON 8-29-89

PR-46

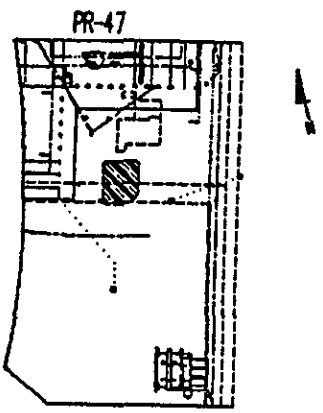


ANANIA GEOLOGIC ENGINEERING

BORING LOG

SITE/LOCATION		CARNATION/OAKLAND		BORING NO.	
PROJECT NO.		004-88-059		PR-46	
WATER LEVEL				SHEET 1 of 1	
TIME				DRILLER	
DATE				START	FINISH
CASING DEPTH				TIME	TIME
DRILLING CONTRACTOR				DATE	DATE
DRILLER		MIKE MOORE		4-27-89	4-27-89
DRILLING METHOD		HOLLOW STEM AUGER		LOGGER	
SAMPLING METHOD		140# HAMMER 30" DROP, MODIFIED CALIFORNIA SAMPLER		CHRIS NIELSON-CERQUONE	
N/S	2663.6	E/W	3163.2	ELEV. 14.51	
BORING DIAMETER:		6 INCHES		WELL CASING DIAMETER: 2 INCHES	

DIST. FROM SURF.	WELL CONST.		LEGEND	TLV READING	SAMPLE NO.	RECOVERY	BLOWS PER 6 IN.	USCS	LOG OF MATERIAL	
	CASING	ANNULUS								
1		4% BENTONITE CEMENT SLURRY	[Cross-hatched pattern]					GP	PORTLAND CEMENT CONCRETE	
2								ML	SANDY GRAVEL- GRAY, MOIST, MEDIUM DENSE.	
3	BLANK								SANDY SILT- BLACK, DRY TO MOIST, MEDIUM STIFF, HYDROCARBON ODOOR.	
4		3/8" BENT. PELL.	[Diagonal hatched pattern]					SM	SILTY SAND- GRAY/GREEN BROWN, DRY TO MOIST, MEDIUM DENSE, STRONG HYDROCARBON ODOOR.	
5										
6				10						
7										
8										
9										
10	0.030 INCH SLOT						5			
11		3/4 SAND	[Dotted pattern]							
12										
13										
14										
15										
										TEST BORING TERMINATED • 15' ON 4-27-89

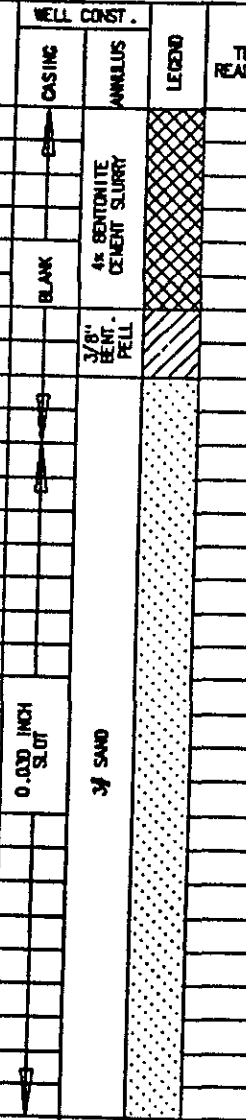


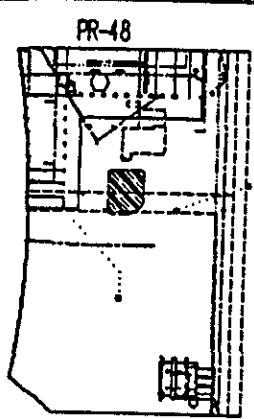
ANANIA GEOLOGIC ENGINEERING

BORING LOG

SITE/LOCATION		CARNATION/OAKLAND		BORING NO.	
PROJECT NO.		004-88-059		PR-47	
WATER LEVEL				SHEET 1 of 1	
TIME				DRILLER	
DATE				START	FINISH
CASING DEPTH				TIME	TIME
DRILLING CONTRACTOR				DATE	DATE
DRILLER MIKE MOORE				4-27-89	4-27-89
DRILLING METHOD				HOLLOW STEM AUGER	
SAMPLING METHOD				140# HAMMER 30' DROP, MODIFIED CALIFORNIA SAMPLER	
LOGGER CHRIS NELSON-CERQUONE					
N/S	2645.4	E/W	3153.8	ELEV. 14.41	
BORING DIAMETER:			6 INCHES	WELL CASING DIAMETER: 2 INCHES	

DIST. FROM SURF.	WELL CONST.			LEGEND	TLY READING	SAMPLE NO.	RECOVERY	BLOWS PER 6 IN.	USCS	LOG OF MATERIAL
	CASING	ANNULUS								
1				[Cross-hatched pattern]					GP ML	PORTLAND CEMENT CONCRETE
2										SANDY GRAVEL- GRAY, MOIST, MEDIUM DENSE
3										SANDY SILT- BLACK, DRY TO MOIST, MEDIUM STIFF.
4										
5				[Dotted pattern]					SM	SILTY SAND- GRAY BROWN, MOIST, MEDIUM DENSE, STRONG HYDROCARBON ODOR. HIT CONCRETE OBSTRUCTION, VERY STRONG SEWAGE ODOR PRESENT.
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
										HIT OBSTRUCTION.
										CONTINUED DRILLING WITH NO CUTTINGS COMING TO SURFACE. WHEN AUGER WAS PULLED OUT THERE WAS A STRONG LEACHATE ODOR.
										TEST BORING TERMINATED • 15' ON 4-27-89





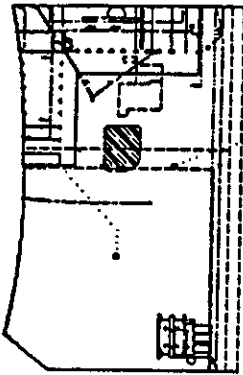
ANANIA GEOLOGIC ENGINEERING

BORING LOG

SITE/LOCATION		CARNATION/OAKLAND		BORING NO.	
PROJECT NO.		004-88-059		PR-48	
WATER LEVEL				SHEET 1 of 1	
TIME				DRILLER	
DATE				START	FINISH
CASING DEPTH				TIME	TIME
DRILLING CONTRACTOR				12:30	13:45
DRILLER	MIKE MOORE			DATE	DATE
DRILLING METHOD	HOLLOW STEM AUGER			4-27-89	4-27-89
SAMPLING METHOD	140# HAMMER 30' DROP, MODIFIED CALIFORNIA SAMPLER				
LOGGER	CHRIS NIELSON-CERQUIONE				
N/S	2627.1	E/W	3148.9	ELEV. 14.57	
BORING DIAMETER:			6 INCHES	WELL CASING DIAMETER: 2 INCHES	

DIST. FROM SURF.	WELL CONST.		LEGEND	TLV READING	SAMPLE NO.	RECOVERY	BLOWS PER 6 IN.	USCS	LOG OF MATERIAL
	CASING	ANNULUS							
1		4% BENTONITE CEMENT SLURRY						OP	PORTLAND CEMENT CONCRETE
2								ML	SANDY GRAVEL- MOIST, MEDIUM DENSE
3	BLANK								SANDY SILT- BLACK, DRY, SOFT, SLIGHT HYDROCARBON ODOR.
4		3/8" BENT. PELL.						SM	SILTY SAND- GRAY/GREEN BROWN, MOIST, MEDIUM DENSE, MODERATE HYDROCARBON ODOR.
5									
6									
7									
8									
9									
10	0.030 INCH SLOT								
11		3/4 SAND							
12									
13									
14									
15									
									TEST BORING TERMINATED @ 15' ON 4-27-89

PR-49



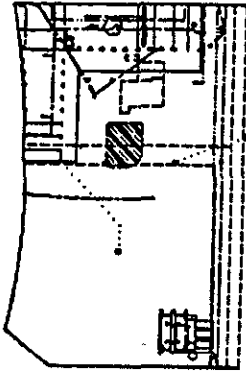
ANANIA GEOLOGIC ENGINEERING

BORING LOG

SITE/LOCATION		CARNATION/OAKLAND		BORING NO.	
PROJECT NO.		004-88-059		PR-49	
WATER LEVEL				SHEET 1 of 1	
TIME				DRILLER	
DATE				START	FINISH
CASING DEPTH				TIME	TIME
DRILLING CONTRACTOR				13:30	14:20
DRILLER	MIKE MOORE			DATE	DATE
DRILLING METHOD	HOLLOW STEM AUGER			4-27-89	4-27-89
SAMPLING METHOD	140# HAMMER 30" DROP, MODIFIED CALIFORNIA SAMPLER				
LOGGER	CHRIS NIELSON-CERQUONE				
N/S	2652 J	E/W	3179.1	ELEV. 14.50	
BORING DIAMETER:		6 INCHES		WELL CASING DIAMETER: 2 INCHES	

DIST. FROM SURF.	WELL CONST.			TLV READING	SAMPLE NO.	RECOVERY	BLOWS PER 6 IN.	USCS	LOG OF MATERIAL DATE: 8-24-89	
	CASING	ANNULUS	LEAD							
1	BLANK	4% BENTONITE CEMENT SLURRY						GP	PORTLAND CEMENT CONCRETE	
2								ML	SANDY GRAVEL- MOIST, MEDIUM DENSE.	
3									SANDY SILT- BLACK, DRY, MEDIUM STIFF, HYDROCARBON ODOOR.	
4		3/8" BENT. PELL.						SM	SILTY SAND- MOTTLED BROWN AND GRAY GREEN, MOIST MEDIUM DENSE.	
5										
6										
7										
8										
9										
10	0.030 INCH SLIT									COLOR CHANGE TO YELLOW BROWN, GRADES WET.
11										
12										
13										
14										
15									TEST BORING TERMINATED @ 15' ON 4-27-89	

PR-50



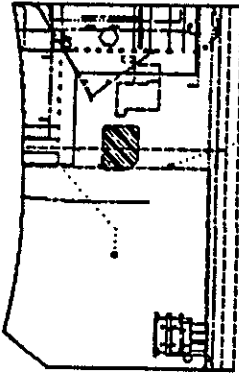
ANANIA GEOLOGIC ENGINEERING

BORING LOG

SITE/LOCATION		CARNATION/OAKLAND		BORING NO.	
PROJECT NO.		004-88-059		PR-50	
WATER LEVEL				SHEET 1 of 1	
TIME				DRILLER	
DATE				START	FINISH
CASING DEPTH				TIME	TIME
DRILLING CONTRACTOR				14:30	
DRILLER				MIKE MOORE	
DRILLING METHOD				HOLLOW STEM AUGER	
SAMPLING METHOD				140# HAMMER 30" DROP, MODIFIED CALIFORNIA SAMPLER	
LOGGER					
CHRIS NIELSON-CERQUONE					
N/S	2635.6	E/W	3173.2	ELEV. 14.37	
BORING DIAMETER:			6 INCHES	WELL CASING DIAMETER:	
				2 INCHES	

DIST. FROM SURF.	WELL CONST.		LEGEND	TLV READING	SAMPLE NO.	RECOVERY	BLOWS PER 6 IN.	USCS	LOG OF MATERIAL
	CASING	ANNULUS							
1		4# BENTONITE CEMENT SLURRY	[Cross-hatched pattern]					GP	PORTLAND CEMENT CONCRETE
2	BLANK							ML	SANDY GRAVEL- MOIST, MEDIUM DENSE
3									SANDY SILT- BLACK, DRY, MEDIUM STIFF.
4		3/8" BENT. PELL	[Diagonal hatched pattern]					SM	SILTY SAND- MOTTLED GRAY GREEN AND BROWN, MOIST, MEDIUM DENSE, STRONG SEWAGE AND HYDROCARBON ODOOR.
5									
6									
7									
8									
9									
10	0.030 INCH SLOT	3# SAND	[Dotted pattern]						
11									
12									
13									
14									
15									
									COLOR CHANGE TO YELLOW BROWN, GRADES WET.
									TEST BORING TERMINATED • 15' ON 4-27-89

PR-51



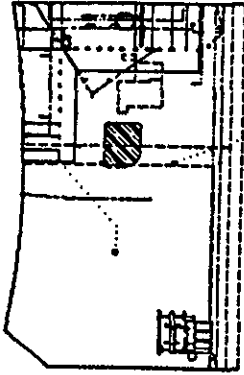
ANANIA GEOLOGIC ENGINEERING

BORING LOG

SITE/LOCATION		CARNATION/DAYLAND		BORING NO.	
PROJECT NO.		004-88-059		PR-51	
WATER LEVEL				SHEET 1 of 1	
TIME				DRILLER	
DATE				START	
CASING DEPTH				FINISH	
DRILLING CONTRACTOR				TIME	
DRILLER		MIKE MOORE		10:15	
DRILLING METHOD		HOLLOW STEM AUGER		DATE	
SAMPLING METHOD		140# HAMMER 30" DROP, MODIFIED CALIFORNIA SAMPLER		4-28-89	
LOGGER		CHRIS NIELSON-CERQUONE		DATE	
N/S		2621.8		E/W	
				3188.4	
				ELEV.	
				14.58	
BORING DIAMETER:		6 INCHES		WELL CASING DIAMETER:	
				2 INCHES	

DIST. FROM SURF.	WELL CONST.		LEGEND	TLV READING	SAMPLE NO.	RECOVERY	BLOWS PER 6" IN.	USCS	LOG OF MATERIAL
	CASING	ANNULUS							
1		4% BENTONITE CEMENT SLURRY	[Cross-hatched pattern]					ML	PORTLAND CEMENT CONCRETE
2	BLANK							ML	SANDY GRAVEL - MOIST, MEDIUM DENSE.
3								ML	SANDY SILT - DARK BROWN TO BLACK, MOIST, MEDIUM STIFF, SEWAGE DOOR (FILL).
4		3/8" BENT. PELL	[Diagonal lines pattern]					ML	ENCOUNTERING (RED BRICK).
5								ML	SILTY SAND - GRAY/GREEN BROWN, MOIST, MEDIUM DENSE.
6								SM	
7								SM	
8								SM	COLOR CHANGE TO BROWN, GRADES VERY MOIST TO WET.
9	0.030 INCH SLOT	3/4 SAND	[Dotted pattern]					SM	
10								SM	
11								SM	
12								SM	COLOR CHANGE TO YELLOW BROWN, GRADES WET.
13								SM	
14								SM	
15								SM	TEST BORING TERMINATED @ 15' ON 4-28-89

PR-52



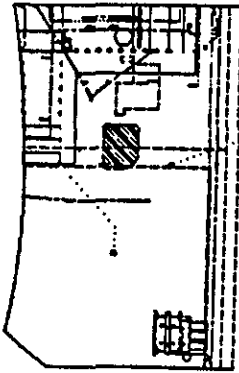
ANANIA GEOLOGIC ENGINEERING

BORING LOG

SITE/LOCATION		CARNATION/OAKLAND		BORING NO.	
PROJECT NO.		004-88-059		PR-52	
WATER LEVEL				SHEET 1 of 1	
TIME				DRILLER	
DATE				START	FINISH
CASING DEPTH				TIME	TIME
DRILLING CONTRACTOR				15:30	
DRILLER		MIKE MOORE		DATE	DATE
DRILLING METHOD		HOLLOW STEM AUGER		4-27-89	4-27-89
SAMPLING METHOD		140# HAMMER 30" DROP, MODIFIED CALIFORNIA SAMPLER			
LOGGER		CHRIS NIELSON-CERQUONE			
N/S	2621.5	E/W	3168.2	ELEV. 14.55	
BORING DIAMETER:			6 INCHES		
			WELL CASING DIAMETER: 2 INCHES		

DIST. FROM SURF.	WELL CONST.			TLV READING	SAMPLE NO.	RECOVERY	BLOWS PER 6 IN.	USCS	LOG OF MATERIAL
	CASING	ANNULUS	LEGEND						
1		4% BENTONITE CEMENT SLURRY	[Cross-hatched pattern]					GP	PORTLAND CEMENT CONCRETE
2								ML	SANDY GRAVEL- GRAY, MOIST, MEDIUM DENSE
3	BLANK								SANDY SILT- BLACK, DRY, MEDIUM STIFF.
4		1/8" BENT. PELL.	[Diagonal hatched pattern]						SILTY SAND- GRAY/GREEN BROWN, DRY TO MOIST, MEDIUM DENSE.
5				10				SM	
6									
7									GRADES MOIST TO WET.
8									
9									
10	0.430 INCH SLOT								
11		3/4 SAND	[Dotted pattern]						
12									
13									
14									
15									
									TEST BORING TERMINATED @ 15' ON 4-27-89

PR-53



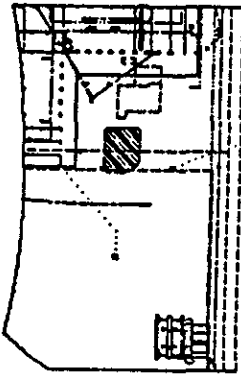
ANANIA GEOLOGIC ENGINEERING

BORING LOG

SITE/LOCATION		CARPATION/OAKLAND		BORING NO.	
PROJECT NO.		004-88-059		PR-53	
WATER LEVEL				SHEET 1 of 1	
TIME				DRILLER	
DATE				START	
CASING DEPTH				FINISH	
DRILLING CONTRACTOR				TIME	
DRILLER		MIKE MOORE		10:00	
DRILLING METHOD		HOLLOW STEM AUGER		DATE	
SAMPLING METHOD		140# HAMMER 30" DROP, MODIFIED CALIFORNIA SAMPLER		4-28-89	
LOGGER		CHRIS NIELSON-CERQUONE		DATE	
N/S		267.2		E/W	
				3187.9	
				ELEV.	
				14.43	
BORING DIAMETER:		6 INCHES		WELL CASING DIAMETER:	
				2 INCHES	

DIST. FROM SURF.	WELL CONST.		LEGEND	TLV READING	SAMPLE NO.	RECOVERY	BLOWS PER 6 IN.	USCS	LOG OF MATERIAL
	CASING	ANNULUS							
1		4% BENTONITE CEMENT SLURRY	[Cross-hatched pattern]					GP	PORTLAND CEMENT CONCRETE
2	BLANK							SM	SANDY GRAVEL - MOIST, MEDIUM DENSE
3									SILTY SAND - DARK BROWN TO BLACK, MOIST, MEDIUM DENSE, FINE GRAINED, SEWAGE ODOR.
4		3/8" BENT. PELL	[Diagonal line pattern]						COLOR CHANGE TO GRAY/GREEN BROWN.
5									
6									
7									
8									
9									
10	0.030 INCH SLOUT	3/4 SAND	[Dotted pattern]						
11									
12									COLOR CHANGE TO YELLOW BROWN, GRADES WET.
13									
14									
15									TEST BORING TERMINATED @ 15' ON 4-28-89

PR-54



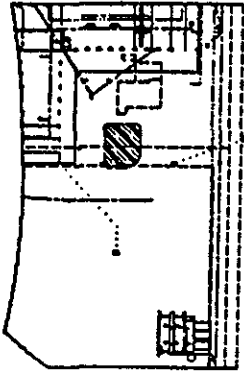
ANANIA GEOLOGIC ENGINEERING

BORING LOG

SITE/LOCATION		CARNATION/DARLAND		BORING NO.	
PROJECT NO.		004-88-059		PR-54	
WATER LEVEL				SHEET 1 of 1	
TIME				DRILLER	
DATE				START	
CASING DEPTH				FINISH	
DRILLING CONTRACTOR				TIME	
DRILLER		MIKE MOORE		TIME	
DRILLING METHOD		HOLLOW STEM AUGER		DATE	
SAMPLING METHOD		140# HAMMER 30" DROP, MODIFIED CALIFORNIA SAMPLER		4-28-89	
LOGGER		CHRIS WILSON-CERUONE		DATE	
				4-28-89	
N/S		2642.4		E/W	
				319.6	
				ELEV.	
				14.33	
BORING DIAMETER:			6 INCHES		
WELL CASING DIAMETER:			2 INCHES		

DIST. FROM SURF.	WELL CONST.			TLY READING	SAMPLE NO.	RECOVERY	BLOWS PER 6 IN.	USCS	LOG OF MATERIAL
	CASING	ANNULUS	LEGEND						
1	BLANK	4% BENTONITE CEMENT SLURRY	[Cross-hatched pattern]					SM	PORTLAND CEMENT CONCRETE
2									SANDY GRAVEL - MOIST, MEDIUM DENSE
3									SILTY SAND - DARK BROWN TO BLACK, MOIST, MED DENSE, HYDROCARBON ODOR.
4		3/8" BENT. PELL.	[Diagonal lines pattern]						COLOR CHANGE TO GRAY/GREEN, SLIGHTLY PLASTIC, STRONG HYDROCARBON ODOR, NO CLASTICS.
5									
6									
7									
8									COLOR CHANGE TO YELLOW BROWN, MOIST TO WET.
9									
10	0.030 INCH SLOT								
11									
12									
13									
14									
15							10,000		
									TEST BORING TERMINATED @ 15' ON 4-28-89

PR-55



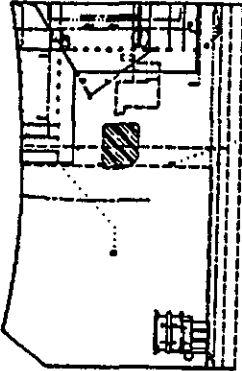
ANANIA GEOLOGIC ENGINEERING

BORING LOG

SITE/LOCATION		CARNATION/OAKLAND		BORING NO.	
PROJECT NO.		004-88-059		PR-55	
WATER LEVEL				SHEET 1 of 1	
TIME				DRILLER	
DATE				START	FINISH
CASING DEPTH				TIME	TIME
DRILLING CONTRACTOR				12:30	
DRILLER	MIKE MOORE			DATE	DATE
DRILLING METHOD	HOLLOW STEM AUGER			4-28-89	4-28-89
SAMPLING METHOD	140# HAMMER 30" DROP, MODIFIED CALIFORNIA SAMPLER				
LOGGER	CHRIS NIELSON-CERQUONE				
N/S	2625.1	E/W	3214.7	ELEV. 14.48	
BORING DIAMETER:			6 INCHES	WELL CASING DIAMETER:	
				2 INCHES	

DIST. FROM SURF.	WELL CONST.			TLV READING	SAMPLE NO.	RECOVERY	BLOWS PER 6 IN.	USCS	LOG OF MATERIAL
	CASING	ANNULUS	LEGEND						
1	BLANK	4% BENTONITE CEMENT SLURRY	[Cross-hatched pattern]					CP	PORTLAND CEMENT CONCRETE
2								SM	SANDY GRAVEL- MOIST, MEDIUM DENSE
3									SILTY SAND- BROWN, MOIST, MEDIUM DENSE, STRONG HYDROCARBON ODOOR.
4		3/8" BENT. PELL.	[Diagonal lines pattern]						COLOR CHANGE TO GRAY/GREEN, MOIST, HYDROCARBON ODOOR.
5									
6									
7									
8									
9									
10	0.030 INCH SLOT								
11		3/4 SAND	[Dotted pattern]						
12									
13									
14									
15							3500		
									TEST BORING TERMINATED @ 15' ON 4-28-89

PR-56



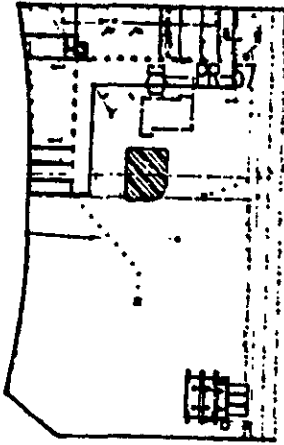
ANANIA GEOLOGIC ENGINEERING

BORING LOG

SITE/LOCATION CARNATION/OAKLAND		BORING NO. PR-56	
PROJECT NO. 004-88-059		SHEET 1 of 1	
WATER LEVEL		DRILLER	
TIME		START	FINISH
DATE		TIME	TIME
CASING DEPTH		DATE	DATE
DRILLING CONTRACTOR		4-28-89	4-28-89
DRILLER MIKE MOORE		LOGGER CHRIS NIELSON-CERQUONE	
DRILLING METHOD HOLLOW STEM AUGER		N/S 2506.9 E/W 3208.2 ELEV. 14.59	
SAMPLING METHOD 140# HAMMER 30" DROP, MODIFIED CALIFORNIA SAMPLER		BORING DIAMETER: 6 INCHES WELL CASING DIAMETER: 2 INCHES	

DIST. FROM SURF.	WELL CONST.			TLV READING	SAMPLE NO.	RECOVERY	BLOWS PER 6 IN.	USCS	LOG OF MATERIAL
	CASING	ANNULUS	LEGEND						
1		4x BENTONITE CEMENT SLURRY	[Cross-hatch pattern]					SM	PORTLAND CEMENT CONCRETE
2	BLANK								SANDY GRAVEL- MOIST, MEDIUM DENSE.
3									SILTY SAND (FINE)- DARK BROWN, MOIST, MEDIUM DENSE, FINE GRAINED.
4		3/8" BENT. PELL.	[Diagonal hatch pattern]						COLOR CHANGE TO GRAY/GREEN BROWN, MEDIUM GRAINED, STRONG HYDROCARBON ODOR.
5									
6									
7									
8									GRADES MOIST TO WET
9									
10	0.030 INCH SLOT								GRADES WET
11									
12									
13									
14									
15				2300					
									TEST BORING TERMINATED • 15' ON 4-28-89

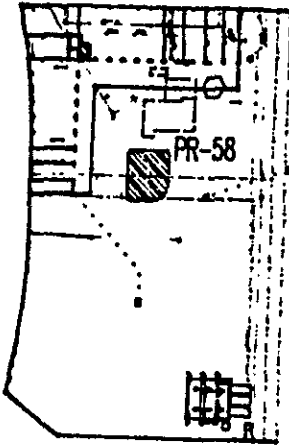
LOCATION OF BORING



SITE/LOCATION		CARNATION/OAKLAND		BORING NO.	
PROJECT NO.		004-88-069		PR-57	
WATER LEVEL				SHEET 1	
TIME				OF 1	
DATE				DRILLER	
CASING DEPTH				START	FINISH
DRILLING CONTRACTOR				TIME	TIME
DRILLER		MIKE MOORE		10:30	11:20
DRILLING METHOD		HOLLOW STEM AUGER		DATE	DATE
SAMPLING METHOD		1498 HAMMER 30' DROP, MODIFIED CALIFORNIA SAMPLER		5-11-89	5-11-89
LOGGER		JOHN RUSSELL			
N/S	2572.7	E/W	3181.1	ELEV.	14.31
BORING DIAMETER:		6 INCHES		WELL CASING DIAMETER: 2 INCHES	
REVIEWED BY:		W.A.M.		DATE 8-29-89	

DIST. FROM SURF.	WELL CONST.			TLV READING	SAMPLE NO.	RECOVERY	BLOWS PER 6 IN.	USCS	LOG OF MATERIAL
	CASING	ANNULUS	LEAD						
1		4" BENTONITE CEMENT SLURRY							PORTLAND CEMENT CONCRETE
2	BLANK								
3		3/8" BENT. PELL.						SP	
4									
5									SAND- BROWN, MOIST, MEDIUM DENSE, FINE GRAINED WITH QUARTZ, MAFICS AND TRACE CLAY, SLIGHT HYDROCARBON ODOOR.
6									
7									
8									
9	0.030 INCH SLOT								
10		3/4 SAND		10					SILTY SAND- BROWN, MOIST, MEDIUM DENSE, FINE GRAINED WITH QUARTZ, MAFICS AND TRACE CLAY, SLIGHT HYDROCARBON ODOOR.
11									
12									
13									
14									
15				20					SLIGHT HYDROCARBON ODOOR.
									TEST BORING TERMINATED @ 15' ON 5-11-89
									MATERIALS: 2 BAGS OF SAND
									1/2 5 GALLON BUCKET OF BENTONITE

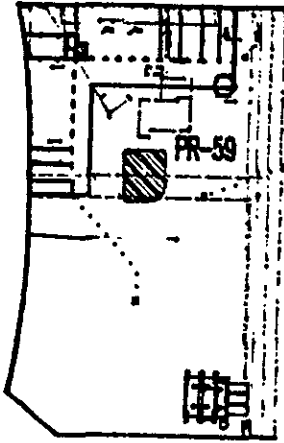
LOCATION OF BORING



SITE/LOCATION		CARNATION/OAKLAND		BORING NO.	
PROJECT NO.		004-88-069		PR-58	
WATER LEVEL				SHEET 1	
TIME				OF 1	
DATE				DRILLER	
CASING DEPTH				START	FINISH
DRILLING CONTRACTOR				TIME	TIME
DRILLER	MIKE MOORE			8:00	9:30
DRILLING METHOD	HOLLOW STEM AUGER			DATE	DATE
SAMPLING METHOD	140# HAMMER 30" DROP, MODIFIED CALIFORNIA SAMPLER.			5-12-89	5-12-89
LOGGER	JOHN RUSSELL				
N/S	2555.6	E/W	3237.4	ELEV. 14.28	
BORING DIAMETER:	8 INCHES		WELL CASING DIAMETER:	2 INCHES	
REVIEWED BY:	M.A.N.			DATE 8-29-89	

DIST. FROM SURF.	WELL CONST.			TLV READING	SAMPLE NO.	RECOVERY	BLOWS PER 6 IN.	USCS	LOG OF MATERIAL
	CASING	ANNULUS	LEND						
1									PORTLAND CEMENT CONCRETE
2								SM	
3	BLANK	4# BENTONITE CEMENT SLURRY							
4		3/8" BENT. PELL.							
5				24					SILTY SAND- BROWN, MOIST, MEDIUM DENSE, FINE GRAINED WITH QUARTZ. MAFICS, HYDROCARBON ODOR.
6									
7									
8									
9	0.030 INCH SLOT								
10				144					COLOR CHANGE TO LIGHT BROWN WITH TRACE CLAY, FINE GRAINED, HYDROCARBON ODOR.
11									
12									
13									
14									
15				1200					HYDROCARBON ODOR.
									TEST BORING TERMINATED @ 15' ON 5-12-89
									MATERIALS: 2 BAGS OF SAND
									1/2 5 GALLON BUCKET OF BENTONITE

LOCATION OF BORING

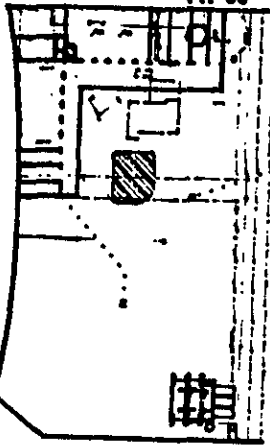


SITE/LOCATION		CARRINGTON/OAKLAND		BORING NO.	
PROJECT NO.		004-88-080		PR-59	
BAYER LEVEL				SHEET 1	
TIME				OF 1	
DATE				DRILLER	
CASING DEPTH				START TIME	FINISH TIME
DRILLING CONTRACTOR				9:45	10:15
DRILLER	MIKE MOORE			DATE	DATE
DRILLING METHOD	HOLLOW STEM AUGER			5-12-89	5-12-89
SAMPLING METHOD 1400 HAMMER 3/4" DROP, MODIFIED CALIFORNIA SAMPLER.					
LOGGER JOHN RUSSELL					
N/S	2580.7	E/W	3284.2	ELEV. 14.15	
BORING DIAMETER: 6 INCHES			WELL CASING DIAMETER: 2 INCHES		
REVIEWED BY: M.A.M.				DATE 8-29-89	

DIST. FROM SURF.	WELL CONST.		LEGEND	TLY READING	SAMPLE NO.	RECOVERY	BLOBS PER 6 IN.	USCS	LOG OF MATERIAL
	CASING	ANNULUS							
1									PORTLAND CEMENT CONCRETE
2									SILTY SAND- BROWN, MOIST, MEDIUM DENSE, FINE GRAINED, QUARTZ, MIN'GS, HYDROCARBON ODOR.
3	BLANK	4" BENTONITE CEMENT SLURRY						SM	
4		3/8" BENT. PELL							
5				85					
6									
7									
8									
9									
10	0.002 INCH SLOT	3/4" SAND							COLOR CHANGE TO RED BROWN, FINE-GRAINED, HYDROCARBON ODOR.
11									
12									
13									
14									
15									GRADES WITH TRACE CLAY, HYDROCARBON ODOR.
16									TEST BORING TERMINATED @ 15' ON 8-11-89
									MATERIALS: 2 BAGS OF SAND
									1/2 5 GALLON BUCKET OF BENTONITE

LOCATION OF BORING

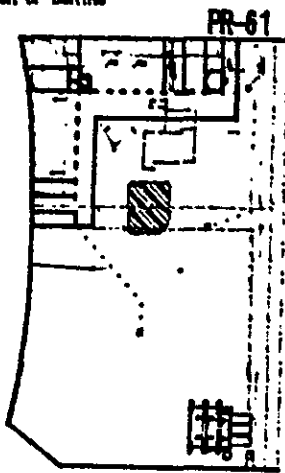
PR-60



SITE/LOCATION		CARNATION/DANLAND		BORING NO.	
PROJECT NO.		004-88-068		PR-60	
WATER LEVEL				SHEET 1	
TIME				OF 1	
DATE				DRILLER	
CASING DEPTH				START	FINISH
				TIME	TIME
				13:30	14:00
DRILLING CONTRACTOR				DATE	DATE
DRILLER		MIKE MOORE		5-18-88	5-18-88
DRILLING METHOD		HOLLOW STEM AUGER			
SAMPLING METHOD		140# HAMMER 30" DROP, MODIFIED CALIFORNIA SAMPLER			
LOGGER		JOHN RUSSELL			
N/S	2811.4	E/W	3253.1	ELEV. 14.87	
BORING DIAMETER: 6 INCHES		WELL CASING DIAMETER: 2 INCHES			
REVIEWED BY: N.A.M.		DATE 8-28-88			

DIST. FROM SURF.	WELL CONST.		LEGEND	TLV READING	SAMPLE NO.	RECOVERY	BLOWS PER 6 IN.	USCS	LOG OF MATERIAL
	CASING	ANNULUS							
1	BLANK	4" BENTONITE CEMENT SLURRY	[Cross-hatched]					SP	PORTLAND CEMENT CONCRETE
2									
3									SAND- GRAY, DRY TO MOIST, FINE-GRAINED, MEDIUM DENSE WITH MICA, QUARTZ, MAFICS, HYDROCARBON ODOR.
4		3/8" BENT. PELL.	[Diagonal lines]						
5									
6									
7									
8									
9									
10	0.030 INCH SLUT						18		SILTY SAND- LIGHT BROWN, MOIST, MEDIUM DENSE, FINE-GRAINED WITH MICA, QUARTZ, MAFICS.
11									
12									
13									
14									
15							18		
									TEST BORING TERMINATED @ 15' ON 5-18-88
									MATERIALS: 2 BAGS OF SAND
									1/2 5 GALLON BUCKET OF BENTONITE

LOCATION OF BORING

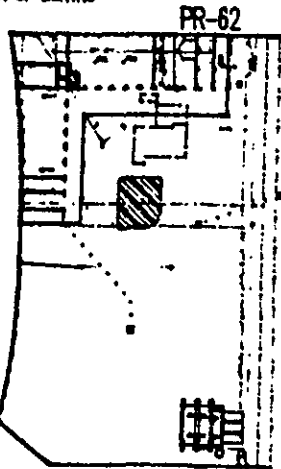


PR-61

SITE/LOCATION		CAPITON/DANLAND		BORING NO.	
PROJECT NO.		004-88-080		PR-61	
WATER LEVEL				SHEET 1	
TIME				OF 1	
DATE				DRILLER	
CASING DEPTH				START	FINISH
DRILLING CONTRACTOR				TIME	TIME
DRILLER		MIKE MOORE		14:10	14:45
DRILLING METHOD		HOLLOW STEM AUGER		DATE	DATE
SAMPLING METHOD		1400 HAMMER 30" DROP, MODIFIED CALIFORNIA SAMPLER			
LOGGER		JOHN RUSSELL			
N/S	2586.3	E/W	3248.1	ELEV. 14.58	
BORING DIAMETER:		6 INCHES		WELL CASING DIAMETER: 2 INCHES	
REVIEWED BY:		W.A.M.		DATE 8-29-88	

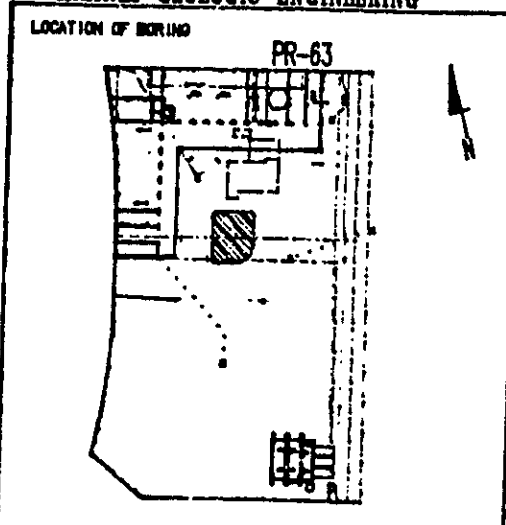
DIST. FROM SURF.	WELL CONST.			TLY READING	SAMPLE NO.	RECOVERY	BLDG PER 6 IN.	UBCS	LOG OF MATERIAL
	CASING	ANNULUS	LEGEND						
1									PORTLAND CEMENT CONCRETE
2		4% BENTONITE CEMENT SLURRY							SAND- BROWN, DRY TO MOIST, MEDIUM DENSE, FINE GRAINED WITH MICA, QUARTZ, MAFICS, HYDROCARBON ODOR.
3	BLANK								
4		3/8" BENT. PELL						SP	
5									
6									
7									
8									
9									
10	0.000 INCH SLOT								SAND- BROWN, DRY TO MOIST, MEDIUM DENSE, FINE GRAINED WITH MICA, QUARTZ, MAFICS, HYDROCARBON ODOR.
11									
12								SM	
13									
14									
15									SILTY SAND- FINE-GRAINED, BROWN, MOIST, SEMI-PLASTIC, MICA, QUARTZ, MAFICS, HYDROCARBON ODOR.
									TEST BORING TERMINATED @ 15' ON 8-18-88
									MATERIALS: 2 BAGS OF SAND
									1/2 5 GALLON BUCKET OF BENTONITE

LOCATION OF BORING



SITE/LOCATION	CARNATION/OAKLAND			BORING NO. PR-62	
PROJECT NO.	004-88-068			SHEET 1 OF 1 DRILLER	
WATER LEVEL				START TIME	FINISH TIME
TIME				10:10	10:40
DATE				DATE	DATE
				5-17-89	5-17-89
CASING DEPTH		DRILLING CONTRACTOR		LOGGING METHOD	
				LOGGING METHOD	
		DRILLER MIKE MOORE		LOGGING METHOD	
		DRILLING METHOD HOLLOW STEM AUGER		LOGGING METHOD	
		SAMPLING METHOD 1400 HAMMER 30' DROP, MODIFIED CALIFORNIA SAMPLER.		LOGGING METHOD	
		LOGGER JOHN RUSSELL		LOGGING METHOD	
N/S	2829.0	E/W	3240.9	ELEV. 14.53	
BORING DIAMETER: 6 INCHES			WELL CASING DIAMETER: 2 INCHES		
REVISED BY: M.A.M.			DATE 8-29-89		

DIST. FROM SURF.	WELL CONST.		LEGEND	TLY. READING	SAMPLE NO.	RECOVERY	BLOWS PER 6 IN.	USCS	LOG OF MATERIAL
	CASING	ANNULUS							
1			4% BENTONITE CEMENT SLURRY					SP	PORTLAND CEMENT CONCRETE
2	BLANK								SAND- DARK GRAY, DRY TO MOIST, MEDIUM DENSE, FINE GRAINED WITH QUARTZ. MAFICS, HYDROCARBON ODOR.
3									
4		3/8" BENT. PELL.							
5									
6				128					
7									
8									
9									
10	0.030 INCH SLOT								
11		3% SAND		1100				SM	SILTY SAND- BROWN, MOIST, MEDIUM DENSE, FINE GRAINED WITH QUARTZ. HYDROCARBON ODOR.
12									
13									
14									
15				2000					HYDROCARBON ODOR.
16									TEST BORING TERMINATED @ 15' ON 5-17-89
									MATERIALS: 2 BAGS OF SAND
									1/2 5 GALLON BUCKET OF BENTONITE

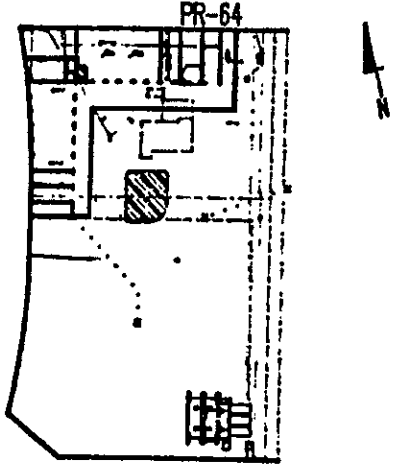


SITE/LOCATION		CARNATION/OAKLAND			BORING NO.		PR-63						
PROJECT NO.		004-88-058			SHEET		1						
WATER LEVEL					OF		1						
TIME					DRILLER								
DATE					START		FINISH						
CASING DEPTH					TIME		TIME						
					11:00		11:40						
DRILLING CONTRACTOR				DRILLER		DATE		DATE					
				MIKE MOORE		5-17-89		5-17-89					
DRILLING METHOD				HOLLOW STEM AUGER		LOGGER							
						JOHN RUSSELL							
SAMPLING METHOD				140# HAMMER 30" DROP, MODIFIED CALIFORNIA SAMPLER.									
N/S		2812.5		E/W		3235.3		ELEV.		14.38			
BORING DIAMETER:				8 INCHES		WELL CASING DIAMETER:				2 INCHES			
REVIEWED BY:						M.A.J.		DATE				8-28-89	

DIST. FROM SURF.	WELL CONST.			LEGEND	TLY. READING	SAMPLE NO.	RECOVERY	BLOWS PER 6 IN.	USCS	LOG OF MATERIAL
	CASING	ANNULUS	REINFORCING							
1	BLANK	4# BENTONITE CEMENT SLURRY		[Cross-hatched]					SP	PORTLAND CEMENT CONCRETE
2										SAND- BROWN, MOIST TO WET, FINE-GRAINED WITH QUARTZ, MAFICS, HYDROCARBON ODOUR.
3										
4		3/8" BENT. FILL		[Diagonal lines]						
5					86					
6										
7										
8										
9										
10	0.750 INCH SLUT	3/4 SAND		[Dotted]	8000				SM	SILTY SAND- BROWN, DRY TO MOIST, MEDIUM DENSE, FINE-GRAINED WITH QUARTZ, MAFICS, HYDROCARBON ODOUR.
11										
12										
13										
14										
15					2800					
16										GRADES WET, HYDROCARBON ODOUR.
17										TEST BORING TERMINATED @ 16' ON 5-17-89
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										
31										
32										
33										
34										
35										
36										
37										
38										
39										
40										
41										
42										
43										
44										
45										
46										
47										
48										
49										
50										
51										
52										
53										
54										
55										
56										
57										
58										
59										
60										
61										
62										
63										
64										
65										
66										
67										
68										
69										
70										
71										
72										
73										
74										
75										
76										
77										
78										
79										
80										
81										
82										
83										
84										
85										
86										
87										
88										
89										
90										
91										
92										
93										
94										
95										
96										
97										
98										
99										
100										

MATERIALS: 2 BAGS OF SAND
1 1/2 5 GALLON BUCKET OF BENTONITE

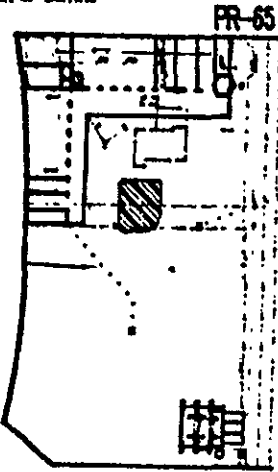
LOCATION OF BORING



SITE/LOCATION CARBATION/OAKLAND		BORING NO. PR-64
PROJECT NO. 004-88-068		SHEET 1 OF 1
WATER LEVEL		DRILLER
TIME		START TIME 11:48
DATE		FINISH TIME 12:30
CASING DEPTH		DATE 5-17-89
DRILLING CONTRACTOR		DATE 5-17-89
DRILLER MIKE MOORE		
DRILLING METHOD HOLLOW STEM AUGER		
SAMPLING METHOD 1408 HAMMER 30" DROP, MODIFIED CALIFORNIA SAMPLER		
LOGGER JOHN RUSSELL		
N/S 2894.8	E/W 3230.2	ELEV. 14.86
BORING DIAMETER: 6 INCHES		WELL CASING DIAMETER: 2 INCHES
REVIEWED BY: M.J.M.		DATE 8-29-89

DIST. FROM SURF.	WELL CONST.		LEGGEND	TYL. READING	SAMPLE NO.	RECOVERY	BLOWS PER 6 IN.	USCS	LOG OF MATERIAL		
	CASING	ANNULUS									
1	BLANK	4% BENTONITE CEMENT SLURRY	[Cross-hatched pattern]				SP		PORTLAND CEMENT CONCRETE		
2									SAND- BROWN, MOIST, MEDIUM DENSE, FINE GRAINED WITH QUARTZ, HYDROCARBON ODOR.		
3											
4	3/8" BENT. WELL	3% SAND	[Dotted pattern]				SM				
5											
6											
7											
8											
9											
10									10000		SILTY SAND- BROWN, MOIST, MEDIUM DENSE, FINE GRAINED WITH QUARTZ, MAFICS, HYDROCARBON ODOR.
11											
12											
13											
14											
15						10000		HYDROCARBON ODOR.			
16								TEST BORING TERMINATED @ 16' ON 8-17-89			
17											
18											
MATERIALS: 2 BAGS OF SAND											
1/2 5 GALLON BUCKET OF BENTONITE											

LOCATION OF BORING



PR-65

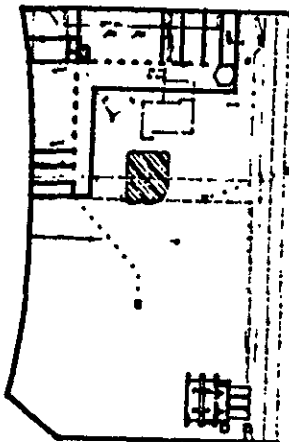
SITE/LOCATION		CARRATON/OAKLAND		BORING NO.	
PROJECT NO.		004-08-068		PR-65	
WATER LEVEL				SHEET 1	
TIME				OF 1	
DATE				DRILLER	
CASING DEPTH				START	FINISH
DRILLING CONTRACTOR				TIME	TIME
DRILLER		MIKE MOORE		3:15	3:45
DRILLING METHOD		HOLLOW STEM AUGER		DATE	DATE
SAMPLING METHOD		1406 HAMMER 30" DROP, MODIFIED CALIFORNIA SAMPLER.		5-17-68	5-17-68
LOGGER		JOHN RUSSELL			
N/S	2883.8	E/W	3283.8	ELEV. 14.50	
BORING DIAMETER: 6 INCHES			WELL CASING DIAMETER: 2 INCHES		
REVIEWED BY: M.A.M.			DATE 8-20-68		

DIST. FROM SURF.	WELL CONST.		LEGEND	T.V. READING	SAMPLE NO.	RECOVERY	BLIPS PER 6 IN.	USCS	LOG OF MATERIAL
	CASING	ANNULUS							
1	BLANK	4" BENTONITE CEMENT SLURRY	[Cross-hatched pattern]					SP	PORTLAND CEMENT CONCRETE
2									SAND- BROWN, DRY TO MOIST, MEDIUM DENSE, FINE-GRAINED WITH QUARTZ, MAFICS, NO HYDROCARBON ODOUR.
3									
4		3/8" BENT. PELL	[Diagonal lines pattern]						
5				64					
6									
7									
8									
9									
10	6" X 20" PUNCH SLOT	3/4" SAND	[Dotted pattern]	7000				SM	SILTY SAND- MOIST, MEDIUM DENSE, FINE GRAINED WITH QUARTZ, MAFICS, HYDROCARBON ODOUR, SOME CLAY.
11									
12									
13									
14									
15				10000					HYDROCARBON ODOUR.
									TEST BORING TERMINATED @ 15' ON 5-17-68
									MATERIALS: 2 BAGS OF SAND 1/2 5 GALLON BUCKET OF BENTONITE

ARANIA GEOLOGIC ENGINEERING

BORING LOG

LOCATION OF BORING PR-66

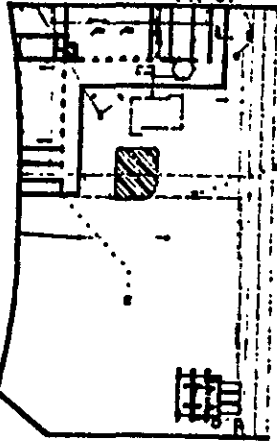


SITE/LOCATION		CARPATION/OAKLAND		BORING NO.	
PROJECT NO.		004-88-068		PR-66	
WATER LEVEL				SHEET 1	
TIME				OF 1	
DATE				DRILLER	
CASING DEPTH				START	FINISH
DRILLING CONTRACTOR		DRILLER MIKE MOORE		TIME	TIME
DRILLING METHOD HOLLOW STEM AUGER		LOGGER JOHN RUSSELL		13:50	14:30
SAMPLING METHOD 1408 HAMMER 30" DROP, MODIFIED CALIFORNIA SAMPLER		N/S 2844.1		DATE	DATE
ELEV. 14.28		E/W 3258.3		5-17-88	5-17-88
BORING DIAMETER: 6 INCHES		WELL CASING DIAMETER: 2 INCHES		REVIEWED BY: M.A.M.	
DATE 8-28-88					

DIST. FROM SURF.	WELL CONST.	LEGEND	TLV READING	SAMPLE NO.	RECOVERY	BLOWS PER 6 IN.	USCS	LOG OF MATERIAL	
1	44 BENTONITE CEMENT SLURRY						SP	PORTLAND CEMENT CONCRETE	
2								SAND- BROWN, DRY TO MOIST, MEDIUM DENSE, FINE GRAINED WITH QUARTZ, MAFICS, NO HYDROCARBON ODOOR.	
3									
4	3/4" BENTONITE CEMENT FILL						SM		
5	SP SAND								
6				70					
7									
8									
9									
10									
11									SILTY SAND- BROWN, DRY TO MOIST, MEDIUM DENSE, FINE GRAINED WITH QUARTZ, MAFICS, HYDROCARBON ODOOR.
12									
13									
14									
15									
16								HYDROCARBON ODOOR.	
								TEST BORING TERMINATED @ 15' ON 5-17-88	
								MATERIALS: 2 BAGS OF SAND 1/2 5 GALLON BUCKET OF BENTONITE	

LOCATION OF BORING

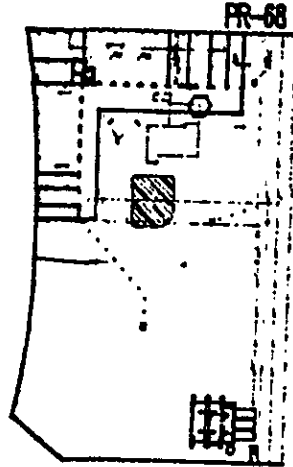
PR-67



SITE/LOCATION		CARBATION/DANLAND		BORING NO.	
PROJECT NO.		004-88-068		PR-67	
WATER LEVEL				SHEET 1	
TIME				OF 1	
DATE				DRILLER	
CASING DEPTH				START	FINISH
DRILLING CONTRACTOR				TIME	TIME
DRILLER				10:00	10:50
DRILLING METHOD				DATE	DATE
SAMPLING METHOD				5-18-88	5-18-88
LOGGER					
JOHN RUSSELL					
N/S		E/W		ELEV.	
2575.8		3224.8		14.12	
BORING DIAMETER: 6 INCHES			WELL CASING DIAMETER: 2 INCHES		
REVIEWED BY: M.A.M.			DATE 8-29-88		

DIST. FROM SURF.	WELL CONST.			TLV READING	SAMPLE NO.	RECOVERY	BLOWS PER 6 IN.	USCS	LOG OF MATERIAL
	CASING	ANNULIS	LEGEND						
1	BLANK	4% BENTONITE CEMENT SLURRY	[Pattern]					SP	CONCRETE
2									SAND- GRAY, MOIST, MEDIUM DENSE, FINE GRAINED WITH QUARTZ, MAFICS. HYDROCARBON ODOOR.
3									
4		3/8" BENT. PELL	[Pattern]						
5				2800					
6									
7									
8									
9									
10				10000					
11									
12									
13									
14									
15				8000					
								SM	HYDROCARBON ODOOR.
									TEST BORING TERMINATED @ 15' ON 5-18-88
									MATERIALS: 2 BAGS OF SAND
									1/2 5 GALLON BUCKET OF BENTONITE

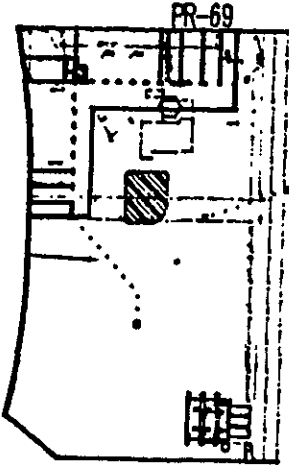
LOCATION OF BORING



SITE/LOCATION		CARNATION/OAKLAND		BORING NO.	
PROJECT NO.		004-88-068		PR-68	
WATER LEVEL				SHEET 1	
TIME				OF 1	
DATE				DRILLER	
CASING DEPTH				START	FINISH
DRILLING CONTRACTOR		MINE MOORE		TIME	TIME
DRILLER		MINE MOORE		10:55	11:40
DRILLING METHOD		HOLLOW STEM AUGER		DATE	DATE
SAMPLING METHOD		1408 HAMMER 30" DROP, MODIFIED CALIFORNIA SAMPLER		5-18-89	5-18-89
LOGGER		JOHN RUSSELL			
N/S	2881.5	E/W	3220.8	ELEV. 14.48	
BORING DIAMETER: 6 INCHES			WELL CASING DIAMETER: 2 INCHES		
REVIEWED BY: N.A.M.			DATE 6-29-89		

DIST. FROM SURF.	WELL CONST.			T.V. READING	SAMPLE NO.	RECOVERY	BLOWS PER 6 IN.	USCS	LOG OF MATERIAL
	CASING	ANNULUS	LEGEND						
1		4" BENTONITE CEMENT SLURRY						SB	PORTLAND CEMENT CONCRETE
2									
3	BLANK								
4		3/8" BENTONITE PELL							
5				800				SM	SAND- MOIST, MEDIUM DENSE, FINE GRAINED WITH QUARTZ, MAFICS, HYDROCARBON ODOR.
6									
7									
8									
9									
10	0.030 INCH SLIT			8000					
11									
12									
13									
14									
15				8000					
									HYDROCARBON ODOR.
									TEST BORING TERMINATED @ 15' ON 5-18-89
									MATERIALS: 2 BAGS OF SAND 1/2 5 GALLON BUCKET OF BENTONITE

LOCATION OF BORING

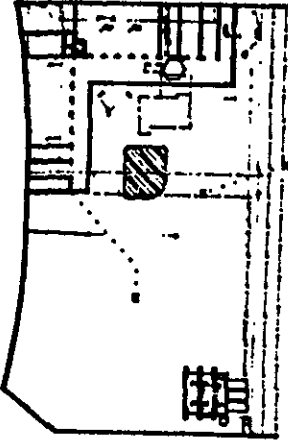


SITE/LOCATION		CARNATION/OAKLAND		BORING NO.	
PROJECT NO.		804-88-069		PR-69	
WATER LEVEL				SHEET 1	
TIME				OF 1	
DATE				DRILLER	
CASING DEPTH				START	FINISH
DRILLING CONTRACTOR				TIME	TIME
DRILLER		WIDE MOORE		11:45	12:15
DRILLING METHOD		HOLLOW STEM AUGER		DATE	DATE
SAMPLING METHOD		1400 HAMMER 30" DROP, MODIFIED CALIFORNIA SAMPLER		5-18-88	5-18-88
LOGGER		JOHN RUSSELL			
N/S	2547.8	E/W	3107.8	ELEV. 14.27	
BORING DIAMETER:		8 INCHES		WELL CASING DIAMETER: 2 INCHES	
REVIEWED BY:		M.A.M.		DATE 8-28-88	

DIST. FROM SURF.	WELL CONST.			TLV READING	SAMPLE NO.	RECOVERY	BLOBS PER 6 IN.	USCS	LOG OF MATERIAL
	CASING	ANNULUS	LEAKS						
1								SM	PORTLAND CEMENT CONCRETE
2		48 BENTONITE CEMENT SLURRY						SM	SILTY SAND- GRAY, MOIST, MEDIUM DENSE, FINE TO COARSE GRAINED WITH COBBLES TO 3mm, HYDROCARBON ODOOR.
3	BLANK								
4		3/8" BENT. FILL							
5				180				ML	
6									
7									
8									
9	0.000 INCH SLOT			5000					
10		3/4 SAND							
11								SM	SANDY SILT- GRAY, MOIST, MEDIUM STIFF WITH TRACE CLAY, QUARTZ, MAFICS, HYDROCARBON ODOOR.
12									
13									
14								SM	SILTY SAND- GRAY, MOIST, MEDIUM DENSE WITH TRACE CLAY QUARTZ, HYDROCARBON ODOOR.
15				4400					
									TEST BORING TERMINATED @ 15' ON 5-18-88
									MATERIALS: 2 BAGS OF SAND
									1/2 5 GALLON BUCKET OF BENTONITE

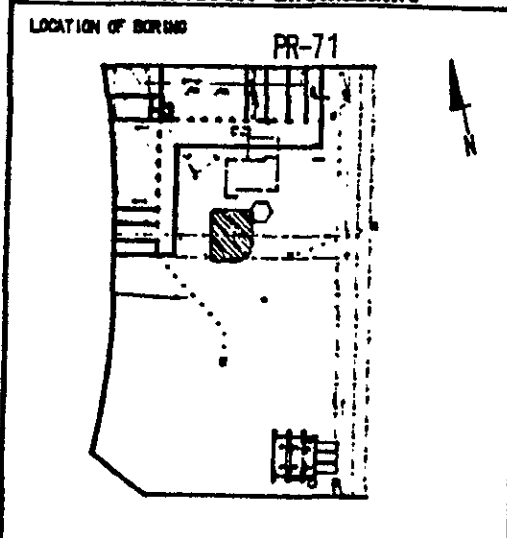
LOCATION OF BORING

PR-70



SITE/LOCATION		CANTON/OAKLAND		BORING NO.	
PROJECT NO.		004-88-088		PR-70	
WATER LEVEL				SHEET 1	
TIME				OF 1	
DATE				DRILLER	
CASING DEPTH				START	FINISH
DRILLING CONTRACTOR				TIME	TIME
DRILLER		MIKE MOORE		13:20	14:00
DRILLING METHOD		HOLLOW STEM AUGER		DATE	DATE
SAMPLING METHOD		1400 HAMMER 36" DROP, MODIFIED CALIFORNIA SAMPLER			
LOGGER		JOHN RUSSELL			
N/S	2882.3	E/W	3201.3	ELEV. 16.47	
BORING DIAMETER: 8 INCHES			WELL CASING DIAMETER: 2 INCHES		
REVIEWED BY: M.A.M.				DATE 8-29-88	

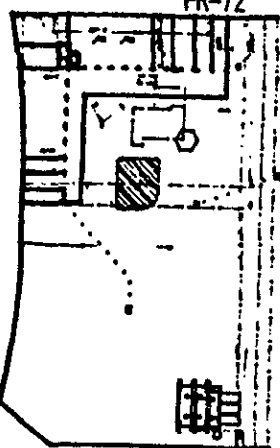
DIST. FROM SURF.	WELL CONST.			TLV READING	SAMPLE NO.	RECOVERY	BLOWS PER 6 IN.	USCS	LOG OF MATERIAL
	CASING	ANNULUS	LEGEND						
1								SP	PORTLAND CEMENT CONCRETE
2									
3	BLANK	4" BENTONITE CEMENT SLURRY							
4		3/8" BENT. PELL.							
5				7800				ML	SAND- GRAY, MOIST, MEDIUM DENSE, FINE-GRAINED WITH QUARTZ, MAFICS, HYDROCARBON ODOR.
6									
7									
8									
9									
10	0.000 INCH SLOT	3/8 SAND		10000					
11									
12									
13									
14									
15				4000					
									GRADES MOIST TO WET, HYDROCARBON ODOR.
									TEST BORING TERMINATED @ 15' ON 8-18-88
									MATERIALS: 2 BAGS OF SAND
									1/2 5 GALLON BUCKET OF BENTONITE



SITE/LOCATION		CARPINATION/OAKLAND		BORING NO.	
PROJECT NO.		004-88-088		PR-71	
WATER LEVEL				SHEET 1	
TIME				OF 1	
DATE				DRILLER	
CASING DEPTH				START	FINISH
DRILLING CONTRACTOR		NINE MOORE		TIME	TIME
DRILLER		JOHN MOORE		9:45	10:45
DRILLING METHOD		HOLLOW STEM AUGER		DATE	DATE
SAMPLING METHOD		160# HAMMER 30" DROP, MODIFIED CALIFORNIA SAMPLER		5-18-89	5-18-89
LOGGER		JOHN RUSSELL			
N/S	2488.7	E/W	3172.6	ELEV. 14.97	
BORING DIAMETER:		6 INCHES		WELL CASING DIAMETER: 2 INCHES	
REVIEWED BY:		M.A.M.		DATE 8-28-88	

DIST. FROM SURF.	WELL CONST.			TLV READING	SAMPLE NO.	RECOVERY	BLOWS PER 6 IN.	USCS	LOG OF MATERIAL
	CASING	ANNULUS	LEGEND						
1	BLANK	4% BENTONITE CEMENT SLURRY	[Cross-hatched pattern]					SP	ASPHALTIC CONCRETE
2									
3									
4	3/8" BENT. BEET. FILL		[Diagonal lines pattern]			X	15		
5						X	22		
6				100	4137	X	17		SAND- LIGHT BROWN, MOIST, DENSE, FINE GRAINED WITH QUARTZ, MAFICS HYDROCARBON ODOR.
7									
8									
9						X	22		
10	0.400 INCH SLOT			84	4138	X	17		HYDROCARBON ODOR.
11									
12									
13									
14						X	15		
15						X	12		
16				82	4139	X	17		HYDROCARBON ODOR.
									TEST BORING TERMINATED @ 16' ON 5-18-89
									MATERIALS: 2 BAGS OF SAND
									1/2 5 GALLON BUCKET OF BENTONITE

LOCATION OF BORING

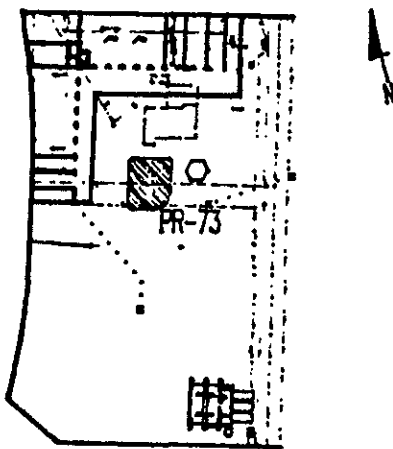


PR-72

SITE/LOCATION		CARNATION/OAKLAND				BORING NO.	
PROJECT NO.		004-88-088				PR-72	
WATER LEVEL						SHEET 1	
TIME						OF 1	
DATE						DRILLER	
CASING DEPTH						START	FINISH
DRILLING CONTRACTOR						TIME	TIME
DRILLER		MIKE MOORE				8:35	9:20
DRILLING METHOD		HOLLOW STEM AUGER				DATE	DATE
SAMPLING METHOD		140# HAMMER 30" DROP, MODIFIED CALIFORNIA SAMPLER				5-18-88	5-18-88
LOGGER		JOHN RUSSELL					
N/S	28 10.8	E/W	3204.8	ELEV.		16.13	
BORING DIAMETER: 8 INCHES		WELL CASING DIAMETER: 2 INCHES					
REVIEWED BY: M.A.M.		DATE 8-28-88					

DIST. FROM SURF.	WELL CONST.			TLV READING	SAMPLE NO.	RECOVERY	BLOBS PER 6 IN.	USCS	LOG OF MATERIAL
	CASING	ANNULUS	LEAKS						
1		4# BENTONITE CEMENT SLURRY						SP	SAND- LIGHT BROWN, MOIST, MEDIUM DENSE TO DENSE, FINE-GRAINED WITH QUARTZ, HYDROCARBON ODOR.
2									
3	BLANK								
4		3/8" BENT. PELL.				X	13		
5						X	21		
6				100	4145	X	12		
7									
8									
9							5		
10		3# SAND		4000	4146	X	18		
11									
12									
13									
14						X	8		
15						X	4		
16				100	4147	X	6		
								HYDROCARBON ODOR.	
								GRADES LOOSE, HYDROCARBON ODOR.	
								TEST BORING TERMINATED @ 16' ON 5-18-88	
								MATERIALS: 2 BAGS OF SAND	
								1/2 GALLON BUCKET OF BENTONITE	

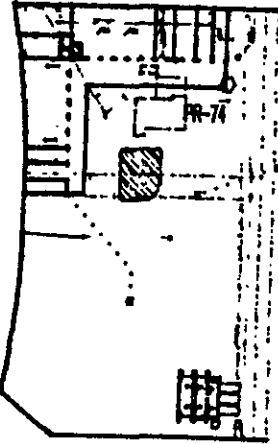
LOCATION OF BORING



SITE/LOCATION		CARNATION/OAKLAND		BORING NO.	
PROJECT NO.		004-08-060		PR-73	
WATER LEVEL				SHEET 1	
TIME				OF 1	
DATE				DRILLER	
CASING DEPTH				START	FINISH
DRILLING CONTRACTOR				TIME	TIME
DRILLER		MIKE MOORE		9:30	10:10
DRILLING METHOD		HOLLOW STEM AUGER		DATE	DATE
SAMPLING METHOD		140# HAMMER 30" DROP, MODIFIED CALIFORNIA SAMPLER.		5-10-89	5-10-89
LOGGER		JOHN RUSSELL			
N/S	2477.5	E/W	3193.7	ELEV. 15.10	
BORING DIAMETER: 6 INCHES		WELL CASING DIAMETER: 2 INCHES			
REVIEWED BY: M.A.M.		DATE 6-29-89			

DIST. FROM SUPP.	WELL CONST.			TLV READING	SAMPLE NO.	RECOVERY	BLOWS PER 6 IN.	USCS	LOG OF MATERIAL
	CASING	ANNULUS	LEGEND						
1			4% BENTONITE CEMENT SLURRY					SP	ASPHALTIC CONCRETE
2									
3	BLANK								
4		3/4" DIA. REIN. FELL.	3# SAND						
4						X	80		
4						X	12		
6				100	4141	X	10		SAND - LIGHT BROWN, MOIST, MEDIUM DENSE, FINE GRAINED WITH QUARTZ. HYDROCARBON ODOR.
8									
9									
10						X	11		
10						X	7		
10				117	4142	X	12		COLOR CHANGE WITH GRAY STAINING, HYDROCARBON ODOR.
11									
12									
13									
14						X	8		
14						X	7		
15				108	4143	X	11		HYDROCARBON ODOR.
									TEST BORING TERMINATED @ 15' ON 5-10-89
									MATERIALS: 2 BAGS OF SAND
									1/2 5 GALLON BUCKET OF BENTONITE

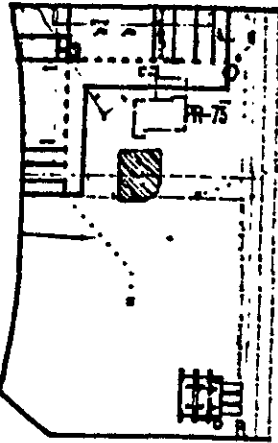
LOCATION OF BORING



SITE/LOCATION		CARNATION/OAKLAND		BORING NO.	
PROJECT NO.		004-88-068		PR-74	
WATER LEVEL				SHEET 1	
TIME				OF 1	
DATE				DRILLER	
CASING DEPTH				START	FINISH
DRILLING CONTRACTOR				TIME	TIME
DRILLER				8:30	10:10
DRILLING METHOD				DATE	DATE
HOLLOW STEM AUGER				5-25-88	5-25-88
SAMPLING METHOD 1468 HAMMER 30" DROP, MODIFIED CALIFORNIA SAMPLER					
LOGGER JOHN RUSSELL					
N/S	2477.5	E/W	3183.7	ELEV. 15.10	
BORING DIAMETER: 6 INCHES			WELL CASING DIAMETER: 2 INCHES		
REVIEWED BY: M.A.M.				DATE 5-28-88	

DIST. FROM SURF.	WELL CONST.		LEGEND	TLV READING	SAMPLE NO.	RECOVERY	BLOBS PER 6 IN.	USCS	LOG OF MATERIAL	
	CASING	ANNULUS								
1			4in BENTONITE CEMENT SLURRY					SP	ASPHALTIC CONCRETE	
2										
3	BLANK									
4		3/8" BENT. PELL	3/8" SAND			X	50			
5					100	4141	X		12	
6							X		11	SAND- LIGHT BROWN, MOIST, MEDIUM DENSE, FINE GRAINED WITH QUARTZ, HYDROCARBON ODOUR.
7							X		7	
8						X	12		COLOR CHANGE WITH GRAY STAINING, HYDROCARBON ODOUR.	
9										
10						X	6			
11						X	7			
12						X	11		HYDROCARBON ODOUR.	
13									TEST BORING TERMINATED @ 15' ON 5-18-88	
14										
15										
16										
MATERIALS: 2 BAGS OF SAND										
1/2 5 GALLON BUCKET OF BENTONITE										

LOCATION OF BORING

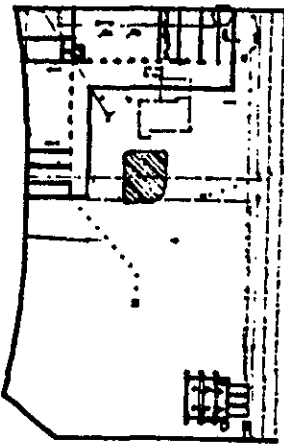


SITE/LOCATION CANNATION/OAKLAND				BORING NO. PR-75	
PROJECT NO. 004-88-068				SHEET 1 OF 1	
WATER LEVEL				DRILLER	
TIME				START	FINISH
DATE				TIME	TIME
CASING DEPTH				9:30	10:10
DRILLING CONTRACTOR				DATE	DATE
DRILLER MIKE MOORE				5-25-89	5-25-89
DRILLING METHOD HOLLOW STEM AUGER					
SAMPLING METHOD 1408 HAMMER 30° DROP, MODIFIED CALIFORNIA SAMPLER					
LOGGER JOHN RUSSELL					
N/S 2477.8		E/W 3193.7		ELEV. 15.18	
BORING DIAMETER: 6 INCHES			WELL CASING DIAMETER: 2 INCHES		
REVISED BY: M.A.M.				DATE 8-29-89	

DIST. FROM SUFF.	WELL CONST.		LEGEND	TVL READING	SAMPLE NO.	RECOVERY	BLOBS PER 6 IN.	USCS	LOG OF MATERIAL
	CASING	ANNULUS							
1	BLANK	4% BENTONITE CEMENT SLURRY	[Cross-hatched pattern]					SP	ASPHALTIC CONCRETE
2	BLANK	4% BENTONITE CEMENT SLURRY	[Cross-hatched pattern]						
3	BLANK	4% BENTONITE CEMENT SLURRY	[Cross-hatched pattern]						
4	3/8" BENT. PELL.	3% SAND	[Dotted pattern]			X	80		
5	3/8" BENT. PELL.	3% SAND	[Dotted pattern]			X	12		
6	3/8" BENT. PELL.	3% SAND	[Dotted pattern]	100	4141	X	10		SAND- LIGHT BROWN, MOIST, MEDIUM DENSE, FINE GRAINED WITH QUARTZ, HYDROCARBON ODOUR.
7	3/8" BENT. PELL.	3% SAND	[Dotted pattern]						
8	3/8" BENT. PELL.	3% SAND	[Dotted pattern]						
9	3/8" BENT. PELL.	3% SAND	[Dotted pattern]			X	11		
10	3/8" BENT. PELL.	3% SAND	[Dotted pattern]			X	7		
11	3/8" BENT. PELL.	3% SAND	[Dotted pattern]	117	4142	X	12		COLOR CHANGE WITH GRAY STAINING, HYDROCARBON ODOUR.
12	3/8" BENT. PELL.	3% SAND	[Dotted pattern]						
13	3/8" BENT. PELL.	3% SAND	[Dotted pattern]						
14	3/8" BENT. PELL.	3% SAND	[Dotted pattern]			X	8		
15	3/8" BENT. PELL.	3% SAND	[Dotted pattern]			X	7		
16	3/8" BENT. PELL.	3% SAND	[Dotted pattern]	108	4143	X	11		HYDROCARBON ODOUR.
									TEST BORING TERMINATED @ 16' ON 5-10-89
									MATERIALS: 2 BAGS OF SAND
									1/2 5 GALLON BUCKET OF BENTONITE

LOCATION OF BORING

PR-76

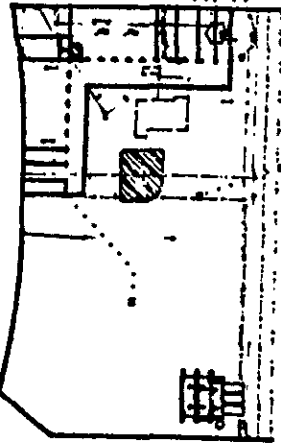


SITE/LOCATION		CANNATION/OAKLAND		BORING NO.	
PROJECT NO.		004-88-088		PR-76	
WATER LEVEL				SHEET 1	
TIME				OF 1	
DATE				DRILLER	
CASING DEPTH				START	FINISH
DRILLING CONTRACTOR				TIME	TIME
DRILLER		MIKE MOORE		14:30	15:10
DRILLING METHOD		HOLLOW STEM AUGER		DATE	DATE
SAMPLING METHOD		140# HAMMER 30" DROP, MODIFIED CALIFORNIA SAMPLER		5-25-88	6-25-88
LOGGER		JOHN RUSSELL			
N/S	2827.8	E/W	3275.7	ELEV.	14.54
BORING DIAMETER:			6 INCHES		
WELL CASING DIAMETER:			2 INCHES		
REVIEWED BY:				M.A.M.	
				DATE 6-29-88	

DIST. FROM SURF.	WELL CONST.			TLV READING	SAMPLE NO.	RECOVERY	BLOWS PER 6 IN.	USCS	LOG OF MATERIAL	
	CASING	ANNULUS	LEGEND							
1								SP	PORTLAND CEMENT CONCRETE	
2		4# BENTONITE CEMENT SLURRY								
3	BLANK									
4		3/8" BENT. PELL.								
5				110				SM	SAND- DARK GRAY, MOIST, MEDIUM DENSE, FINE GRAINED WITH QUARTZ, MAFICS, HYDROCARBON ODOR.	
6										
7										
8										
9										
10	0.000 INCH SLOT			200						SILTY SAND- DARK GRAY, MOIST, MEDIUM DENSE, FINE GRAINED WITH TRACE CLAY, QUARTZ, MAFICS, HYDROCARBON ODOR.
11										
12										
13										
14										
15				180					GRADES MOIST TO WET, HYDROCARBON ODOR.	
									TEST BORING TERMINATED @ 15' ON 5-25-88	
									MATERIALS: 2 BAGS OF SAND	
									1/2 GALLON BUCKET OF BENTONITE	

LOCATION OF BORING

PR-77



SITE/LOCATION		CAPMATION/OAKLAND		BORING NO.	
PROJECT NO.		004-88-068		PR-77	
WATER LEVEL				SHEET 1	
TIME				OF 1	
DATE				DRILLER	
CASING DEPTH				START	FINISH
DRILLING CONTRACTOR				TIME	TIME
DRILLER		MIKE MOORE		18:30	18:30
DRILLING METHOD		HOLLOW STEM AUGER		DATE	DATE
SAMPLING METHOD		140# HAMMER 38" DROP, MODIFIED CALIFORNIA SAMPLER		5-25-89	5-25-89
LOGGER		JOHN RUSSELL			
N/S	2897.1	E/W	3287.9	ELEV. 14.28	
BORING DIAMETER: 6 INCHES		WELL CASING DIAMETER: 2 INCHES			
REVIEWED BY: M.A.M.				DATE 5-29-89	

DIST. FROM SURF.	WELL CONST.			TLV READING	SAMPLE NO.	RECOVERY	BLOWS PER 6 IN.	USCS	LOG OF MATERIAL
	CASING	ANNULUS	LENDG						
1									PORTLAND CEMENT CONCRETE
2									
3	BLANK	4# BENTONITE CEMENT SLURRY							
4		3/8" BENT. PELL.							
5				230				SB	SAND- DARK GRAY, MOIST, MEDIUM DENSE, FINE GRAINED WITH QUARTZ. MAFICS HYDROCARBON ODOR.
6									
7									
8									
9	0.000 INCH SLOT	3# SAND							
10				210					SAND- FINE-GRAINED, DARK GRAY, SOME SILT, MOIST, NON-PLASTIC. QUARTZ, MAFICS, HYDROCARBON ODOR.
11									
12									
13									
14									
15				500				SM	SILTY SAND- DARK GRAY, MOIST, MEDIUM DENSE, FINE GRAINED WITH QUARTZ. MAFICS, HYDROCARBON ODOR.
									TEST BORING TERMINATED @ 15' ON 5-25-89
									MATERIALS: 2 BAGS OF SAND
									1/2 GALLON BUCKET OF BENTONITE

DATE STARTED: 7/13/89

SURFACE CONDITIONS: Asphalt Pavement

DATE COMPLETED: 7/13/89

SURFACE ELEVATION: 14.76

DRILLING EQUIPMENT: Hollow Stem Auger

COORDINATES: N 2,512.4 E 3,151.0

DRILLING CONTRACTOR: Accubore

GROUNDWATER CONDITIONS:

LOGGED BY: Jim Wallace

TOTAL DEPTH: 15.5

CASING DEPTH: 15.5 feet

BORING DIAMETER: 6"

FILTER PACK: #2/16 sand SLOT SIZE:.020"

REMARKS	FIELD					DEPTH (feet)	USCS CLASS.	SOIL DESCRIPTION
	WELL	SAMP. NO.	FIELD READ.	BLOWS / 6"	SAMP TYPE			
2 inch Diameter Casing			280					Asphaltic Concrete
5% Bentonite Cement Grout			300			2		SILTY SAND(SM) black stained, dry to moist, medium dense, strong hydrocarbon odor
Bentonite Pellets						4		color change to gray green
#2/16 Sand			300			6		
			300			8		grades moist to wet, fine grained
						10		color change to red brown
0.02 inch Slot Screen			30			10		grades with some clay, no hydrocarbon odor
			30			12		
						14		grades with increasing clay content

AGE

ANANIA GEOLOGIC ENGINEERING

Carnation/Oakland
1310 14th St., Oakland, Ca.

LOG OF PR-78

Sheet 1 of 2

PROJECT NO. 004-88-059

REMARKS	FIELD					DEPTH (feet)	USCS CLASS.	SOIL DESCRIPTION
	WELL	SAMP. NO.	FIELD READ.	BLOWS / 6"	SAMP TYPE			
			800			16		Test Boring Terminated at 15 1/2 feet on 7-13-89 Materials: 2 bags #2/16 sand 1/2 bucket bentonite
						18		
						20		
						22		
						24		
						26		
						28		
						30		
						32		
						34		
						36		
						38		

_____ AGE _____
ANANIA GEOLOGIC ENGINEERING
 PROJECT NO. 004-88-059

Carnation/Oakland
 1310 14th St., Oakland, Ca.
LOG OF PR-78

Sheet 2 of 2

DATE STARTED: 7/13/89

SURFACE CONDITIONS: Asphalt Pavement

DATE COMPLETED: 7/13/89

SURFACE ELEVATION: 14.56

DRILLING EQUIPMENT: Hollow Stem Auger

COORDINATES: N 2,514.9 E 3,127.4

DRILLING CONTRACTOR: Accubore

GROUNDWATER CONDITIONS:

LOGGED BY: Jim Wallace

TOTAL DEPTH: 15.0

CASING DEPTH: 15 feet

BORING DIAMETER: 6"

FILTER PACK: #2/16 sand SLOT SIZE:.020"

REMARKS	FIELD					DEPTH (feet)	USCS CLASS.	SOIL DESCRIPTION
	WELL	SAMP. NO.	FIELD READ.	BLOWS / 6"	SAMP TYPE			
2 inch Diameter Casing			18					Asphaltic Concrete
5% Bentonite Cement Grout			28			2		Aggregate Baserock
Bentonite Pellets						4		SILTY SAND(SM) black, moist, loose, with nails, wood, brick and concrete (FILL)
#2/16 Sand			40			6		SILTY SAND(SM) black, dry to moist, medium dense, grading to red brown
			40			8		color change to green gray
						10		color change to red brown
						12		grades with increasing clay and moisture content
0.02 inch Slot Screen			28			14		no hydrocarbon odor
			50			15		Test Boring Terminated at 15 feet on 7-13-89 Materials: 2 bags of #2/16 sand 1/2 bucket bentonite

AGE _____
ANANIA GEOLOGIC ENGINEERING
 PROJECT NO. 004-88-059

Carnation/Oakland
 1310 14th St., Oakland, Ca.
LOG OF PR-79

Sheet 1 of 1

DATE STARTED: 7/13/89

SURFACE CONDITIONS: Asphalt Pavement

DATE COMPLETED: 7/13/89

SURFACE ELEVATION: 14.43

DRILLING EQUIPMENT: Hollow Stem Auger

COORDINATES: N 2,539.5 E 3,129.5

DRILLING CONTRACTOR: Accubore

GROUNDWATER CONDITIONS:

LOGGED BY: Jim Wallace

TOTAL DEPTH: 15.0

CASING DEPTH: 15 feet

BORING DIAMETER: 6"

FILTER PACK: #2/16 sand SLOT SIZE:.020"

REMARKS	FIELD					DEPTH (feet)	USCS CLASS.	SOIL DESCRIPTION
	WELL	SAMP. NO.	FIELD READ.	BLOWS / 6"	SAMP TYPE			
2 inch Diameter Casing								Asphaltic Concrete
5% Bentonite Cement Grout								Aggregate Baserock
Bentonite Pellets						2		SILTY SAND(SM) black, moist, loose, strong hydrocarbon odor (FILL)
#2/16 Sand			200			4		SILTY SAND(SM) green gray, dry to moist, medium dense
			300			6		
			340			8		
0.02 inch Slot Screen						10		
			20			12		no hydrocarbon odor
			150			14		Test Boring Terminated at 15 feet on 7-13-89 Materials: 2 bags of #2/16 sand 1/2 bucket bentonite

AGE _____
ANANIA GEOLOGIC ENGINEERING
 PROJECT NO. 004-88-059

Carnation/Oakland
 1310 14th St., Oakland, Ca.
LOG OF PR-80

Sheet 1 of 1

DATE STARTED: 7/13/89

SURFACE CONDITIONS: Asphalt Pavement

DATE COMPLETED: 7/13/89

SURFACE ELEVATION: 14.86

DRILLING EQUIPMENT: Hollow Stem Auger

COORDINATES: N 2,490.3 E 3,155.0

DRILLING CONTRACTOR: Accubore

GROUNDWATER CONDITIONS:

LOGGED BY: Jim Wallace

TOTAL DEPTH: 15.0

CASING DEPTH: 15 feet

BORING DIAMETER: 6"

FILTER PACK: #2/16 sand SLOT SIZE:.020"

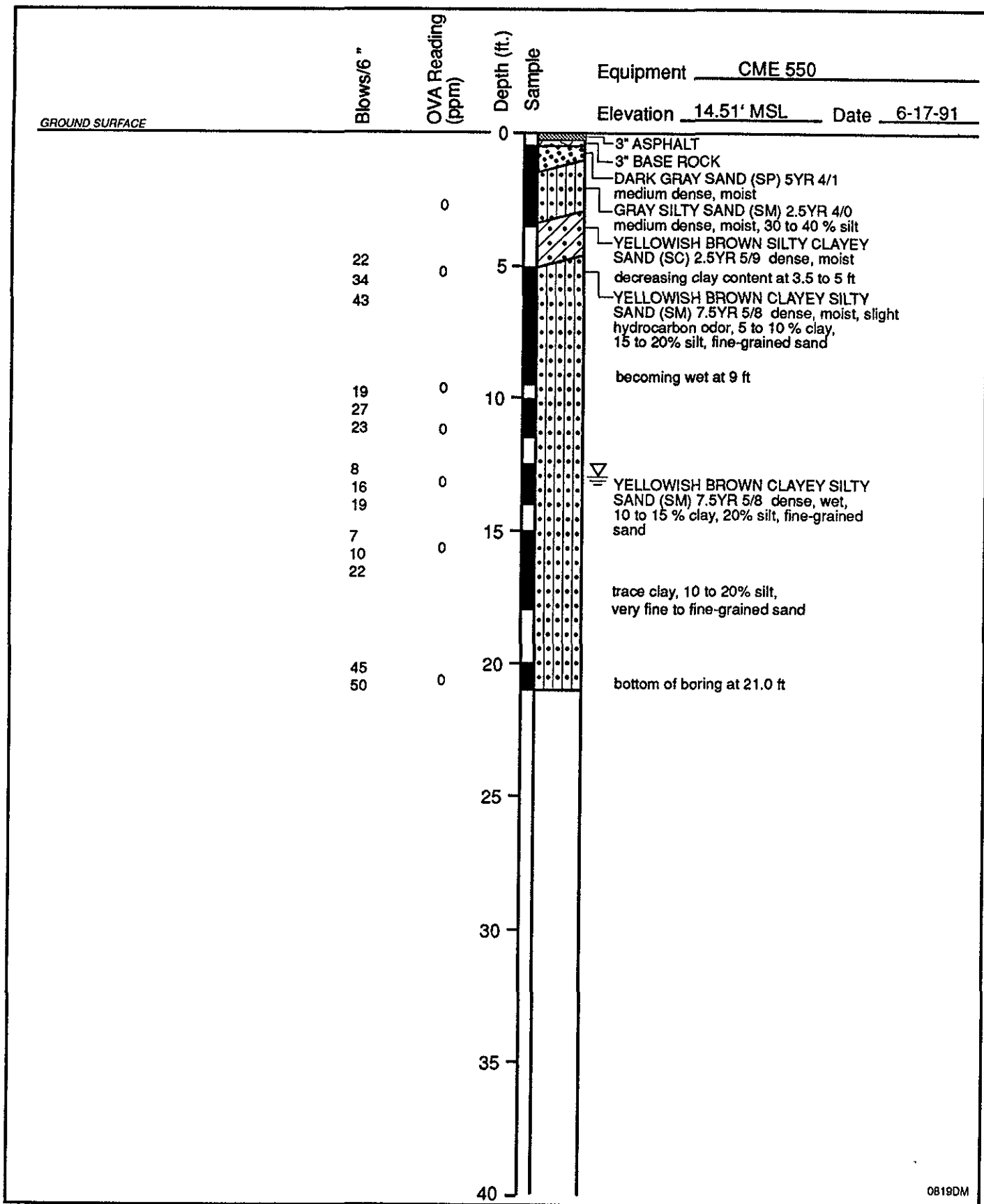
REMARKS	FIELD					DEPTH (feet)	USCS CLASS.	SOIL DESCRIPTION
	WELL	SAMP. NO.	FIELD READ.	BLOWS / 6"	SAMP TYPE			
2 inch Diameter Casing								Asphaltic Concrete
5% Bentonite Cement Grout			60			2		Aggregate Baserock
Bentonite Pellets			68			4		SILTY SAND(SM) black, dry to moist, medium dense, strong hydrocarbon odor
#2/16 Sand						6		grades with fine grained sand
						8		color change to green gray
			38			10		color change to red brown
0.02 inch Slot Screen						12		
			150			14		Test Boring Terminated at 15 feet on 7-13-89 Materials: 2 bags of #2/16 sand 1/2 bucket bentonite

AGE
 ANANIA GEOLOGIC ENGINEERING
 PROJECT NO. 004-88-059

Carnation/Oakland
 1310 14th St., Oakland, Ca.
 LOG OF PR-81

Sheet 1 of 1

Appendix B
HLA BORING LOGS



0819DM



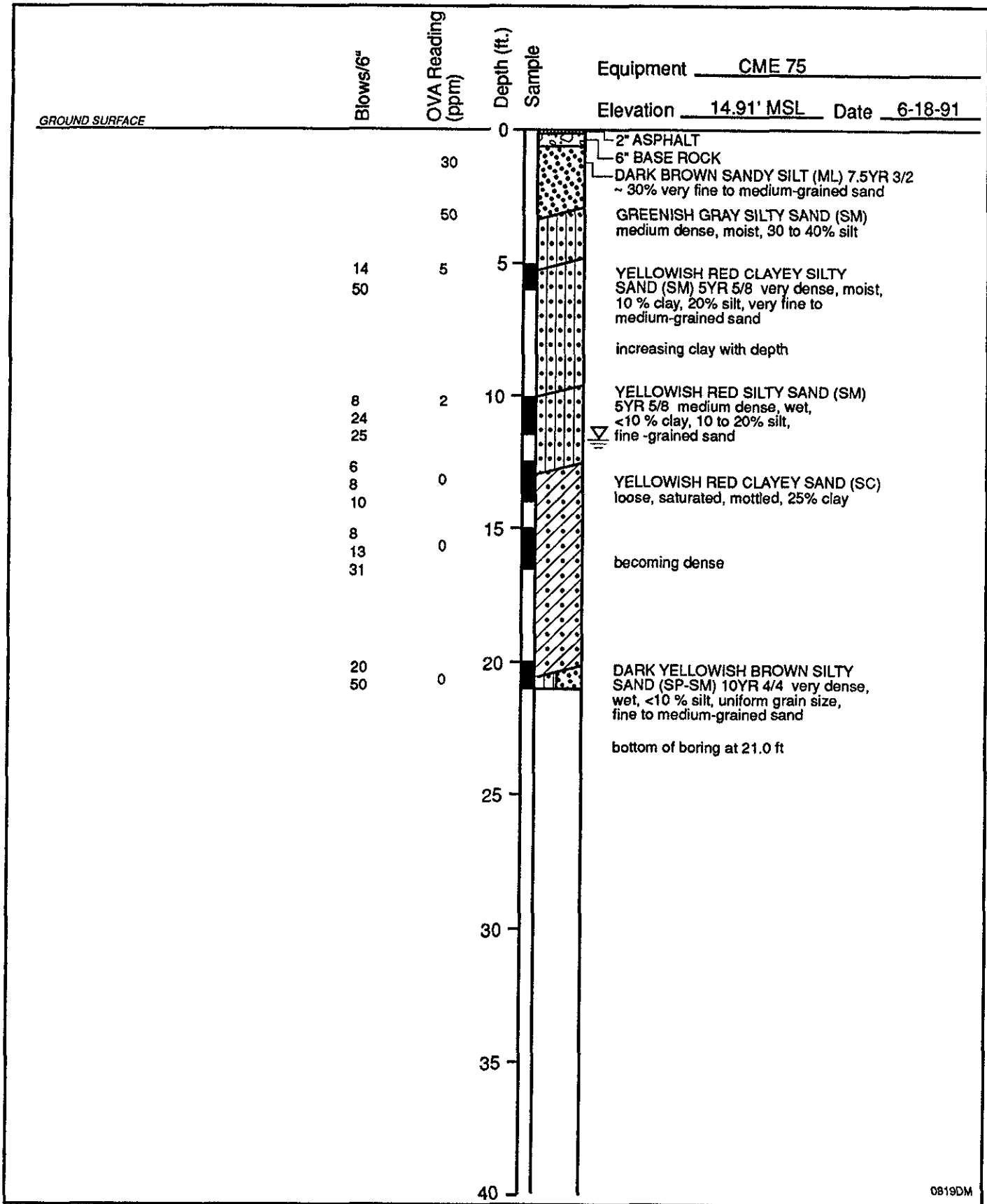
Harding Lawson Associates
Engineering and Environmental Services

Log of Boring SB-1
Carnation Facility
Oakland, California

PLATE

B1

DRAWN PMc	JOB NUMBER 20294,006.02	APPROVED <i>D. J. Cronk</i>	DATE 7/91	REVISED DATE
--------------	----------------------------	--------------------------------	--------------	--------------



0819DM



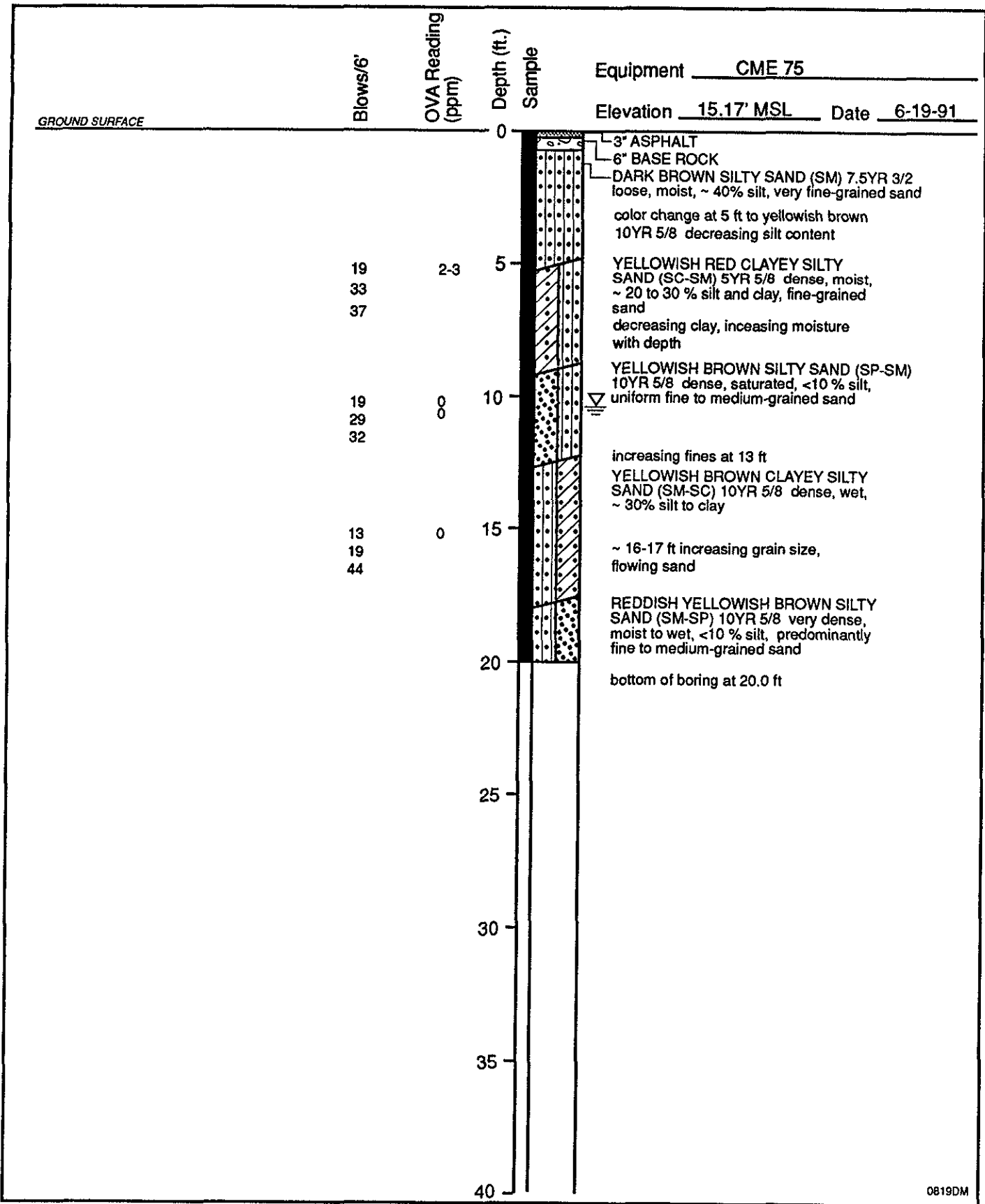
Harding Lawson Associates
Engineering and Environmental Services

Log of Boring SB-2
Carnation Facility
Oakland, California

PLATE

B2

DRAWN PMc	JOB NUMBER 20294,006.02	APPROVED <i>D. J. Curry</i>	DATE 7/91	REVISED DATE
--------------	----------------------------	--------------------------------	--------------	--------------



0819DM



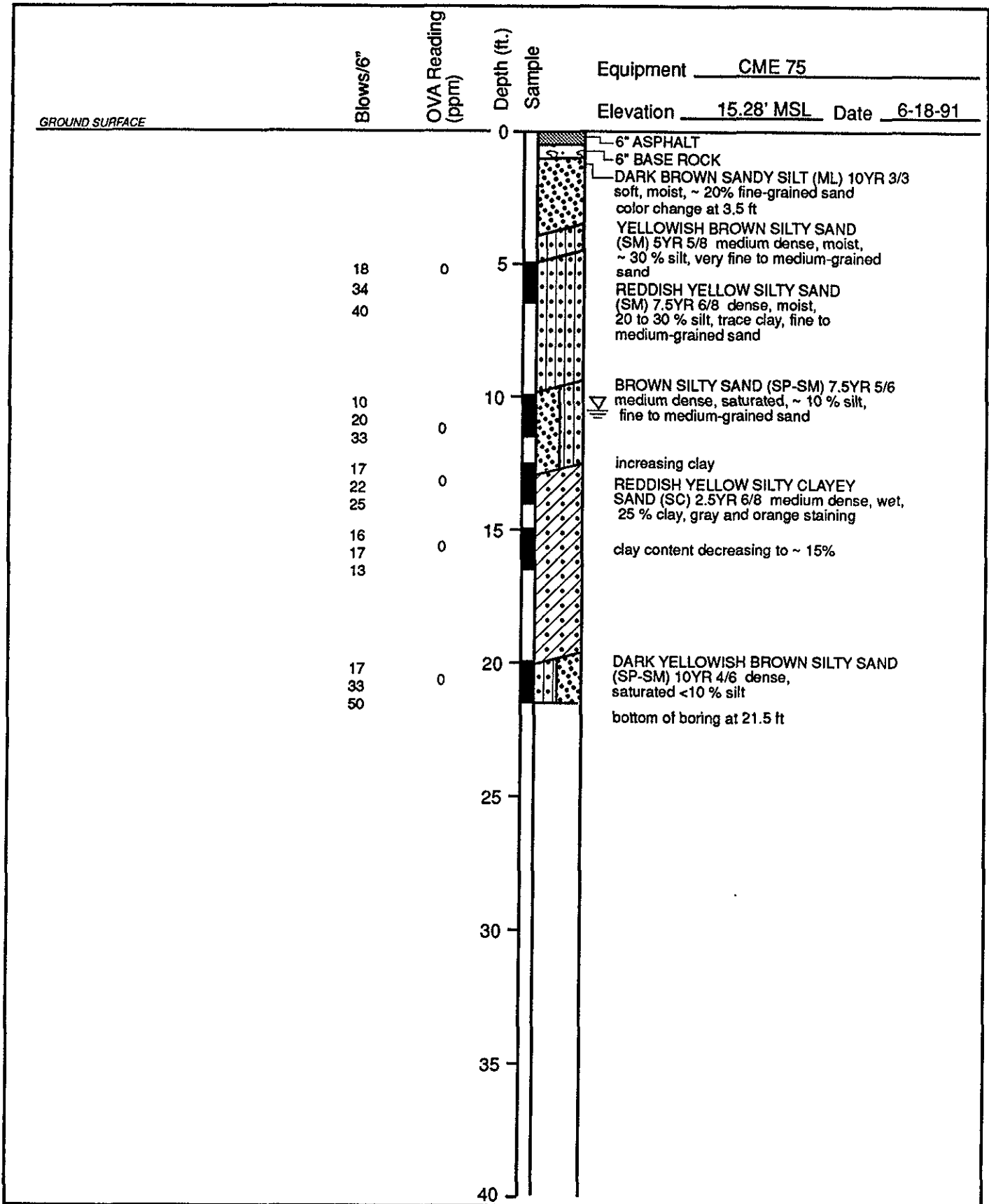
Harding Lawson Associates
Engineering and Environmental Services

Log of Boring SB-3
Carnation Facility
Oakland, California

PLATE

B3

DRAWN PMC	JOB NUMBER 20294,006.02	APPROVED <i>D. J. Cray</i>	DATE 7/91	REVISED DATE
--------------	----------------------------	-------------------------------	--------------	--------------

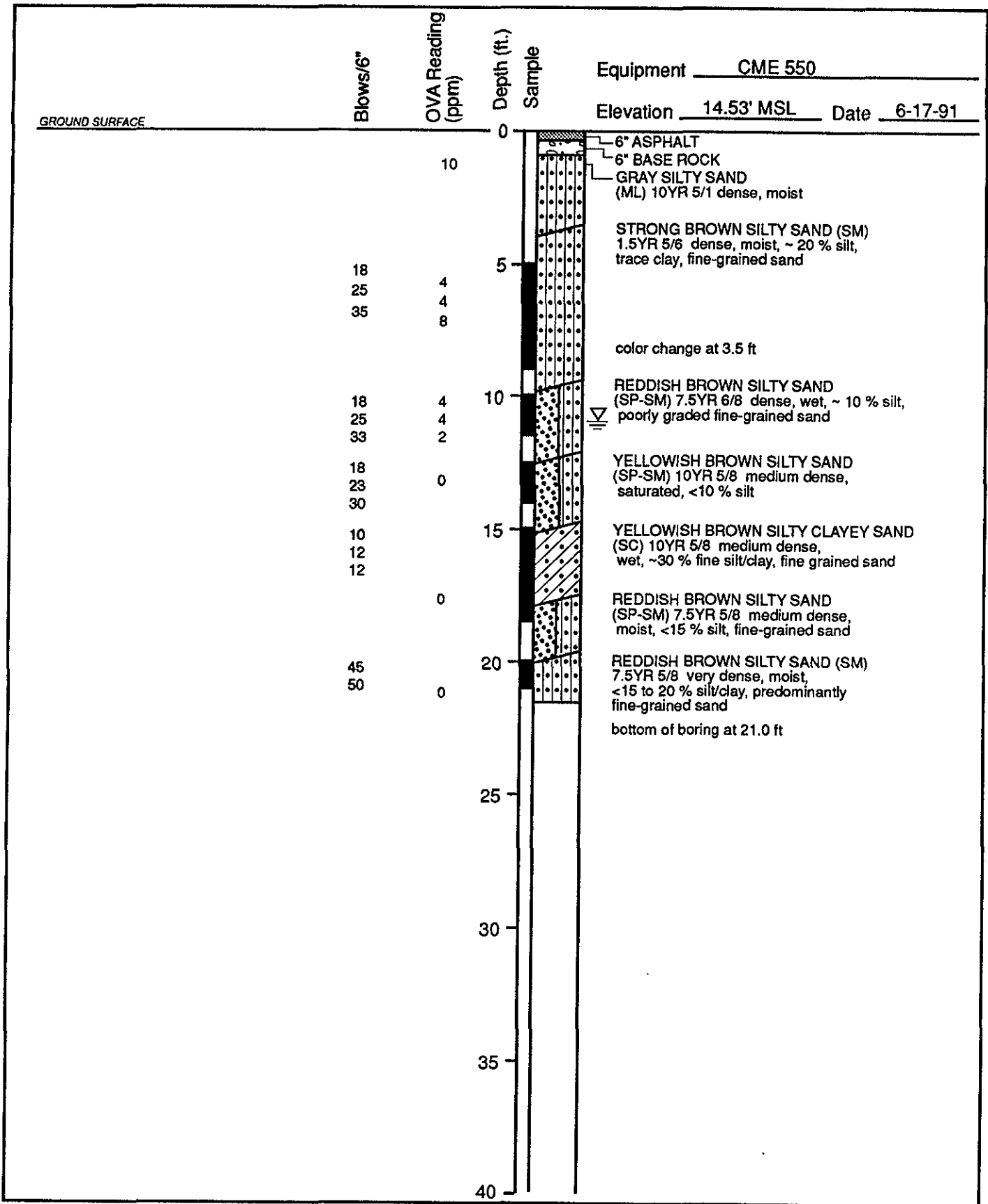


Harding Lawson Associates
 Engineering and
 Environmental Services

Log of Boring SB-4
 Carnation Facility
 Oakland, California

PLATE
B4

DRAWN PMC	JOB NUMBER 20294,006.02	APPROVED <i>D. Craig</i>	DATE 7/91	REVISED DATE
--------------	----------------------------	-----------------------------	--------------	--------------



Harding Lawson Associates
Engineering and Environmental Services

Log of Boring SB-5
Carnation Facility
Oakland, California

PLATE

B5

DRAWN PMC	JOB NUMBER 20294,006.02	APPROVED <i>D. A. Craig</i>	DATE 7/91	REVISED DATE
--------------	----------------------------	--------------------------------	--------------	--------------

Laboratory Tests

Blows/6"

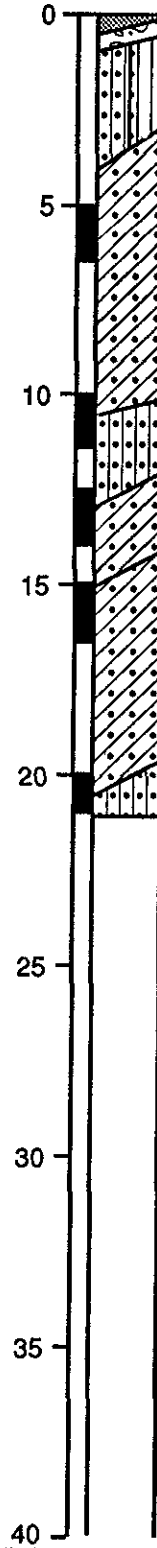
OVA Reading (ppm)

Depth (ft.)

Sample

Equipment CME 75

Elevation 14.63' MSL Date 10-1-90



3" ASPHALT
6" BASEROCK

DARK BROWN SILTY SAND (SM-ML) 10YR 2/2
loose, moist, 50% silt, 50% sand

BROWN CLAYEY SAND (SC) ~10YR 5/6
very dense, moist, 25-30% clay, fine sand

brown petroleum product in soil
GRAY SILTY SAND (SM) dense, saturated, ~15% silt

YELLOWISH BROWN CLAYEY SAND (SC)
loose, wet, ~20-30% clay, fine sand

BROWN CLAYEY SAND (SC) ~10YR 5/3
medium dense, wet, ~25% clay, fine sand

increasing clay

BROWN SILTY SAND (SM) ~10YR 5/3
very dense, moist
Bottom of boring at 21 ft



Harding Lawson Associates
Engineering and
Environmental Services

Log of Boring SB-6
Carnation Facility
Oakland, California

PLATE

B6

DRAWN
NJBC

JOB NUMBER
20294,006.02

APPROVED
D. A. Craig

DATE
7/91

REVISED DATE

Laboratory Tests

Blows/6"

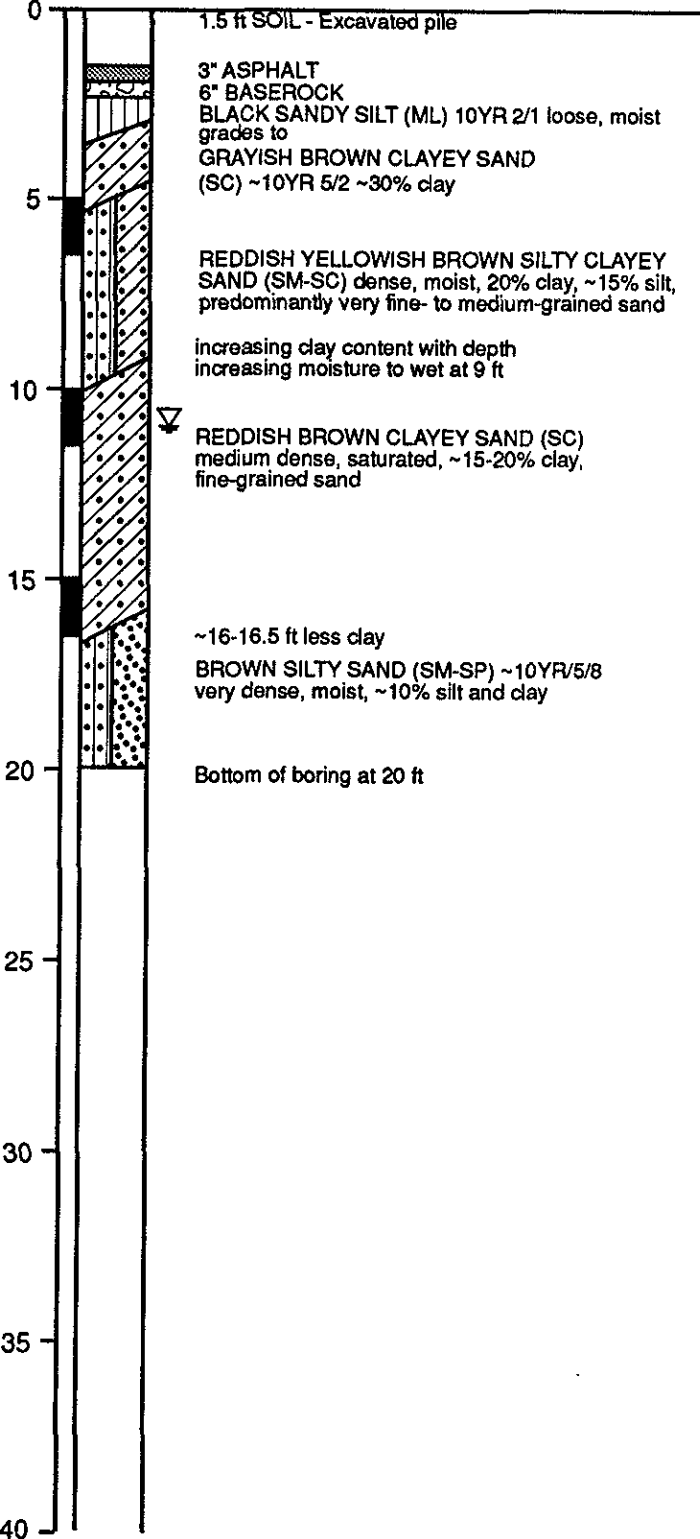
OVA Reading (ppm)

Depth (ft.)

Sample

Equipment CME 75

Elevation 15.68' MSL Date 6-19-91



Harding Lawson Associates
Engineering and
Environmental Services

Log of Boring SB-7
Carnation Facility
Oakland, California

PLATE

B7

DRAWN
NJBC

JOB NUMBER
20294,006.02

APPROVED
D. A. Craig

DATE
7/91

REVISED DATE

Laboratory Tests

Blows/6"

OVA Reading (ppm)

Depth (ft.)
Sample

Equipment CME 75

Elevation 15.15' MSL Date 6-19-91

0
200
200
5
10
15
20
25
30
35
40



3" ASPHALT
6" BASEROCK
BLACK SANDY SILT (ML) 10YR 2/1 loose, moist, 30-40% very fine-grained sand
GRAYISH BROWN SILTY CLAYEY SAND (SM-SC) medium dense, moist, ~25% silt-clay, fine-grained sand
YELLOWISH BROWN CLAYEY SILTY SAND (SM-SC) ~10YR 5/8 very dense, moist pockets of gray clay ~15-20% silt, fine-grained sand
increasing moisture, wet at 9 ft
brown petroleum product in soil at 10 ft
GRAYISH YELLOWISH BROWN SILTY SAND (SM-SP) ~10YR 5/8 dense, saturated
change ~ 12 ft increase clay to ~15%
BROWN SILTY CLAYEY SAND (SC) 10YR 5/8 loose, medium dense, saturated
Bottom of boring at 16.5 ft

1
18
34
44

>1000
>1000
>1000

23
33
35

>1000

8
10
15

>1000



Harding Lawson Associates
Engineering and
Environmental Services

Log of Boring SB-8
Carnation Facility
Oakland, California

PLATE

B8

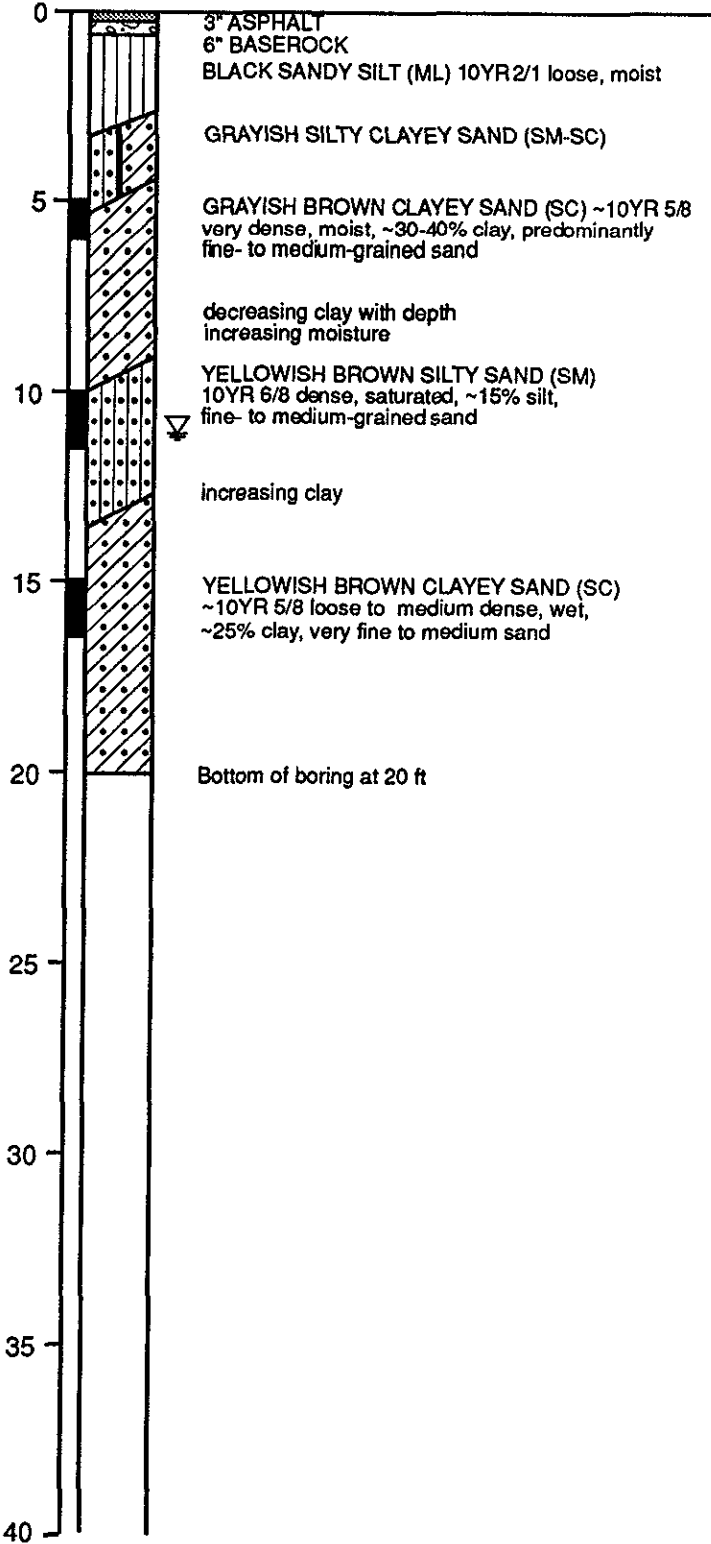
DRAWN NJBC	JOB NUMBER 20294,006.02	APPROVED <i>D. A. Crand</i>	DATE 7/91	REVISED DATE
---------------	----------------------------	--------------------------------	--------------	--------------

Laboratory Tests

Blows/6"

Depth (ft.)
Sample

Equipment CME 75
Elevation 15.25' MSL Date 6-19-91



Harding Lawson Associates
Engineering and
Environmental Services

Log of Boring SB-9
Carnation Facility
Oakland, California

PLATE

B9

DRAWN
NJBC

JOB NUMBER
20294,006.02

APPROVED
M. Craig

DATE
7/91

REVISED DATE

Laboratory Tests

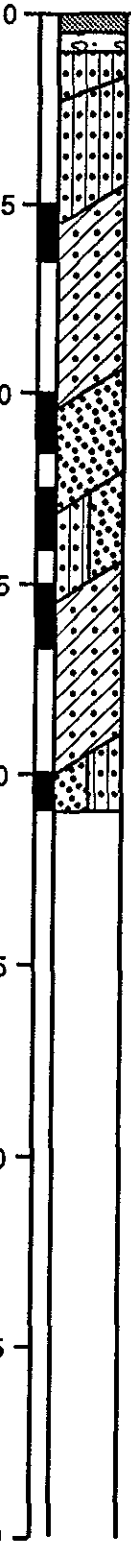
Blows/6"

OVA Reading (ppm)

Depth (ft.)
Sample

Equipment CME 550
Elevation 14.56' MSL Date 6-17-91

0
5
10
15
20
25
30
35
40



6" CONCRETE
6" BASE ROCK
BLACK SILTY SAND (SM)
color change at 2 ft to GRAY SILTY SAND (SM)
2.5 YR N5/ medium dense, moist

REDDISH BROWN CLAYEY SAND (SC)
5YR 5/8 very dense, moist ~30-40% clay, gray mottling

REDDISH BROWN SAND (SP) 5 YR 5/8
dense, wet, trace silt, predominantly fine-grained sand

REDDISH BROWN SILTY SAND (SM-SP) 5YR
5/8 medium dense, wet

BROWN CLAYEY SAND (SC) 7.5YR 5/8
~20% clay, fine- to medium-grained sand,
gray mottling

BROWN SILTY SAND (SP-SM) 7.5YR 5/8
very dense, wet, <10% silt, very fine- to medium-
grained sand
Bottom of boring at 21 ft

16
45
47

0

20
32
45

5
>1000

24
25
17

10
8
3

12
17
18

0

38
50

0



Harding Lawson Associates
Engineering and
Environmental Services

Log of Boring SB-10
Carnation Facility
Oakland, California

PLATE

B10

DRAWN NJBC	JOB NUMBER 20294,006.02	APPROVED <i>[Signature]</i>	DATE 7/91	REVISED DATE
---------------	----------------------------	--------------------------------	--------------	--------------

Laboratory Tests

Blows/6"

OVA Reading (ppm)

Depth (ft.)

Sample

Equipment CME 75

Elevation 14.62' MSL Date 6-20-91

>1000

6" ASPHALT
18" BASE ROCK

YELLOWISH BROWN SILTY SAND (SM) 10YR 6/8
medium dense, moist

31
31
46

>1000

BROWNISH GRAY SILTY SAND (SM) 10YR 4/1
very dense, moist, ~20% silt

increasing clay, moisture

8
23
28

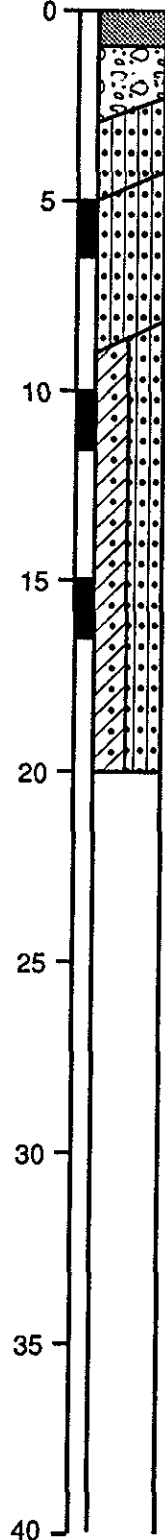
>1000

GRAYISH BROWN CLAYEY SILTY SAND (SC-SM)
10 YR 5/2 dense, saturated 5-10% clay,
~15-20% silt, fine sand

7
7
7

>1000

Bottom of boring at 20 ft



Harding Lawson Associates

Engineering and
Environmental Services

Log of Boring SB-11

Carnation Facility
Oakland, California

PLATE

B11

DRAWN
NJBC

JOB NUMBER
20294,006.02

APPROVED
[Signature]

DATE
7/91

REVISED DATE

Laboratory Tests

Blows/6"

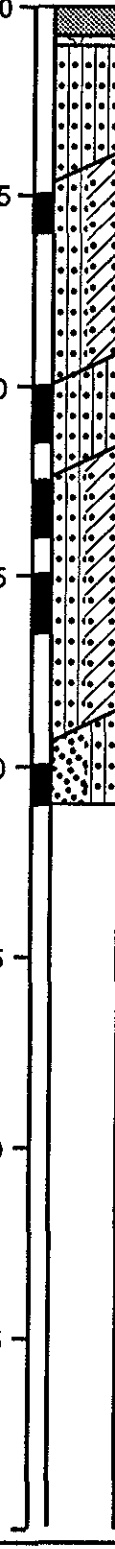
OVA Reading (ppm)

Depth (ft.)

Sample

Equipment CME 75
Elevation 14.89' MSL Date 6-18-91

0
5
10
15
20
25
30
35
40



8" ASPHALT
4" BASEROCK
YELLOW SILTY SAND (SM) 10YR 6/8
medium dense, moist, 20-30% silt, very fine-
to medium-grain sand
REDDISH YELLOW CLAYEY SILTY SAND (SM-SC)
7.5 YR 6/8 very dense, moist, ~10% clay, 10-20% silt
predominantly fine-grained sand
decreasing clay
REDDISH YELLOW SILTY SAND (SM) 7.5 YR 6/8
dense, wet, 20-30% silt, trace clay in gray pockets
BROWN SILTY CLAYEY SAND (SM-SC)
7.5 YR 5/8 ~30% silt-clay, fine- to medium-grained
sand
orange staining, pockets of gray clayey sand
BROWN SILTY SAND (SP-SM) 7.5 YR 4/6
very dense, wet, <10% silt, predominantly
fine- to medium-grained sand
Bottom of boring at 21 ft



Harding Lawson Associates
Engineering and
Environmental Services

Log of Boring SB-12
Carnation Facility
Oakland, California

PLATE

B12

DRAWN
NJBC

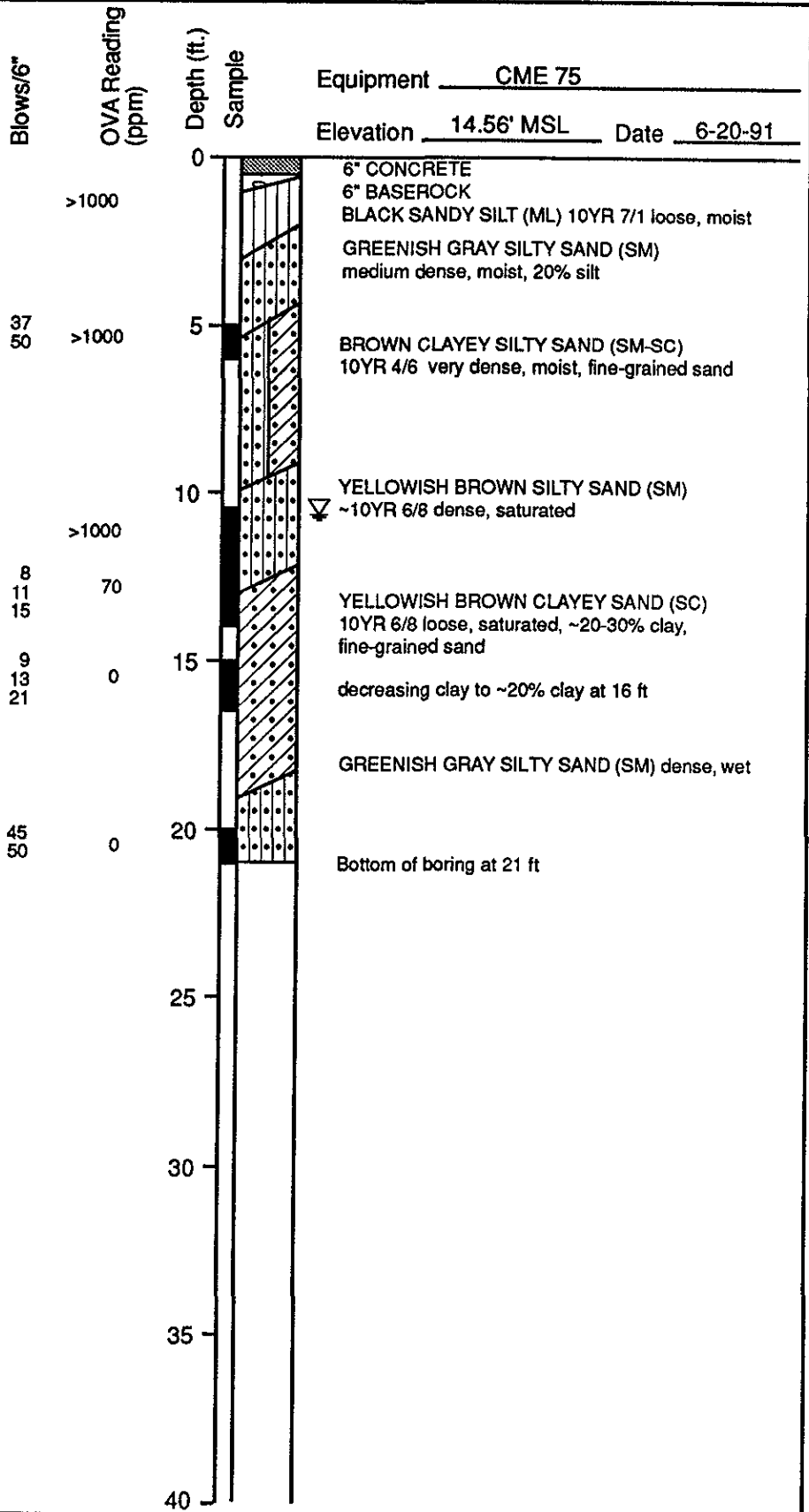
JOB NUMBER
20294.006.02

APPROVED
J.A. Crum

DATE
7/91

REVISED DATE

Laboratory Tests



Harding Lawson Associates
Engineering and
Environmental Services

Log of Boring SB-13
Carnation Facility
Oakland, California

PLATE

B13

DRAWN NJbc	JOB NUMBER 20294,006.02	APPROVED <i>D.A. [Signature]</i>	DATE 7/91	REVISED DATE
---------------	----------------------------	-------------------------------------	--------------	--------------

Laboratory Tests

Blows/6"

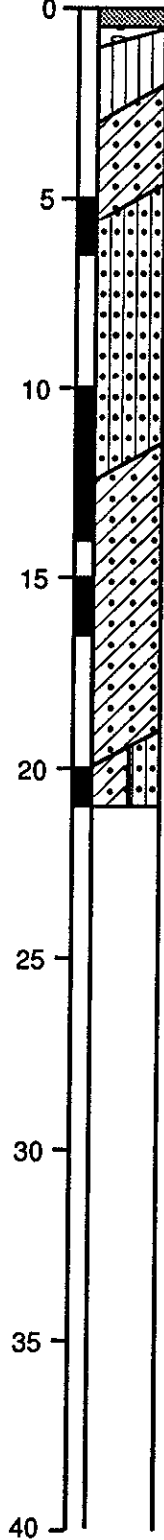
OVA Reading (ppm)

Depth (ft.)

Sample

Equipment CME 75

Elevation 14.55' MSL Date 6-20-91



6" CONCRETE
 6" BASEROCK
 DARK YELLOWISH BROWN SANDY SILT (ML)
 10YR 3/6 loose, moist, 30% fine-grained sand
 YELLOWISH BROWN CLAYEY SAND (SC)
 10YR 5/6 medium dense, moist, 25% clay, fine sand

YELLOWISH BROWN SILTY SAND (SM)
 10YR 5/8 very dense, moist, 10% clay in gray pockets,
 15-20% silt, predominantly fine- to medium-
 grained sand
 increasing clay content, becoming wet at ~ 9 ft

BROWN CLAYEY SAND (SC) 10YR 6/8
 medium dense, 25-30% clay, fine-grained sand

YELLOWISH BROWN CLAYEY SILTY SAND
 (SC-SM) 10YR 6/8 very dense
 Bottom of boring at 21 ft



Harding Lawson Associates
 Engineering and
 Environmental Services

Log of Boring SB-14
 Carnation Facility
 Oakland, California

PLATE

B14

DRAWN
NJBc

JOB NUMBER
20294,006.02

APPROVED
D. A. Crum

DATE
7/91

REVISED DATE

Laboratory Tests

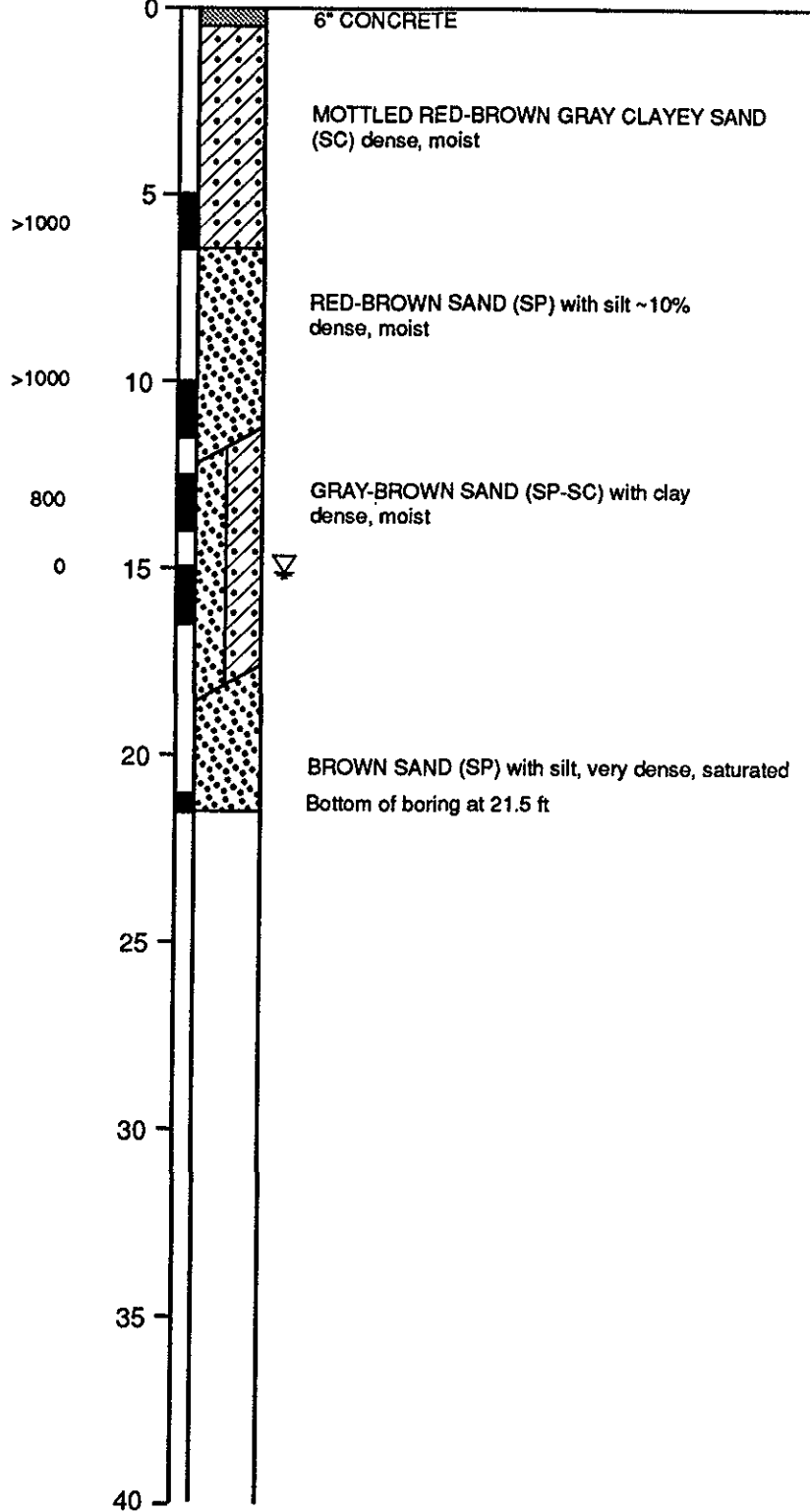
Blows/6"

OVA Reading (ppm)

Depth (ft.)
Sample

Equipment CME 75

Elevation 14.69' MSL Date 6-21-91



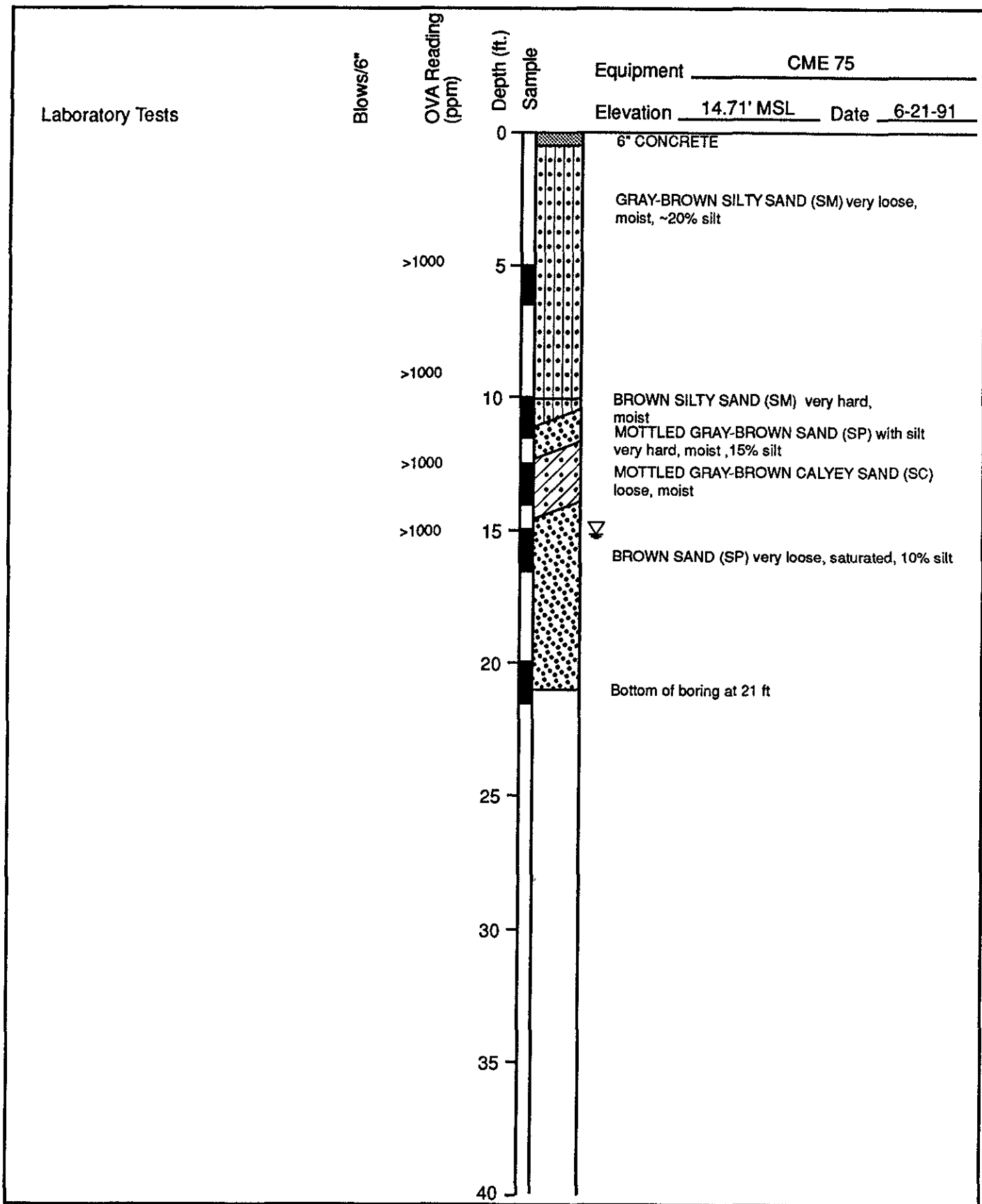
Harding Lawson Associates
Engineering and
Environmental Services

Log of Boring SB-15
Carnation Facility
Oakland, California

PLATE

B15

DRAWN NJBC	JOB NUMBER 20294,006.02	APPROVED <i>N. A. Croney</i>	DATE 7/91	REVISED DATE
---------------	----------------------------	---------------------------------	--------------	--------------



Harding Lawson Associates
Engineering and Environmental Services

Log of Boring SB-16
Carnation Facility
Oakland, California

PLATE

B16

DRAWN
NJBC

JOB NUMBER
20294,006.02

APPROVED
D. J. C. [Signature]

DATE
7/91

REVISED DATE

Laboratory Tests

Blows/6"

OVA Reading (ppm)

Depth (ft.)

Sample

Equipment

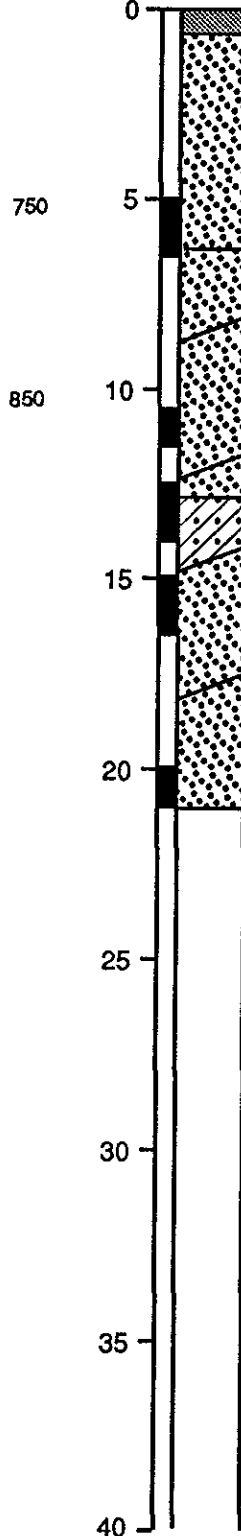
CME 75

Elevation

14.73' MSL

Date

6-21-91



~8" CONCRETE

BLACK SAND WITH SILT (SP)
very dense, moist

MOTTLED BROWN SAND (SP) with silt, very dense, moist

MOTTLED BROWN SAND (SP) with silt, very dense, moist

MOTTLED GRAY RED BROWN SAND (SP) with silt, dense, moist

MOTTLED GRAY RED BROWN CLAYEY SAND (SC) dense, moist

MOTTLED GRAY RED BROWN SAND (SP) with silt, medium dense, saturated

BROWN SAND WITH SILT (SP)
very dense, saturated

Bottom of boring at 21 ft



Harding Lawson Associates

Engineering and Environmental Services

Log of Boring SB-17

Carnation Facility
Oakland, California

PLATE

B17

DRAWN
NJBC

JOB NUMBER
20294,006.02

APPROVED
A. J. Conway

DATE
7/91

REVISED DATE

Laboratory Tests

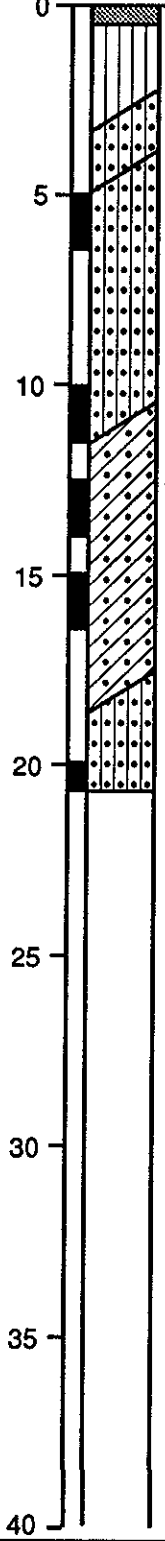
Blows/6"

OVA Reading (ppm)

Depth (ft.)

Sample

Equipment CME 75
 Elevation 14.71' MSL Date 6-18-91



5" CONCRETE
 DARK BROWN SANDY SILT (ML) 10YR 3/4
 loose, moist, ~40% fine-grained sand
 YELLOWISH BROWN SILTY SAND (SM)
 10YR 5/6 10-20% silt
 increasing clay
 REDDISH BROWN SILTY SAND (SM) 7.5YR 5/6
 dense, moist, 10-20% silt, trace clay
 YELLOWISH RED SILTY CLAYEY SAND (SC)
 5YR 5/8 dense, moist, 20% clay, predominantly
 fine- to medium-grained sand
 sample saturated at 13 ft
 decreasing clay content
 GRAYISH BROWN SILTY SAND (SM) 10YR 5/8
 medium dense, wet, decreasingly fines,
 increasing sand with depth
 Bottom of boring at 20.8 ft



Harding Lawson Associates
 Engineering and
 Environmental Services

Log of Boring SB-18
 Carnation Facility
 Oakland, California

PLATE

B18

DRAWN NJBC	JOB NUMBER 20294,006.02	APPROVED D. J. Cray	DATE 7/91	REVISED DATE
---------------	----------------------------	------------------------	--------------	--------------

Laboratory Tests

Blows/6"

OVA Reading (ppm)

Depth (ft.)
Sample

Equipment CME 75
Elevation 13.43' MSL Date 6-21-91

0
300
>1000
5
10
15
20
25
30
35
40

21
33
33

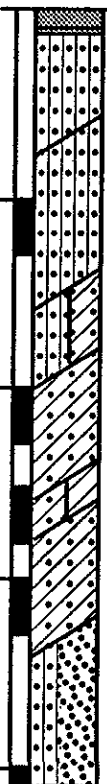
25
24
21

8
12
13

10
35
50

50

300
>1000
300
10
0
0



6" ASPHALT
3" CEMENT
GRAY SILTY SAND (SM) loose, moist, ~10-15% silt

~3.5 color changing to GREENISH GRAY SILTY SAND (SM) 5Y 4/4 dense, moist, ~15% silt

YELLOWISH BROWN CLAYEY SILTY SAND (SM-SC) 10YR 5/8 dense, moist, ~5-10% clay, 15% silt, fine- to medium-grained sand

YELLOWISH BROWN SILTY CLAYEY SAND (SC) 10YR 5/8 medium dense, saturated, trace silt, 20% clay, fine- to medium- sand

MOTTLED CLAYEY SAND (SC-CL) medium dense, moist, 50% clay

CLAYEY SAND (SC) loose, saturated

decreasing clay
YELLOWISH BROWN SILTY SAND (SM-SP) 10YR 5/8 very dense, 10% silt

Bottom of boring at 20.5 ft



Harding Lawson Associates
Engineering and Environmental Services

Log of Boring SB-19
Carnation Facility
Oakland, California

PLATE

B19

DRAWN
NJBC

JOB NUMBER
20294,006.02

APPROVED
D.A. Craig

DATE
7/91

REVISED DATE

Laboratory Tests

Blows/6"

OVA Reading (ppm)

Depth (ft.)

Sample

Equipment CME 75

Elevation 13.72' MSL Date 6-21-91

0
5
10
15
20
25
30
35
40

>1000
>1000
>1000
>1000
>1000
120
0
0

25
42
42
25
27
27
7
7
8
6
10
40
40
50

3" ASPHALT
6" CEMENT
DARK BROWN SILTY SAND (ML-SM) 10YR 2/1
loose, moist
GREENISH GRAY SILTY SAND (SM)
medium dense, moist to wet
GREEN GRAY SILTY SAND (SM) 5Y 4/2
dense, moist 15% silt trace clay, fine-
to medium-grained sand
YELLOWISH BROWN SILTY CLAYEY SAND (SC)
~10YR 5/8 loose, saturated ~25% silt to clay,
fine- to medium-grained sand
YELLOWISH BROWN SILTY SAND (SM) 10YR 6/8
very dense, wet, trace clay ~20-30% silt, fine sand
YELLOWISH BROWN SILTY SAND (SM-SP) dense
REDDISH BROWN SAND (SP) 5YR 5/8 ~10%
silty, very dense, wet
Bottom of boring at 21 ft



Harding Lawson Associates
Engineering and
Environmental Services

Log of Boring SB-20
Carnation Facility
Oakland, California

PLATE

B20

DRAWN
NJbc

JOB NUMBER
20294,006.02

APPROVED
J. Corning

DATE
7/91

REVISED DATE

MAJOR DIVISIONS					TYPICAL NAMES			
COARSE-GRAINED SOILS MORE THAN HALF IS COARSER THAN No. 200 SIEVE	GRAVELS	CLEAN GRAVELS WITH LITTLE OR NO FINES	GW		WELL GRADED GRAVELS WITH OR WITHOUT SAND, LITTLE OR NO FINES			
			GP		POORLY GRADED GRAVELS WITH OR WITHOUT SAND, LITTLE OR NO FINES			
		GRAVELS WITH OVER 12% FINES	GM		SILTY GRAVELS, SILTY GRAVELS WITH SAND			
			GC		CLAYEY GRAVELS, CLAYEY GRAVELS WITH SAND			
	SANDS	CLEAN SANDS WITH LITTLE OR NO FINES	SW		WELL GRADED SANDS WITH OR WITHOUT GRAVEL, LITTLE OR NO FINES			
			SP		POORLY GRADED SANDS WITH OR WITHOUT GRAVEL, LITTLE OR NO FINES			
		SANDS WITH OVER 12% FINES	SM		SILTY SANDS WITH OR WITHOUT GRAVEL			
			SC		CLAYEY SANDS WITH OR WITHOUT GRAVEL			
			FINE-GRAINED SOILS MORE THAN HALF IS FINER THAN No. 200 SIEVE	SILTS AND CLAYS		ML		INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTS WITH SANDS AND GRAVELS
				LIQUID LIMIT 50% OR LESS		CL		INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, CLAYS WITH SANDS AND GRAVELS, LEAN CLAYS
SILTS AND CLAYS		OL			ORGANIC SILTS OR CLAYS OF LOW PLASTICITY			
LIQUID LIMIT GREATER THAN 50%		MH		INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS, FINE SANDY OR SILTY SOILS, ELASTIC SILTS				
		CH		INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS				
		OH		ORGANIC SILTS OR CLAYS OF MEDIUM TO HIGH PLASTICITY				
HIGHLY ORGANIC SOILS			Pt		PEAT AND OTHER HIGHLY ORGANIC SOILS			

UNIFIED SOIL CLASSIFICATION - ASTM D2487-85

Perm	-	Permeability		
Consol	-	Consolidation		
LL	-	Liquid Limit (%)		
PI	-	Plasticity Index (%)		
G _s	-	Specific Gravity		
MA	-	Particle Size Analysis		
	-	"Undisturbed" Sample		
	-	Bulk or Classification Sample		
			TxUU 3200 (2600)	- Unconsolidated Undrained Triaxial Shear
			(FM) or (S)	- (field moisture or saturated)
			TxCU 3200 (2600)	- Consolidated Undrained Triaxial Shear
			(P)	- (with or without pore pressure measurement)
			TxCD 3200 (2600)	- Consolidated Drained Triaxial Shear
			SSCU 3200 (2600)	- Simple Shear Consolidated Undrained
			(P)	- (with or without pore pressure measurement)
			SSCD 3200 (2600)	- Simple Shear Consolidated Drained
			DSCD 2700 (2000)	- Consolidated Drained Direct Shear
			UC 470	- Unconfined Compression
			LVS 700	- Laboratory Vane Shear



Harding Lawson Associates
Engineering and
Environmental Services

Unified Soil Classification Chart
Carnation Facility
Oakland, California

PLATE

B21

DRAWN
LZc

JOB NUMBER
20294,011.02

APPROVED
D. J. Gray

DATE
9/91

REVISED DATE

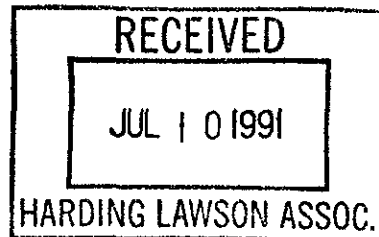
Appendix C

**SOIL CHEMISTRY LABORATORY RESULTS
AND CHAIN OF CUSTODY FORMS**



NATIONAL
ENVIRONMENTAL
TESTING, INC.

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



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

Date: 07-09-91
NET Client Acct No: 281
NET Pacific Log No: 8139
Received: 06-18-91 0800

Client Reference Information

Carnation, Oakland, 20294.006.02

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

JS:rcr
Enclosure(s)



NET Pacific, Inc.

Client No: 281
Client Name: Harding Lawson Associates
NET Log No: 8139

Date: 07-09-91

Page: 2

Ref: Carnation, Oakland, 20294.006.02

Descriptor, Lab No. and Results

Parameter	Method	Reporting Limit	Descriptor, Lab No. and Results		Units
			91061701 06-17-91 0932	91061702 06-17-91 0953	
			88667**	88668	
Oil & Grease(Total)	EPA9071	50	270	ND	mg/Kg
Oil & Grease(Non-Polar)	SM5520EF	50	230	ND	mg/Kg
PETROLEUM HYDROCARBONS VOLATILE (SOIL)			--	--	
DILUTION FACTOR *			1	1	
DATE ANALYZED			06-28-91	06-28-91	
METHOD GC FID/5030 as Gasoline			1	ND	mg/Kg
PETROLEUM HYDROCARBONS EXTRACTABLE (SOIL)			--	--	
DILUTION FACTOR *			10	1	
DATE EXTRACTED			06-19-91	06-19-91	
DATE ANALYZED			06-22-91	06-22-91	
METHOD GC FID/3550 as Diesel			1	ND	mg/Kg
as Motor Oil			10	ND	mg/Kg

** Note: The positive result for the PETROLEUM HYDROCARBONS as Diesel analysis on this sample appears to be a lighter hydrocarbon than Diesel.



NET Pacific, Inc.

Client No: 281
Client Name: Harding Lawson Associates
NET Log No: 8139

Date: 07-09-91

Page: 3

Ref: Carnation, Oakland, 20294.006.02

Descriptor, Lab No. and Results

Parameter	Method	Reporting Limit	91061711	91061712	Units
			06-17-91 1356	06-17-91 1413	
			88669**	88670**	
Oil & Grease(Total)	EPA9071	50	ND	ND	mg/Kg
Oil & Grease(Non-Polar)	SM5520EF	50	ND	ND	mg/Kg
PETROLEUM HYDROCARBONS			--	--	
VOLATILE (SOIL)			--	--	
DILUTION FACTOR *			5	200	
DATE ANALYZED			06-28-91	06-29-91	
METHOD GC FID/5030			--	--	
as Gasoline		1	26	1,200	mg/Kg
PETROLEUM HYDROCARBONS			--	--	
EXTRACTABLE (SOIL)			--	--	
DILUTION FACTOR *			1	10	
DATE EXTRACTED			06-19-91	06-19-91	
DATE ANALYZED			06-22-91	06-22-91	
METHOD GC FID/3550			--	--	
as Diesel		1	17	260	mg/Kg
as Motor Oil		10	ND	ND	mg/Kg

** Note: The positive result for the PETROLEUM HYDROCARBONS as Diesel analysis on this sample appears to be a lighter hydrocarbon than Diesel.



NET Pacific, Inc.

Client No: 281
Client Name: Harding Lawson Associates
NET Log No: 8139

Date: 07-09-91

Page: 4

Ref: Carnation, Oakland, 20294.006.02

Descriptor, Lab No. and Results

Parameter	Method	Reporting Limit	91061703	91061704	Units
			06-17-91 1006	06-17-91 1015	
			88671	88672	
PETROLEUM HYDROCARBONS			--	--	
VOLATILE (SOIL)			--	--	
DILUTION FACTOR *			1	1	
DATE ANALYZED			06-28-91	06-28-91	
METHOD GC FID/5030			--	--	
as Gasoline		1	ND	ND	mg/Kg
PETROLEUM HYDROCARBONS			--	--	
EXTRACTABLE (SOIL)			--	--	
DILUTION FACTOR *			1	1	
DATE EXTRACTED			06-19-91	06-19-91	
DATE ANALYZED			06-22-91	06-22-91	
METHOD GC FID/3550			--	--	
as Diesel		1	ND	ND	mg/Kg
as Motor Oil		10	ND	ND	mg/Kg



NET Pacific, Inc.

Client No: 281
Client Name: Harding Lawson Associates
NET Log No: 8139

Date: 07-09-91

Page: 5

Ref: Carnation, Oakland, 20294.006.02

Descriptor, Lab No. and Results

Parameter	Method	Reporting Limit	91061705	91061706	Units
			06-17-91 1033	06-17-91 1128	
			88673	88674	
PETROLEUM HYDROCARBONS			--	--	
VOLATILE (SOIL)			--	--	
DILUTION FACTOR *			1	1	
DATE ANALYZED			06-28-91	06-28-91	
METHOD GC FID/5030			--	--	
as Gasoline		1	ND	ND	mg/Kg
PETROLEUM HYDROCARBONS			--	--	
EXTRACTABLE (SOIL)			--	--	
DILUTION FACTOR *			1	1	
DATE EXTRACTED			06-19-91	06-19-91	
DATE ANALYZED			06-22-91	06-22-91	
METHOD GC FID/3550			--	--	
as Diesel		1	ND	ND	mg/Kg
as Motor Oil		10	ND	ND	mg/Kg



NET Pacific, Inc.

Client No: 281
Client Name: Harding Lawson Associates
NET Log No: 8139

Date: 07-09-91

Page: 6

Ref: Carnation, Oakland, 20294.006.02

Descriptor, Lab No. and Results

Parameter	Method	Reporting Limit	91061707	91061708	Units
			06-17-91 1220	06-17-91 1239	
			88675	88676	
PETROLEUM HYDROCARBONS			--	--	
VOLATILE (SOIL)			--	--	
DILUTION FACTOR *			1	1	
DATE ANALYZED			06-28-91	06-28-91	
METHOD GC FID/5030			--	--	
as Gasoline		1	ND	ND	mg/Kg
PETROLEUM HYDROCARBONS			--	--	
EXTRACTABLE (SOIL)			--	--	
DILUTION FACTOR *			1	1	
DATE EXTRACTED			06-19-91	06-19-91	
DATE ANALYZED			06-22-91	06-22-91	
METHOD GC FID/3550			--	--	
as Diesel		1	ND	ND	mg/Kg
as Motor Oil		10	ND	ND	mg/Kg



NET Pacific, Inc.

Client No: 281
Client Name: Harding Lawson Associates
NET Log No: 8139

Date: 07-09-91

Page: 7

Ref: Carnation, Oakland, 20294.006.02

Descriptor, Lab No. and Results

Parameter	Method	Reporting Limit	91061709	91061710	Units
			06-17-91 1254	06-17-91 1316	
			88677	88678	
PETROLEUM HYDROCARBONS			--	--	
VOLATILE (SOIL)			--	--	
DILUTION FACTOR *			1	1	
DATE ANALYZED			06-28-91	06-28-91	
METHOD GC FID/5030			--	--	
as Gasoline		1	ND	ND	mg/Kg
PETROLEUM HYDROCARBONS			--	--	
EXTRACTABLE (SOIL)			--	--	
DILUTION FACTOR *			1	1	
DATE EXTRACTED			06-19-91	06-19-91	
DATE ANALYZED			06-22-91	06-22-91	
METHOD GC FID/3550			--	--	
as Diesel		1	ND	ND	mg/Kg
as Motor Oil		10	ND	ND	mg/Kg



NET Pacific, Inc.

Client No: 281
Client Name: Harding Lawson Associates
NET Log No: 8139

Date: 07-09-91
Page: 8

Ref: Carnation, Oakland, 20294.006.02

Descriptor, Lab No. and Results

Parameter	Method	Reporting Limit	91061713 06-17-91 1422	91061714 06-17-91 1430	Units
		88679	88679	88680	
PETROLEUM HYDROCARBONS VOLATILE (SOIL)			--	--	
DILUTION FACTOR *			1	1	
DATE ANALYZED			06-28-91	06-28-91	
METHOD GC FID/5030 as Gasoline		1	ND	ND	mg/Kg
PETROLEUM HYDROCARBONS EXTRACTABLE (SOIL)			--	--	
DILUTION FACTOR *			1	1	
DATE EXTRACTED			06-19-91	06-19-91	
DATE ANALYZED			06-22-91	06-22-91	
METHOD GC FID/3550 as Diesel		1	ND	ND	mg/Kg
as Motor Oil		10	ND	ND	mg/Kg



NET Pacific, Inc.

Client No: 281
Client Name: Harding Lawson Associates
NET Log No: 8139

Date: 07-09-91

Page: 9

Ref: Carnation, Oakland, 20294.006.02

Descriptor, Lab No. and Results

Parameter	Method	Reporting Limit	91061715 06-17-91 1445 88681	Units
PETROLEUM HYDROCARBONS			--	
VOLATILE (SOIL)			--	
DILUTION FACTOR *			1	
DATE ANALYZED			06-28-91	
METHOD GC FID/5030			--	
as Gasoline		1	ND	mg/Kg
PETROLEUM HYDROCARBONS			--	
EXTRACTABLE (SOIL)			--	
DILUTION FACTOR *			1	
DATE EXTRACTED			06-19-91	
DATE ANALYZED			06-22-91	
METHOD GC FID/3550			--	
as Diesel		1	ND	mg/Kg
as Motor Oil		10	ND	mg/Kg



NET Pacific, Inc.

Client Acct: 281
Client Name: Harding Lawson Associates
NET Log No: 8139

Date: 07-02-91
Page: 10

Ref: Carnation, Oakland, 20294.006.02

QUALITY CONTROL DATA

Parameter	Reporting Limits	Units	Cal Verf Stand % Recovery	Blank Data	Spike % Recovery	Duplicate Spike % Recovery	RPD
O&G (Total)	50	mg/Kg	103	ND	105	106	< 1
O&G (Non-Polar)	50	mg/Kg	97	ND	N/A	N/A	N/A
Diesel	1	mg/Kg	104	ND	97	84	14
Motor Oil	10	mg/Kg	92	ND	N/A	N/A	N/A
Gasoline	1	mg/Kg	106	ND	91	90	1.3
Gasoline	1	mg/Kg	95	ND	84	97	14

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, $100 \frac{|\text{Value 1} - \text{Value 2}|}{\text{mean value}}$.
- 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.

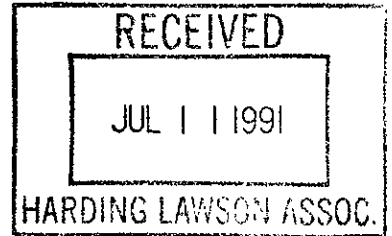
Methods 1000 through 9999: see "Test Methods for Evaluating Solid Waste", U.S. EPA SW-846, 3rd edition, 1986.

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



**NATIONAL
ENVIRONMENTAL
TESTING, INC.**

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



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


Date: 07-09-91
NET Client Acct No: 281
NET Pacific Log No: 8170
Received: 06-19-91 0800

Client Reference Information

Carnation, Oakland, 20294.006.02

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

JS:rct
Enclosure(s)



NET Pacific, Inc.

Client No: 281
Client Name: Harding Lawson Associates
NET Log No: 8170

Date: 07-09-91

Page: 2

Ref: Carnation, Oakland, 20294.006.02

Descriptor, Lab No. and Results

Parameter	Method	Reporting Limit	91061801	91061802	Units
			06-18-91 0831	06-18-91 0845	
			88968	88969	
Oil & Grease(Total)	EPA9071	50	ND	ND	mg/Kg
Oil & Grease(Non-Polar)	SM5520EF	50	ND	ND	mg/Kg
PETROLEUM HYDROCARBONS			--	--	
VOLATILE (SOIL)			--	--	
DILUTION FACTOR *			1	1	
DATE ANALYZED			06-29-91	06-29-91	
METHOD GC FID/5030			--	--	
as Gasoline		1	ND	ND	mg/Kg
PETROLEUM HYDROCARBONS			--	--	
EXTRACTABLE (SOIL)			--	--	
DILUTION FACTOR *			1	1	
DATE EXTRACTED			06-20-91	06-20-91	
DATE ANALYZED			06-25-91	06-25-91	
METHOD GC FID/3550			--	--	
as Diesel		1	ND	ND	mg/Kg
as Motor Oil		10	ND	ND	mg/Kg



NET Pacific, Inc.

Client No: 281
Client Name: Harding Lawson Associates
NET Log No: 8170

Date: 07-09-91

Page: 3

Ref: Carnation, Oakland, 20294.006.02

Descriptor, Lab No. and Results

Parameter	Method	Reporting Limit	91061807	91061808	Units
			06-18-91 0959	06-18-91 1010	
			88970	88971	
Oil & Grease(Total)	EPA9071	50	ND	ND	mg/Kg
Oil & Grease(Non-Polar)	SM5520EF	50	ND	ND	mg/Kg
PETROLEUM HYDROCARBONS			--	--	
VOLATILE (SOIL)			--	--	
DILUTION FACTOR *			1	1	
DATE ANALYZED			06-29-91	06-29-91	
METHOD GC FID/5030			--	--	
as Gasoline		1	ND	ND	mg/Kg
PETROLEUM HYDROCARBONS			--	--	
EXTRACTABLE (SOIL)			--	--	
DILUTION FACTOR *			1	1	
DATE EXTRACTED			06-20-91	06-20-91	
DATE ANALYZED			06-25-91	06-25-91	
METHOD GC FID/3550			--	--	
as Diesel		1	ND	ND	mg/Kg
as Motor Oil		10	ND	ND	mg/Kg



NET Pacific, Inc.

Client No: 281
Client Name: Harding Lawson Associates
NET Log No: 8170

Date: 07-09-91

Page: 4

Ref: Carnation, Oakland, 20294.006.02

Descriptor, Lab No. and Results

Parameter	Method	Reporting Limit	91061813	91061815	Units
			06-18-91	06-18-91	
			1123	1148	
			88972	88973	
Oil & Grease(Total)	EPA9071	50	ND	ND	mg/Kg
Oil & Grease(Non-Polar)	SM5520EF	50	ND	ND	mg/Kg
PETROLEUM HYDROCARBONS			--	--	
VOLATILE (SOIL)			--	--	
DILUTION FACTOR *			1	1	
DATE ANALYZED			06-29-91	06-29-91	
METHOD GC FID/5030			--	--	
as Gasoline			1	ND	mg/Kg
PETROLEUM HYDROCARBONS			--	--	
EXTRACTABLE (SOIL)			--	--	
DILUTION FACTOR *			1	1	
DATE EXTRACTED			06-20-91	06-20-91	
DATE ANALYZED			06-25-91	06-25-91	
METHOD GC FID/3550			--	--	
as Diesel			1	ND	mg/Kg
as Motor Oil			10	ND	mg/Kg



NET Pacific, Inc.

Client No: 281
Client Name: Harding Lawson Associates
NET Log No: 8170

Date: 07-09-91

Page: 5

Ref: Carnation, Oakland, 20294.006.02

Descriptor, Lab No. and Results

Parameter	Method	Reporting Limit	91061804	91061805	Units
			06-18-91 0905	06-18-91 0914	
			88978	88979	
PETROLEUM HYDROCARBONS			--	--	
VOLATILE (SOIL)			--	--	
DILUTION FACTOR *			1	1	
DATE ANALYZED			06-29-91	06-29-91	
METHOD GC FID/5030			--	--	
as Gasoline		1	ND	ND	mg/Kg
PETROLEUM HYDROCARBONS			--	--	
EXTRACTABLE (SOIL)			--	--	
DILUTION FACTOR *			1	1	
DATE EXTRACTED			06-20-91	06-20-91	
DATE ANALYZED			06-25-91	06-25-91	
METHOD GC FID/3550			--	--	
as Diesel		1	ND	ND	mg/Kg
as Motor Oil		10	ND	ND	mg/Kg



NET Pacific, Inc.

Client No: 281
Client Name: Harding Lawson Associates
NET Log No: 8170

Date: 07-09-91

Page: 6

Ref: Carnation, Oakland, 20294.006.02

Descriptor, Lab No. and Results

Parameter	Method	Reporting Limit	91061806	91061810	Units
			06-18-91 0927	06-18-91 1019	
			88980	88981	
PETROLEUM HYDROCARBONS VOLATILE (SOIL)			--	--	
DILUTION FACTOR *			1	1	
DATE ANALYZED			06-29-91	06-29-91	
METHOD GC FID/5030			--	--	
as Gasoline		1	ND	ND	mg/Kg
PETROLEUM HYDROCARBONS EXTRACTABLE (SOIL)			--	--	
DILUTION FACTOR *			1	1	
DATE EXTRACTED			06-20-91	06-20-91	
DATE ANALYZED			06-25-91	06-25-91	
METHOD GC FID/3550			--	--	
as Diesel		1	ND	ND	mg/Kg
as Motor Oil		10	ND	ND	mg/Kg



NET Pacific, Inc.

Client No: 281
Client Name: Harding Lawson Associates
NET Log No: 8170

Date: 07-09-91

Page: 7

Ref: Carnation, Oakland, 20294.006.02

Descriptor, Lab No. and Results

Parameter	Method	Reporting Limit	91061811	91061812	Units
			06-18-91 1026	06-18-91 1038	
			88982	88983	
PETROLEUM HYDROCARBONS			--	--	
VOLATILE (SOIL)			--	--	
DILUTION FACTOR *			1	1	
DATE ANALYZED			06-29-91	06-29-91	
METHOD GC FID/5030			--	--	
as Gasoline		1	ND	ND	mg/Kg
PETROLEUM HYDROCARBONS			--	--	
EXTRACTABLE (SOIL)			--	--	
DILUTION FACTOR *			1	1	
DATE EXTRACTED			06-20-91	06-20-91	
DATE ANALYZED			06-25-91	06-25-91	
METHOD GC FID/3550			--	--	
as Diesel		1	ND	ND	mg/Kg
as Motor Oil		10	ND	ND	mg/Kg



NET Pacific, Inc.

Client No: 281
Client Name: Harding Lawson Associates
NET Log No: 8170

Date: 07-09-91

Page: 8

Ref: Carnation, Oakland, 20294.006.02

Descriptor, Lab No. and Results

Parameter	Method	Reporting Limit	91061816	91061817	Units
			06-18-91 1157	06-18-91 1207	
			88984	88985	
PETROLEUM HYDROCARBONS			--	--	
VOLATILE (SOIL)			--	--	
DILUTION FACTOR *			1	1	
DATE ANALYZED			06-29-91	06-29-91	
METHOD GC FID/5030			--	--	
as Gasoline	1		ND	ND	mg/Kg
PETROLEUM HYDROCARBONS			--	--	
EXTRACTABLE (SOIL)			--	--	
DILUTION FACTOR *			1	1	
DATE EXTRACTED			06-20-91	06-20-91	
DATE ANALYZED			06-25-91	06-25-91	
METHOD GC FID/3550			--	--	
as Diesel	1		ND	ND	mg/Kg
as Motor Oil	10		ND	ND	mg/Kg



NET Pacific, Inc.

Client No: 281

Client Name: Harding Lawson Associates

NET Log No: 8170

Date: 07-09-91

Page: 9

Ref: Carnation, Oakland, 20294.006.02

Descriptor, Lab No. and Results

Parameter	Method	Reporting Limit	91061818	91061819	Units
			06-18-91	06-18-91	
			1227	1347	
			88986	88987	
PETROLEUM HYDROCARBONS			--	--	
VOLATILE (SOIL)			--	--	
DILUTION FACTOR *			1	1	
DATE ANALYZED			06-29-91	06-29-91	
METHOD GC FID/5030			--	--	
as Gasoline		1	ND	ND	mg/Kg
PETROLEUM HYDROCARBONS			--	--	
EXTRACTABLE (SOIL)			--	--	
DILUTION FACTOR *			1	1	
DATE EXTRACTED			06-20-91	06-20-91	
DATE ANALYZED			06-25-91	06-25-91	
METHOD GC FID/3550			--	--	
as Diesel		1	ND	ND	mg/Kg
as Motor Oil		10	ND	ND	mg/Kg



NET Pacific, Inc.

Client No: 281
Client Name: Harding Lawson Associates
NET Log No: 8170

Date: 07-09-91
Page: 10

Ref: Carnation, Oakland, 20294.006.02

Descriptor, Lab No. and Results

Parameter	Method	Reporting Limit	91061820	91061821	Units
			06-18-91	06-18-91	
			1359	1407	
			88988	88989	
PETROLEUM HYDROCARBONS			--	--	
VOLATILE (SOIL)			--	--	
DILUTION FACTOR *			1	1	
DATE ANALYZED			06-30-91	06-29-91	
METHOD GC FID/5030			--	--	
as Gasoline		1	ND	ND	mg/Kg
PETROLEUM HYDROCARBONS			--	--	
EXTRACTABLE (SOIL)			--	--	
DILUTION FACTOR *			1	1	
DATE EXTRACTED			06-20-91	06-20-91	
DATE ANALYZED			06-25-91	06-25-91	
METHOD GC FID/3550			--	--	
as Diesel		1	ND	ND	mg/Kg
as Motor Oil		10	ND	ND	mg/Kg



NET Pacific, Inc.

Client No: 281
Client Name: Harding Lawson Associates
NET Log No: 8170

Date: 07-09-91

Page: 11

Ref: Carnation, Oakland, 20294.006.02

Descriptor, Lab No. and Results

Parameter	Method	Reporting Limit	91061822	91061823	Units
			06-18-91 1416	06-18-91 1428	
			88990	88991	
PETROLEUM HYDROCARBONS			--	--	
VOLATILE (SOIL)			--	--	
DILUTION FACTOR *			1	1	
DATE ANALYZED			06-30-91	06-29-91	
METHOD GC FID/5030			--	--	
as Gasoline	1		ND	ND	mg/Kg
PETROLEUM HYDROCARBONS			--	--	
EXTRACTABLE (SOIL)			--	--	
DILUTION FACTOR *			1	1	
DATE EXTRACTED			06-20-91	06-20-91	
DATE ANALYZED			06-26-91	06-25-91	
METHOD GC FID/3550			--	--	
as Diesel	1		ND	ND	mg/Kg
as Motor Oil	10		ND	ND	mg/Kg



NET Pacific, Inc.

Client Acct: 281
Client Name: Harding Lawson Associates
NET Log No: 8170

Date: 07-02-91
Page: 12

Ref: Carnation, Oakland, 20294.006.02

QUALITY CONTROL DATA

Parameter	Reporting Limits	Units	Cal Verf Stand % Recovery	Blank Data	Spike % Recovery	Duplicate Spike % Recovery	RPD
O&G(Total)	50	mg/Kg	103	ND	105	106	< 1
O&G(Non-Polar)	50	mg/Kg	97	ND	N/A	N/A	N/A
Diesel	1	mg/Kg	104	ND	76	79	3.9
Motor Oil	10	mg/Kg	105	ND	N/A	N/A	N/A
Gasoline	1	mg/Kg	101	ND	86	91	5.6

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, $100 \text{ [Value 1 - Value 2]}/\text{mean value}$.
- 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.

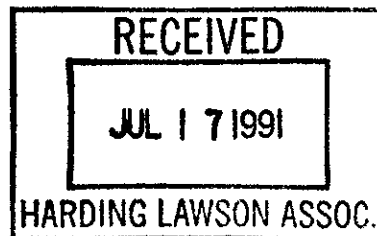
Methods 1000 through 9999: see "Test Methods for Evaluating Solid Waste", U.S. EPA SW-846, 3rd edition, 1986.

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



NATIONAL
ENVIRONMENTAL
TESTING, INC.

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



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

Date: 07-12-91
NET Client Acct No: 281
NET Pacific Log No: 8195
Received: 06-20-91 0800

Client Reference Information

Carnation Oakland, Job: 20294,006.02

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

JS:rct
Enclosure(s)



NET Pacific, Inc.

Client No: 281
Client Name: Harding Lawson Associates
NET Log No: 8195

Date: 07-12-91

Page: 2

Ref: Carnation Oakland, Job: 20294,006.02

Descriptor, Lab No. and Results

Parameter	Method	Reporting Limit	91061901	91061902	Units
			06-19-91 0843	06-19-91 0903	
			89129	89130	

METHOD 8080

DATE EXTRACTED			06-24-91	06-24-91	
DATE ANALYZED			06-25-91	06-25-91	
DILUTION FACTOR *			1	1	
POLYCHLORINATED BIPHENYLS			--	--	
Aroclor 1016		100	ND	ND	ug/Kg
Aroclor 1221		500	ND	ND	ug/Kg
Aroclor 1232		200	ND	ND	ug/Kg
Aroclor 1242		100	ND	ND	ug/Kg
Aroclor 1248		100	ND	ND	ug/Kg
Aroclor 1254		50	ND	ND	ug/Kg
Aroclor 1260		50	ND	ND	ug/Kg



NET Pacific, Inc.

Client No: 281
Client Name: Harding Lawson Associates
NET Log No: 8195

Date: 07-12-91

Page: 3

Ref: Carnation Oakland, Job: 20294,006.02

Descriptor, Lab No. and Results

Parameter	Method	Reporting Limit	91061903	91061904	Units
			06-19-91 0928	06-19-91 1017	
			89131	89132	

METHOD 8080

DATE EXTRACTED			06-24-91	06-24-91	
DATE ANALYZED			06-25-91	06-25-91	
DILUTION FACTOR *			1	1	
POLYCHLORINATED BIPHENYLS			--	--	
Aroclor 1016		100	ND	ND	ug/Kg
Aroclor 1221		500	ND	ND	ug/Kg
Aroclor 1232		200	ND	ND	ug/Kg
Aroclor 1242		100	ND	ND	ug/Kg
Aroclor 1248		100	ND	ND	ug/Kg
Aroclor 1254		50	ND	ND	ug/Kg
Aroclor 1260		50	ND	ND	ug/Kg



NET Pacific, Inc.

Client No: 281
Client Name: Harding Lawson Associates
NET Log No: 8195

Date: 07-12-91

Page: 4

Ref: Carnation Oakland, Job: 20294,006.02

Descriptor, Lab No. and Results

Parameter	Method	Reporting Limit	91061905	91061906	Units
			06-19-91 1028	06-19-91 1040	
			89133	89134	

METHOD 8080

DATE EXTRACTED			06-24-91	06-24-91	
DATE ANALYZED			06-25-91	06-25-91	
DILUTION FACTOR *			1	1	
POLYCHLORINATED BIPHENYLS			--	--	
Aroclor 1016		100	ND	ND	ug/Kg
Aroclor 1221		500	ND	ND	ug/Kg
Aroclor 1232		200	ND	ND	ug/Kg
Aroclor 1242		100	ND	ND	ug/Kg
Aroclor 1248		100	ND	ND	ug/Kg
Aroclor 1254		50	ND	ND	ug/Kg
Aroclor 1260		50	ND	ND	ug/Kg



NET Pacific, Inc.

Client No: 281
Client Name: Harding Lawson Associates
NET Log No: 8195

Date: 07-12-91

Page: 5

Ref: Carnation Oakland, Job: 20294,006.02

Descriptor, Lab No. and Results

Parameter	Method	Reporting Limit	91061907	91061908	Units
			06-19-91 1300	06-19-91 1317	
			89135	89136	

METHOD 8080

DATE EXTRACTED			06-24-91	06-24-91	
DATE ANALYZED			06-25-91	06-25-91	
DILUTION FACTOR *			1	1	
POLYCHLORINATED BIPHENYLS			--	--	
Aroclor 1016	100	ND	ND	ND	ug/Kg
Aroclor 1221	500	ND	ND	ND	ug/Kg
Aroclor 1232	200	ND	ND	ND	ug/Kg
Aroclor 1242	100	ND	ND	ND	ug/Kg
Aroclor 1248	100	ND	ND	ND	ug/Kg
Aroclor 1254	50	55	130	130	ug/Kg
Aroclor 1260	50	ND	ND	ND	ug/Kg



NET Pacific, Inc.

Client No: 281
Client Name: Harding Lawson Associates
NET Log No: 8195

Date: 07-12-91

Page: 6

Ref: Carnation Oakland, Job: 20294,006.02

Descriptor, Lab No. and Results

Parameter	Method	Reporting Limit	91061909	91061911	Units
			06-19-91 1337	06-19-91 1427	
			89137	89138	

METHOD 8080

DATE EXTRACTED			06-24-91	06-24-91	
DATE ANALYZED			06-25-91	06-25-91	
DILUTION FACTOR *			1	1	
POLYCHLORINATED BIPHENYLS			--	--	
Aroclor 1016	100	ND	ND	ND	ug/Kg
Aroclor 1221	500	ND	ND	ND	ug/Kg
Aroclor 1232	200	ND	ND	ND	ug/Kg
Aroclor 1242	100	ND	ND	ND	ug/Kg
Aroclor 1248	100	ND	ND	ND	ug/Kg
Aroclor 1254	50	260	ND	ND	ug/Kg
Aroclor 1260	50	ND	ND	ND	ug/Kg



NET Pacific, Inc.

Client No: 281

Client Name: Harding Lawson Associates

NET Log No: 8195

Date: 07-12-91

Page: 7

Ref: Carnation Oakland, Job: 20294,006.02

Descriptor, Lab No. and Results

Parameter	Method	Reporting Limit	91061912 06-19-91 1438	91061913 06-19-91 1450	Units
		89139	89139	89140	

METHOD 8080

DATE EXTRACTED			06-24-91	06-24-91	
DATE ANALYZED			06-25-91	06-25-91	
DILUTION FACTOR *			1	1	
POLYCHLORINATED BIPHENYLS			--	--	
Aroclor 1016		100	ND	ND	ug/Kg
Aroclor 1221		500	ND	ND	ug/Kg
Aroclor 1232		200	ND	ND	ug/Kg
Aroclor 1242		100	ND	ND	ug/Kg
Aroclor 1248		100	ND	ND	ug/Kg
Aroclor 1254		50	ND	ND	ug/Kg
Aroclor 1260		50	ND	ND	ug/Kg



NET Pacific, Inc.

Client No: 281
Client Name: Harding Lawson Associates
NET Log No: 8195

Date: 07-12-91

Page: 8

Ref: Carnation Oakland, Job: 20294,006.02

Descriptor, Lab No. and Results

Parameter	Method	Reporting Limit	91061910 06-19-91 1400 89141	Units
DATE EXTRACTED			06-24-91	
DATE ANALYZED			06-25-91	
POLYCHLORINATED BIPHENYLS			--	
Aroclor 1016		1.0	ND	mg/Kg
Aroclor 1221		1.0	ND	mg/Kg
Aroclor 1232		1.0	ND	mg/Kg
Aroclor 1242		1.0	ND	mg/Kg
Aroclor 1248		1.0	ND	mg/Kg
Aroclor 1254		1.0	49	mg/Kg
Aroclor 1260		1.0	ND	mg/Kg



NET Pacific, Inc.

Client Acct: 281

Client Name: Harding Lawson Associates

NET Log No: 8195

Date: 07-02-91

Page: 9

Ref: Carnation Oakland, Job: 20294,006.02

QUALITY CONTROL DATA

Parameter	Reporting Limits	Units	Cal Verif Stand % Recovery	Blank Data	Spike % Recovery	Duplicate Spike % Recovery	RPD
Aroclor 1254	50	ug/Kg	89	ND	88	91	3.4



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, $100 \text{ [Value 1 - Value 2] / mean value}$.
- 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.



NATIONAL
ENVIRONMENTAL
TESTING, INC.

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

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

Date: 07-12-91
NET Client Acct No: 281
NET Pacific Log No: 8221
Received: 06-21-91 0800

Client Reference Information

Carnation-Oakland, Job: 20294.006.02

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

JS:rct
Enclosure(s)



NET Pacific, Inc.

Client No: 281
Client Name: Harding Lawson Associates
NET Log No: 8221

Date: 07-12-91

Page: 2

Ref: Carnation-Oakland, Job: 20294.006.02

Descriptor, Lab No. and Results

Parameter	Method	Reporting Limit	91062001	91062002	Units
			06-20-91 0921	06-20-91 0940	
			89258**	89259**	
PETROLEUM HYDROCARBONS			--	--	
VOLATILE (SOIL)			--	--	
DILUTION FACTOR *			250	100	
DATE ANALYZED			07-02-91	07-02-91	
METHOD GC FID/5030			--	--	
as Gasoline		1	2,500	1,400	mg/Kg
PETROLEUM HYDROCARBONS			--	--	
EXTRACTABLE (SOIL)			--	--	
DILUTION FACTOR *			10	20	
DATE EXTRACTED			06-25-91	06-25-91	
DATE ANALYZED			06-26-91	06-26-91	
METHOD GC FID/3550			--	--	
as Diesel		1	470	670	mg/Kg
as Motor Oil		10	ND	ND	mg/Kg

** Note: The positive result for the PETROLEUM HYDROCARBONS as Diesel analysis on this sample appears to be a mixture of lighter hydrocarbon and diesel.



NET Pacific, Inc.

Client No: 281
Client Name: Harding Lawson Associates
NET Log No: 8221

Date: 07-12-91

Page: 3

Ref: Carnation-Oakland, Job: 20294.006.02

Descriptor, Lab No. and Results

Parameter	Method	Reporting Limit	91062004	91062005	Units
			06-20-91 0952	06-20-91 1000	
			89260	89261	
PETROLEUM HYDROCARBONS			--	--	
VOLATILE (SOIL)			--	--	
DILUTION FACTOR *			1	1	
DATE ANALYZED			07-02-91	07-02-91	
METHOD GC FID/5030			--	--	
as Gasoline		1	6.9	1.1	mg/Kg
PETROLEUM HYDROCARBONS			--	--	
EXTRACTABLE (SOIL)			--	--	
DILUTION FACTOR *			1	1	
DATE EXTRACTED			06-25-91	06-25-91	
DATE ANALYZED			06-26-91	06-26-91	
METHOD GC FID/3550			--	--	
as Diesel		1	6.6	ND	mg/Kg
as Motor Oil		10	ND	ND	mg/Kg



NET Pacific, Inc.

Client No: 281
Client Name: Harding Lawson Associates
NET Log No: 8221

Date: 07-12-91

Page: 4

Ref: Carnation-Oakland, Job: 20294.006.02

Descriptor, Lab No. and Results

Parameter	Method	Reporting Limit	91062006	91062007	Units
			06-20-91 1012	06-20-91 1053	
			89262	89263**	
PETROLEUM HYDROCARBONS VOLATILE (SOIL) DILUTION FACTOR *			--	--	
DATE ANALYZED			1	20	
METHOD GC FID/5030 as Gasoline			07-02-91	07-03-91	
	1	ND	--	--	
			ND	320	mg/Kg
PETROLEUM HYDROCARBONS EXTRACTABLE (SOIL) DILUTION FACTOR *			--	--	
DATE EXTRACTED			1	1	
DATE ANALYZED			06-25-91	06-25-91	
METHOD GC FID/3550 as Diesel			06-26-91	06-26-91	
	1	ND	--	--	
	10	ND	ND	27	mg/Kg
			ND	ND	mg/Kg

** Note: The positive result for the PETROLEUM HYDROCARBONS as Diesel analysis on this sample appears to be a lighter hydrocarbon than diesel.



NET Pacific, Inc.

Client No: 281
Client Name: Harding Lawson Associates
NET Log No: 8221

Date: 07-12-91

Page: 5

Ref: Carnation-Oakland, Job: 20294.006.02

Descriptor, Lab No. and Results

Parameter	Method	Reporting Limit	Descriptor, Lab No. and Results		Units
			91062009 06-20-91 1122 89264	91062010 06-20-91 1133 89265**	
PETROLEUM HYDROCARBONS VOLATILE (SOIL)			--	--	
DILUTION FACTOR *			--	--	
DATE ANALYZED			1	1	
METHOD GC FID/5030			07-02-91	07-06-91	
as Gasoline		1	--	--	
			2.0	1.6	mg/Kg
PETROLEUM HYDROCARBONS EXTRACTABLE (SOIL)			--	--	
DILUTION FACTOR *			--	--	
DATE EXTRACTED			1	1	
DATE ANALYZED			06-25-91	06-25-91	
METHOD GC FID/3550			06-26-91	06-26-91	
as Diesel		1	--	--	
as Motor Oil		10	ND	ND	mg/Kg
			ND	ND	mg/Kg

** Note: This sample was analyzed on 07-02-91 and 07-06-91 in order to achieve an appropriate response within the calibration range of the instrumentation. The results from both dates were comparable.



NET Pacific, Inc.

Client No: 281
Client Name: Harding Lawson Associates
NET Log No: 8221

Date: 07-12-91

Page: 6

Ref: Carnation-Oakland, Job: 20294.006.02

Descriptor, Lab No. and Results

Parameter	Method	Reporting Limit	91062011	91062015	Units
			06-20-91 1152	06-20-91 1310	
			89266	89267**	
PETROLEUM HYDROCARBONS			--	--	
VOLATILE (SOIL)			--	--	
DILUTION FACTOR *			1	100	
DATE ANALYZED			07-02-91	07-02-91	
METHOD GC FID/5030			--	--	
as Gasoline		1	ND	350	mg/Kg
PETROLEUM HYDROCARBONS			--	--	
EXTRACTABLE (SOIL)			--	--	
DILUTION FACTOR *			1	5	
DATE EXTRACTED			06-25-91	06-25-91	
DATE ANALYZED			06-26-91	06-26-91	
METHOD GC FID/3550			--	--	
as Diesel		1	ND	86	mg/Kg
as Motor Oil		10	ND	ND	mg/Kg

** Note: The positive result for the PETROLEUM HYDROCARBONS as Diesel analysis on this sample appears to be a lighter hydrocarbon than diesel.



NET Pacific, Inc.

Client No: 281
Client Name: Harding Lawson Associates
NET Log No: 8221

Date: 07-12-91

Page: 7

Ref: Carnation-Oakland, Job: 20294.006.02

Descriptor, Lab No. and Results

Parameter	Method	Reporting Limit	91062016	91062017	Units
			06-20-91 1317	06-20-91 1327	
			89268**	89269***	
PETROLEUM HYDROCARBONS			--	--	
VOLATILE (SOIL)			--	--	
DILUTION FACTOR *			10	1	
DATE ANALYZED			07-03-91	07-02-91	
METHOD GC FID/5030			--	--	
as Gasoline		1	180	ND	mg/Kg
PETROLEUM HYDROCARBONS			--	--	
EXTRACTABLE (SOIL)			--	--	
DILUTION FACTOR *			1	1	
DATE EXTRACTED			06-25-91	06-25-91	
DATE ANALYZED			06-26-91	06-26-91	
METHOD GC FID/3550			--	--	
as Diesel		1	37	23	mg/Kg
as Motor Oil		10	22	ND	mg/Kg

** Note: The positive result for the PETROLEUM HYDROCARBONS as Diesel analysis on this sample appears to be a mixture of lighter and heavier hydrocarbons than diesel.

*** Note: The positive result for the PETROLEUM HYDROCARBONS as Diesel analysis on this sample appears to be a lighter hydrocarbon than diesel.



NET Pacific, Inc.

Client No: 281
Client Name: Harding Lawson Associates
NET Log No: 8221

Date: 07-12-91

Page: 8

Ref: Carnation-Oakland, Job: 20294.006.02

Descriptor, Lab No. and Results

Parameter	Method	Reporting Limit	91062012	91062013	Units
			06-20-91 1253	06-20-91 1303	
			89270	89271**	
Oil & Grease(Total)	EPA9071	50	150	330	mg/Kg
Oil & Grease(Non-Polar)	SM5520EF	50	120	250	mg/Kg
PETROLEUM HYDROCARBONS					
VOLATILE (SOIL)					
DILUTION FACTOR *					
DATE ANALYZED					
METHOD GC FID/5030					
as Gasoline		1	600	1,900	mg/Kg
PETROLEUM HYDROCARBONS					
EXTRACTABLE (SOIL)					
DILUTION FACTOR *					
DATE EXTRACTED					
DATE ANALYZED					
METHOD GC FID/3550					
as Diesel		1	15	170	mg/Kg
as Motor Oil		10	ND	ND	mg/Kg

** Note: The positive result for the PETROLEUM HYDROCARBONS as Diesel analysis on this sample appears to be a lighter hydrocarbon than diesel.



NET Pacific, Inc.

Client No: 281
Client Name: Harding Lawson Associates
NET Log No: 8221

Date: 07-12-91

Page: 9

Ref: Carnation-Oakland, Job: 20294,006.02

Descriptor, Lab No. and Results

Parameter	Method	Reporting Limit	91062018	91062019	Units
			06-20-91 1400	06-20-91 1410	
			89272	89273	
Oil & Grease(Total)	EPA9071	50	85	290	mg/Kg
Oil & Grease(Non-Polar)	SM5520EF	50	81	160	mg/Kg
METHOD 8080					
DATE EXTRACTED			06-24-91	06-24-91	
DATE ANALYZED			06-25-91	06-25-91	
DILUTION FACTOR *			1	1	
POLYCHLORINATED BIPHENYLS					
Aroclor 1016		100	ND	ND	ug/Kg
Aroclor 1221		500	ND	ND	ug/Kg
Aroclor 1232		200	ND	ND	ug/Kg
Aroclor 1242		100	ND	ND	ug/Kg
Aroclor 1248		100	ND	ND	ug/Kg
Aroclor 1254		50	ND	ND	ug/Kg
Aroclor 1260		50	ND	ND	ug/Kg



NET Pacific, Inc.

Client No: 281
Client Name: Harding Lawson Associates
NET Log No: 8221

Date: 07-12-91

Page: 10

Ref: Carnation-Oakland, Job: 20294,006.02

Descriptor, Lab No. and Results

Parameter	Method	Reporting Limit	Units
		91062020	
		06-20-91	
		1421	
		89274	

METHOD 8080

DATE EXTRACTED		06-24-91	
DATE ANALYZED		06-25-91	
DILUTION FACTOR *		1	
POLYCHLORINATED BIPHENYLS		--	
Aroclor 1016	100	ND	ug/Kg
Aroclor 1221	500	ND	ug/Kg
Aroclor 1232	200	ND	ug/Kg
Aroclor 1242	100	ND	ug/Kg
Aroclor 1248	100	ND	ug/Kg
Aroclor 1254	50	ND	ug/Kg
Aroclor 1260	50	ND	ug/Kg



NET Pacific, Inc.

Client Acct: 281
Client Name: Harding Lawson Associates
NET Log No: 8221

Date: 07-12-91
Page: 11

Ref: Carnation-Oakland, Job: 20294.006.02

QUALITY CONTROL DATA

Parameter	Reporting Limits	Units	Cal Verf Stand % Recovery	Blank Data	Spike % Recovery	Duplicate Spike % Recovery	RPD
Aroclor 1254	50	ug/Kg	89	ND	88	91	3.4
O&G(Total)	50	mg/Kg	107	ND	97	105	7.9
O&G(Non-Polar)	50	mg/Kg	86	ND	N/A	N/A	N/A
O&G(Total)	50	mg/Kg	95	ND	105	106	< 1
O&G(Non-Polar)	50	mg/Kg	90	ND	N/A	N/A	N/A
Diesel	1	mg/Kg	112	ND	66	65	1.5
Motor Oil	10	mg/Kg	105	ND	N/A	N/A	N/A
Gasoline	1	mg/Kg	105	ND	88	89	1.7
Gasoline	1	mg/Kg	109	ND	105	97	7.9
Gasoline	1	mg/Kg	91	ND	88	96	8.6

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, $100 \frac{|\text{Value 1} - \text{Value 2}|}{\text{mean value}}$.
- 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.



NATIONAL
ENVIRONMENTAL
TESTING, INC.

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

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

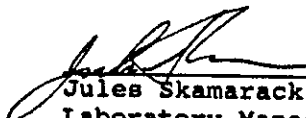
Date: 07-16-91
NET Client Acct No: 281
NET Pacific Log No: 8279
Received: 06-25-91 0800

Client Reference Information

Carnation-Oakland, 20294,006.02

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

JS:rct
Enclosure(s)



NET Pacific, Inc.

Client No: 281
Client Name: Harding Lawson Associates
NET Log No: 8279

Date: 07-16-91

Page: 2

Ref: Carnation-Oakland, 20294,006.02

Descriptor, Lab No. and Results

Parameter	Method	Reporting Limit	91062103	91062104	Units
			06-21-91 0912	06-21-91 0927	
			89573	89574	
Oil & Grease(Total)	EPA9071	50	ND	ND	mg/Kg
Oil & Grease(Non-Polar)	SM5520EF	50	ND	ND	mg/Kg
PETROLEUM HYDROCARBONS					
VOLATILE (SOIL)					
DILUTION FACTOR *					
DATE ANALYZED					
METHOD GC FID/5030					
as Gasoline					
		1	ND	ND	mg/Kg
PETROLEUM HYDROCARBONS					
EXTRACTABLE (SOIL)					
DILUTION FACTOR *					
DATE EXTRACTED					
DATE ANALYZED					
METHOD GC FID/3550					
as Diesel					
as Motor Oil					
		1	ND	ND	mg/Kg
		10	ND	ND	mg/Kg



NET Pacific, Inc.

Client No: 281
Client Name: Harding Lawson Associates
NET Log No: 8279

Date: 07-16-91

Page: 3

Ref: Carnation-Oakland, 20294,006.02

Descriptor, Lab No. and Results

Parameter	Method	Reporting Limit	91062108	91062109	Units
			06-21-91 1042	06-21-91 1057	
			89575**	89576**	
Oil & Grease(Total)	EPA9071	50	57	ND	mg/Kg
Oil & Grease(Non-Polar)	SM5520EF	50	ND	ND	mg/Kg
PETROLEUM HYDROCARBONS					
VOLATILE (SOIL)					
DILUTION FACTOR *					
DATE ANALYZED					
METHOD GC FID/5030					
as Gasoline					
		1	ND	820	mg/Kg
PETROLEUM HYDROCARBONS					
EXTRACTABLE (SOIL)					
DILUTION FACTOR *					
DATE EXTRACTED					
DATE ANALYZED					
METHOD GC FID/3550					
as Diesel					
as Motor Oil					
		1	17	65	mg/Kg
		10	25	34	mg/Kg

** Note: The positive result for the PETROLEUM HYDROCARBONS as Diesel analysis on this sample appears to be a mixture of lighter hydrocarbon and tranformer oil.



NET Pacific, Inc.

Client No: 281
Client Name: Harding Lawson Associates
NET Log No: 8279

Date: 07-16-91

Page: 4

Ref: Carnation-Oakland, 20294,006.02

Descriptor, Lab No. and Results

Parameter	Method	Reporting Limit	Descriptor, Lab No. and Results		Units
			91SB1655 06-21-91	91SB1610 06-21-91	
			89577**	89578**	
Oil & Grease(Total)	EPA9071	50	130	250	mg/Kg
Oil & Grease(Non-Polar)	SM5520EF	50	130	240	mg/Kg
PETROLEUM HYDROCARBONS					
VOLATILE (SOIL)			--	--	
DILUTION FACTOR *			--	--	
DATE ANALYZED			200	500	
METHOD GC FID/5030			07-03-91	07-03-91	
as Gasoline			--	--	
		1	550	6,400	mg/Kg
PETROLEUM HYDROCARBONS					
EXTRACTABLE (SOIL)			--	--	
DILUTION FACTOR *			--	--	
DATE EXTRACTED			5	20	
DATE ANALYZED			06-26-91	06-26-91	
METHOD GC FID/3550			06-30-91	06-30-91	
as Diesel			--	--	
		1	21	940	mg/Kg
as Motor Oil			10	280	mg/Kg

** Note: The positive result for the PETROLEUM HYDROCARBONS as Diesel analysis on this sample appears to be a mixture of lighter hydrocarbon and transformer oil.



NET Pacific, Inc.

Client No: 281
Client Name: Harding Lawson Associates
NET Log No: 8279

Date: 07-16-91

Page: 5

Ref: Carnation-Oakland, 20294,006.02

Descriptor, Lab No. and Results

Parameter	Method	Reporting Limit	91062101	91062102	Units
			06-21-91 0730	06-21-91 0800	
			89598	89599**	
Oil & Grease(Total)	EPA9071	50	160	380	mg/Kg
Oil & Grease(Non-Polar)	SM5520EF	50	140	370	mg/Kg
Lead	6010	20	42	27	mg/Kg
PETROLEUM HYDROCARBONS			--	--	
VOLATILE (SOIL)			--	--	
DILUTION FACTOR *			1	1	
DATE ANALYZED			07-03-91	07-03-91	
METHOD GC FID/5030			--	--	
as Gasoline			1	4.5	mg/Kg
METHOD 8020			--	--	
DILUTION FACTOR *			1	1	
DATE ANALYZED			07-03-91	07-03-91	
Benzene			2.5	ND	ug/Kg
Ethylbenzene			2.5	ND	ug/Kg
Toluene			2.5	ND	ug/Kg
Xylenes, total			2.5	ND	ug/Kg
PETROLEUM HYDROCARBONS			--	--	
EXTRACTABLE (SOIL)			--	--	
DILUTION FACTOR *			5	10	
DATE EXTRACTED			06-27-91	06-27-91	
DATE ANALYZED			07-02-91	07-02-91	
METHOD GC FID/3550			--	--	
as Diesel			1	120	mg/Kg
as Motor Oil			10	150	mg/Kg

** Note: The positive result for the PETROLEUM HYDROCARBONS as Gasoline analysis on this sample appears to be a heavier hydrocarbon than gasoline.



NET Pacific, inc.

Client No: 281
Client Name: Harding Lawson Associates
NET Log No: 8279

Date: 07-16-91

Page: 6

Ref: Carnation-Oakland, 20294,013.02

Descriptor, Lab No. and Results

Parameter	Method	Reporting Limit	91062105	91062106	Units
			06-21-91 0934	06-21-91 0945	
			89579	89580	
PETROLEUM HYDROCARBONS			--	--	
VOLATILE (SOIL)			--	--	
DILUTION FACTOR *			1	1	
DATE ANALYZED			07-03-91	07-03-91	
METHOD GC FID/5030			--	--	
as Gasoline		1	ND	ND	mg/Kg
PETROLEUM HYDROCARBONS			--	--	
EXTRACTABLE (SOIL)			--	--	
DILUTION FACTOR *			1	1	
DATE EXTRACTED			06-26-91	06-26-91	
DATE ANALYZED			06-28-91	06-28-91	
METHOD GC FID/3550			--	--	
as Diesel		1	ND	ND	mg/Kg
as Motor Oil		10	ND	ND	mg/Kg



NET Pacific, Inc.

Client No: 281
Client Name: Harding Lawson Associates
NET Log No: 8279

Date: 07-16-91

Page: 7

Ref: Carnation-Oakland, 20294,006.02

Descriptor, Lab No. and Results

Parameter	Method	Reporting Limit	91062107	91062110	Units
			06-21-91 1002	06-21-91 1105	
			89581	89582	
PETROLEUM HYDROCARBONS			--	--	
VOLATILE (SOIL)			--	--	
DILUTION FACTOR *			1	1	
DATE ANALYZED			07-03-91	07-03-91	
METHOD GC FID/5030			--	--	
as Gasoline	1		ND	ND	mg/Kg
PETROLEUM HYDROCARBONS			--	--	
EXTRACTABLE (SOIL)			--	--	
DILUTION FACTOR *			1	1	
DATE EXTRACTED			06-26-91	06-26-91	
DATE ANALYZED			06-28-91	06-28-91	
METHOD GC FID/3550			--	--	
as Diesel	1		ND	ND	mg/Kg
as Motor Oil	10		ND	ND	mg/Kg



NET Pacific, Inc.

Client No: 281
Client Name: Harding Lawson Associates
NET Log No: 8279

Date: 07-16-91

Page: 8

Ref: Carnation-Oakland, 20294,006.02

Descriptor, Lab No. and Results

Parameter	Method	Reporting Limit	91062111	91062112	Units
			06-21-91 1118	06-21-91 1135	
			89583	89584	
PETROLEUM HYDROCARBONS			--	--	
VOLATILE (SOIL)			--	--	
DILUTION FACTOR *			1	1	
DATE ANALYZED			07-03-91	07-03-91	
METHOD GC FID/5030			--	--	
as Gasoline		1	ND	ND	mg/Kg
PETROLEUM HYDROCARBONS			--	--	
EXTRACTABLE (SOIL)			--	--	
DILUTION FACTOR *			1	1	
DATE EXTRACTED			06-26-91	06-26-91	
DATE ANALYZED			06-28-91	06-28-91	
METHOD GC FID/3550			--	--	
as Diesel		1	ND	ND	mg/Kg
as Motor Oil		10	ND	ND	mg/Kg



NET Pacific, Inc.

Client No: 281
Client Name: Harding Lawson Associates
NET Log No: 8279

Date: 07-16-91

Page: 9

Ref: Carnation-Oakland, 20294,006.02

Descriptor, Lab No. and Results

Parameter	Method	Reporting Limit	Descriptor, Lab No. and Results		Units
			91SB1613 06-21-91	91SB1621 06-21-91	
			89585***	89586**	
PETROLEUM HYDROCARBONS			--	--	
VOLATILE (SOIL)			--	--	
DILUTION FACTOR *			20	100	
DATE ANALYZED			07-06-91	07-06-91	
METHOD GC FID/5030			--	--	
as Gasoline		1	100	260	mg/Kg
PETROLEUM HYDROCARBONS			--	--	
EXTRACTABLE (SOIL)			--	--	
DILUTION FACTOR *			1	1	
DATE EXTRACTED			06-26-91	06-26-91	
DATE ANALYZED			06-28-91	06-28-91	
METHOD GC FID/3550			--	--	
as Diesel		1	45	2.8	mg/Kg
as Motor Oil		10	ND	ND	mg/Kg

*** Note: The positive result for the PETROLEUM HYDROCARBONS as Gasoline analysis is an unknown hydrocarbon which consists of a singular peak and lighter hydrocarbons. This sample was analyzed on 07-03-91 at a 1:1 dilution and 07-06-91 to achieve a result within the calibration range of the instrument. The results from both dates were comparable.

** Note: The positive result for the PETROLEUM HYDROCARBONS as Diesel analysis on this sample appears to be a lighter hydrocarbon than diesel. This sample was analyzed for gasoline on 07-03-91 at a 1:1 dilution and 07-06-91 to achieve a result within the calibration range of the instrument. The results from both dates were comparable.



NET Pacific, Inc.

Client No: 281
Client Name: Harding Lawson Associates
NET Log No: 8279

Date: 07-16-91

Page: 10

Ref: Carnation-Oakland, 20294,006.02

Descriptor, Lab No. and Results

Parameter	Method	Reporting Limit	91SB1615	91SB1555	Units
			06-21-91	06-21-91	
			89587**	89588	
PETROLEUM HYDROCARBONS			--	--	
VOLATILE (SOIL)			--	--	
DILUTION FACTOR *			200	1	
DATE ANALYZED			07-06-91	07-03-91	
METHOD GC FID/5030			--	--	
as Gasoline	1		1,900	ND	mg/Kg
PETROLEUM HYDROCARBONS			--	--	
EXTRACTABLE (SOIL)			--	--	
DILUTION FACTOR *			1	1	
DATE EXTRACTED			06-26-91	06-26-91	
DATE ANALYZED			06-28-91	06-28-91	
METHOD GC FID/3550			--	--	
as Diesel	1		59	ND	mg/Kg
as Motor Oil	10		44	ND	mg/Kg

** Note: The positive result for the PETROLEUM HYDROCARBONS as Diesel analysis on this sample appears to be a mixture of lighter hydrocarbons and transformer oil. This sample was analyzed for gasoline on 07-03-91 at a 1:50 dilution and 07-06-91 to achieve a result within the calibration range of the instrument. The results from both dates were comparable.



NET Pacific, Inc.

Client No: 281
Client Name: Harding Lawson Associates
NET Log No: 8279

Date: 07-16-91

Page: 11

Ref: Carnation-Oakland, 20294,006.02

Descriptor, Lab No. and Results

Parameter	Method	Reporting Limit	91SB1510	91SB1513	Units
			06-21-91	06-21-91	
			89589**	89590	
PETROLEUM HYDROCARBONS			--	--	
VOLATILE (SOIL)			--	--	
DILUTION FACTOR *			1	1	
DATE ANALYZED			07-03-91	07-03-91	
METHOD GC FID/5030			--	--	
as Gasoline	1		3.2	ND	mg/Kg
PETROLEUM HYDROCARBONS			--	--	
EXTRACTABLE (SOIL)			--	--	
DILUTION FACTOR *			1	1	
DATE EXTRACTED			06-26-91	06-26-91	
DATE ANALYZED			06-28-91	06-28-91	
METHOD GC FID/3550			--	--	
as Diesel	1		57	ND	mg/Kg
as Motor Oil	10		45	ND	mg/Kg

** Note: The positive result for the PETROLEUM HYDROCARBONS as Diesel analysis on this sample appears to be a mixture of lighter hydrocarbons and transformer oil.



NET Pacific, Inc.

Client No: 281
Client Name: Harding Lawson Associates
NET Log No: 8279

Date: 07-16-91

Page: 12

Ref: Carnation-Oakland, 20294,006.02

Descriptor, Lab No. and Results

Parameter	Method	Reporting Limit	91SB1515	91SB1521	Units
			06-21-91	06-21-91	
			89591	89592	
PETROLEUM HYDROCARBONS			--	--	
VOLATILE (SOIL)			--	--	
DILUTION FACTOR *			1	1	
DATE ANALYZED			07-06-91	07-03-91	
METHOD GC FID/5030			--	--	
as Gasoline	1		ND	ND	mg/Kg
PETROLEUM HYDROCARBONS			--	--	
EXTRACTABLE (SOIL)			--	--	
DILUTION FACTOR *			1	1	
DATE EXTRACTED			06-26-91	06-26-91	
DATE ANALYZED			06-28-91	06-28-91	
METHOD GC FID/3550			--	--	
as Diesel	1		ND	ND	mg/Kg
as Motor Oil	10		ND	ND	mg/Kg



NET Pacific, Inc.

Client No: 281
Client Name: Harding Lawson Associates
NET Log No: 8279

Date: 07-16-91

Page: 13

Ref: Carnation-Oakland, 20294,006.02

Descriptor, Lab No. and Results

Parameter	Method	Reporting Limit	91SB1765	91SB1710	Units
			06-21-91	06-21-91	
			89593***	89594**	
PETROLEUM HYDROCARBONS					
VOLATILE (SOIL)			--	--	
DILUTION FACTOR *			1	1000	
DATE ANALYZED			07-09-91	07-06-91	
METHOD GC FID/5030			--	--	
as Gasoline		1	1.1	10,000	mg/Kg
PETROLEUM HYDROCARBONS					
EXTRACTABLE (SOIL)			--	--	
DILUTION FACTOR *			5	100	
DATE EXTRACTED			06-27-91	06-27-91	
DATE ANALYZED			06-30-91	06-30-91	
METHOD GC FID/3550			--	--	
as Diesel		1	110	810	mg/Kg
as Motor Oil		10	80	ND	mg/Kg

*** Note: This sample was analyzed for gasoline on 07-03-91 at a 1:100 dilution, 07-06-91 at a 1:10 dilution and 07-09-91 to achieve a result within the calibration range of the instrument. The results from the three dates were comparable.

** Note: The positive result for the PETROLEUM HYDROCARBONS as Diesel analysis on this sample appears to be a lighter hydrocarbon than diesel. This sample was analyzed for gasoline on 07-03-91 at a 1:200 dilution and 07-06-91 to achieve a result within the calibration range of the instrument. The results from both dates were comparable.



NET Pacific, Inc.

Client No: 281
Client Name: Harding Lawson Associates
NET Log No: 8279

Date: 07-16-91

Page: 14

Ref: Carnation-Oakland, 20294,006.02

Descriptor, Lab No. and Results

Parameter	Method	Reporting Limit	91SB1713	91SB1715	Units
			06-21-91	06-21-91	
			89595**	89596**	
PETROLEUM HYDROCARBONS			--	--	
VOLATILE (SOIL)			--	--	
DILUTION FACTOR *			50	100	
DATE ANALYZED			07-03-91	07-03-91	
METHOD GC FID/5030			--	--	
as Gasoline	1		88	130	mg/Kg
PETROLEUM HYDROCARBONS			--	--	
EXTRACTABLE (SOIL)			--	--	
DILUTION FACTOR *			1	5	
DATE EXTRACTED			06-27-91	06-27-91	
DATE ANALYZED			06-30-91	06-30-91	
METHOD GC FID/3550			--	--	
as Diesel	1		45	130	mg/Kg
as Motor Oil	10		37	69	mg/Kg

** Note: The positive result for the PETROLEUM HYDROCARBONS as Diesel analysis on this sample appears to be a lighter hydrocarbon than diesel.



NET Pacific, Inc.

Client No: 281
Client Name: Harding Lawson Associates
NET Log No: 8279

Date: 07-16-91

Page: 15

Ref: Carnation-Oakland, 20294,006.02

Descriptor, Lab No. and Results

Parameter	Method	Reporting Limit	91SB1721 06-21-91 89597**	Units
PETROLEUM HYDROCARBONS VOLATILE (SOIL)			--	
DILUTION FACTOR *			1	
DATE ANALYZED			07-09-91	
METHOD GC FID/5030 as Gasoline			--	
	1		ND	mg/Kg
PETROLEUM HYDROCARBONS EXTRACTABLE (SOIL)			--	
DILUTION FACTOR *			1	
DATE EXTRACTED			06-27-91	
DATE ANALYZED			06-30-91	
METHOD GC FID/3550 as Diesel			--	
	1		ND	mg/Kg
as Motor Oil	10		ND	mg/Kg

** Note: This sample was analyzed for gasoline on 07-03-91 at a 1:20 dilution and 07-06-91 at a 1:10 dilution and 07-09-91 to achieve a result within the calibration range of the instrument. The results from the three dates were comparable.



Client Acct: 281
 Client Name: Harding Lawson Associates
 NET Log No: 8279

Date: 07-15-91
 Page: 16

NET Pacific, Inc.

Ref: Carnation-Oakland, 20294,006.02

QUALITY CONTROL DATA

Parameter	Reporting Limits	Units	Cal Verif Stand % Recovery	Blank Data	Spike % Recovery	Duplicate Spike % Recovery	RPD
Lead	20	mg/Kg	105	ND	95	83	19
O&G(Total)	50	mg/Kg	95	ND	105	106	< 1
O&G(Non-Polar)	50	mg/Kg	90	ND	N/A	N/A	N/A
O&G(Total)	50	mg/Kg	88	ND	104	125	18
O&G(Non-Polar)	50	mg/Kg	81	ND	N/A	N/A	N/A
Diesel	1	mg/Kg	101	ND	75	77	2.9
Motor Oil	10	mg/Kg	98	ND	N/A	N/A	N/A
Gasoline	1	mg/Kg	109	ND	105	97	7.9
Gasoline	1	mg/Kg	109	ND	101	102	1.0

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, $100 \text{ [Value 1 - Value 2] / mean value}$.
- 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.



NATIONAL
ENVIRONMENTAL
TESTING, INC.

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

707

JUL 91 9:33

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

Date: 07-24-91
NET Client Acct. No: 281
NET Pacific Log No: 8451
Received: 07-03-91 1650

Client Reference Information

Carnation-Oakland, 20294,006.02

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
Client Name: Harding Lawson Associates
NET Log No: 8451

Date: 07-24-91
Page: 2

Ref: Carnation-Oakland, 20294,006.02

SAMPLE DESCRIPTION: 91062013 06-20-91 1303
LAB Job No: (-90767)

Parameter	Method	Reporting Limit	Results	Units
METHOD 8080				
DATE EXTRACTED			07-09-91	
DATE ANALYZED			07-16-91	
DILUTION FACTOR *			1	
POLYCHLORINATED BIPHENYLS				
Aroclor 1016		100	ND	ug/Kg
Aroclor 1221		500	ND	ug/Kg
Aroclor 1232		200	ND	ug/Kg
Aroclor 1242		100	ND	ug/Kg
Aroclor 1248		100	ND	ug/Kg
Aroclor 1254		50	100	ug/Kg
Aroclor 1260		50	ND	ug/Kg



Client Acct: 281
Client Name: Harding Lawson Associates
NET Log No: 8451

Date: 07-19-91
Page: 3

NET Pacific, Inc.

Ref: Carnation-Oakland, 20294,006.02

QUALITY CONTROL DATA

Parameter	Reporting Limits	Units	Cal Verf Stand % Recovery	Blank Data	Spike % Recovery	Duplicate Spike % Recovery	RPD
Aroclor 1254	50	ug/Kg	75	ND	73	65	12



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, $100 \frac{|\text{Value 1} - \text{Value 2}|}{\text{mean value}}$.
- 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.



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

8739 Lab: Net Pacific

Job Number: 70294.006.02

Name/Location: Carnation Oakland

Project Manager: Bruce Scheibach

Samplers: Pick Endura

Recorder: Pick Endura
 (Signature Required)

SOURCE CODE	MATRIX				#CONTAINERS & PRESERV.			SAMPLE NUMBER OR LAB NUMBER			DATE								
	Water	Sediment	Soil	Oil	Unpres.	H ₂ SO ₄	HNO ₃	Yr	Wk	Seq	Yr	Mo	Dy	Time					
STO		X			1			9	10	6	12	11	9	10	6	12	13	5	6

STATION DESCRIPTION/NOTES

CUSTODY SEALED 6/17/91
 @ 17:30
 JW
 Paul Inhet

ANALYSIS REQUESTED											
EPA 601/8010	EPA 602/8020	EPA 624/8240	EPA 625/8270	ICP METALS	EPA 8015/8710 TPH	Gas, Diesel	503 D/E				
				X	X						
				X	X						
				X	X						
				X	X						
				X	X						

LAB NUMBER			DEPTH IN FEET	COL MTD CD	QA CODE	MISCELLANEOUS
Yr	Wk	Seq				
						* Oil and Grease, polar and non-polar; ZPA methods SO3 D/E

CHAIN OF CUSTODY RECORD		
RELINQUISHED BY: (Signature) <u>Pick Endura</u>	RECEIVED BY: (Signature) <u>Jeff Sichel</u>	DATE/TIME 6/17/91 16:20
RELINQUISHED BY: (Signature) <u>Jeff Sichel</u>	RECEIVED BY: (Signature)	DATE/TIME 6/17 17:30
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) <u>Sample</u>
METHOD OF SHIPMENT <u>NCS</u>		DATE/TIME 6/18/91 0800

Laboratory Copy White Project Office Copy Yellow Field or Office Copy Pink



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

CHAIN OF CUSTODY FORM

8139

Lab: Net Pacific

Job Number: 70294.006.02

Name/Location: Carnation Oakland

Project Manager: Bruce Sheibach

Samplers: Rick Erdman

Recorder: Rick Erdman
 (Signature Required)

SOURCE CODE	MATRIX				#CONTAINERS & PRESERV.			SAMPLE NUMBER OR LAB NUMBER			DATE				STATION DESCRIPTION/NOTES		
	Water	Sediment	Soil	Oil	Unpres.	H ₂ SO ₄	HNO ₃	Yr	Wk	Seq	Yr	Mo	Dy	Time			
W0			X		1			9	106	1701	9	106	17	09	32		
										1702					09	53	
										1703					10	05	
										1704					10	15	
										1705					10	33	
										1706					11	28	
										1707					12	20	
										1708					12	39	
										1709					12	54	
										1710					13	16	

ANALYSIS REQUESTED	
EPA 601/8010	
EPA 602/8020	
EPA 624/8240	
EPA 625/8270	
ICP METALS	
EPA 8015M/TPH/SS/dioxin	
EPA 503 D/S*	

LAB NUMBER			DEPTH IN FEET	COL MTD CD	QA CODE	MISCELLANEOUS
Yr	Wk	Seq				
						* Oil & Grease, polar and non-polar; EPA methods 503 D/S

CHAIN OF CUSTODY RECORD		
RELINQUISHED BY: (Signature) <u>Rick Erdman</u>	RECEIVED BY: (Signature) <u>Jeff Arnold</u>	DATE/TIME <u>6/17/91 16:20</u>
RELINQUISHED BY: (Signature) <u>Jeff Arnold</u>	RECEIVED BY: (Signature)	DATE/TIME <u>17:30</u>
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) <u>Kjungle</u>
METHOD OF SHIPMENT <u>lab counter / NCS</u>		



Harding Lawson Associates
 7655 Redwood Boulevard
 P.O. Box 578
 Novato, California 94948
 415/892-0821
 Telecopy: General: 415/892-0831
 Accounting: 415/896-1052

CHAIN OF CUSTODY FORM

8170

Lab: Net Pacific

Job Number: 70294.006.02

Samplers: Rich Endman

Name/Location: Carnation - Oakland

Project Manager: Bruce Sheibach

Recorder: Rich Endman
 (Signature Required)

SOURCE CODE	MATRIX				#CONTAINERS & PRESERV.			SAMPLE NUMBER OR LAB NUMBER			DATE				STATION DESCRIPTION/NOTES
	Water	Sediment	Soil	Oil	Unpres.	H ₂ SO ₄	HNO ₃	Yr	Wk	Seq	Yr	Mo	Dy	Time	
50		X			1			9	10	1801	9	10	6	180831	
		X								1807				0845	
		X								1804				0905	
		X								1805				0914	
		X								1806				0927	
		X								1807				0959	
		X								1808				1010	
		X								1810				1019	
		X								1811				1026	
		X								1812				1038	

ANALYSIS REQUESTED											
EPA 601/8010	EPA 602/8020	EPA 624/8240	EPA 625/8270	ICP METALS	EPA 8015M/TPH-gal.diesel	503 D:ET					
				X	X						
				X	X						
				X							
				X							
				X							
				X							
				X							
				X							
				X							
				X							
				X							
				X							

LAB NUMBER			DEPTH IN FEET	COL MTD CD	QA CODE	MISCELLANEOUS
Yr	Wk	Seq				
						Oil & Grease, polar & non-polar, EPA Methods 503 D:ET

CHAIN OF CUSTODY RECORD			
RELINQUISHED BY: (Signature) <u>Rich Endman</u>	RECEIVED BY: (Signature) <u>Jeffa Wick</u>	DATE/TIME 6/18/91 16:10	
RELINQUISHED BY: (Signature) <u>Jeffa Wick</u>	RECEIVED BY: (Signature)	DATE/TIME 6/18/91 19:00	
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) <u>Jeffa Wick</u>	DATE/TIME 6/19/91 0800
METHOD OF SHIPMENT <u>lab courier / NCS</u>			

CUSTODY SEALED 6/18/91
 19:00 J.W.
 [Signature]



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

8195

Lab: Net Pacific

Job Number: 20294-DOB-02

Name/Location: Carnation - Oakland

Project Manager: Bruce Sheibach

Samplers: Rick Erdman

Recorder: Rick Erdman
 (Signature Required)

SOURCE CODE	MATRIX				#CONTAINERS & PRESERV.			SAMPLE NUMBER OR LAB NUMBER			DATE			
	Water	Sediment	Soil	Oil	Unpres.	H ₂ SO ₄	HNO ₃	Yr	Wk	Seq	Yr	Mo	Dy	Time
M0			X		1			9	10	6	19	10	6	190843
														0903
														0928
														1017
														1028
														1040
														1300
														1317
														1337
			X											1400

ANALYSIS REQUESTED										
EPA 601/8010	EPA 602/8020	EPA 624/8240	EPA 625/8270	ICP METALS	EPA 8015M/TPH	EPA 8080 PCBs				
						X				
						X				
						X				
						X				
						X				
						X				
						X				
						X				
						X				
						X				
						X				
						X				
						X				

LAB NUMBER			DEPTH IN FEET	COL MTD CD	QA CODE	MISCELLANEOUS
Yr	Wk	Seq				
						* 1910 - 1-VOA w/ product - minimal volume provided please analyze for PCBs

CHAIN OF CUSTODY RECORD		
RELINQUISHED BY: (Signature) <u>Rick Erdman</u>	RECEIVED BY: (Signature) <u>Jeff Winkler</u>	DATE/TIME 6/19/91 16:40
RELINQUISHED BY: (Signature) <u>Jeff Winkler</u>	RECEIVED BY: (Signature)	DATE/TIME 6/19/91 19:00
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) <u>Sample</u> 6/20/91 0900
METHOD OF SHIPMENT <u>lab courier / NCS</u>		



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

8195

Lab: Net Pacific

Job Number: 20279-006.02

Samplers: Rick Erdman

Name/Location: Carnation - Oakland

Project Manager: Bruce Shelbach

Recorder: Rick Erdman
 (Signature Required)

SOURCE CODE	MATRIX				#CONTAINERS & PRESERV.			SAMPLE NUMBER OR LAB NUMBER			DATE							
	Water	Sediment	Soil	Oil	Unpres.	H ₂ SO ₄	HNO ₃	Yr	Wk	Seq	Yr	Mo	Dy	Time				
S0		X			1			9	10	6	19	11	9	10	6	19	14	22
					2													

STATION DESCRIPTION/NOTES

CUSTODY SEALED 6/19/91

19:00 I.W.
real intact

ANALYSIS REQUESTED										
EPA 601/8010										
EPA 602/8020										
EPA 624/8240										
EPA 625/8270										
ICP METALS										
EPA 8015M/TPH										
EPA 8080 PCBs										

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

CHAIN OF CUSTODY RECORD		
RELINQUISHED BY: (Signature) <u>Rick Erdman</u>	RECEIVED BY: (Signature) <u>Jeff Wickler</u>	DATE/TIME <u>6/19/91 16:40</u>
RELINQUISHED BY: (Signature) <u>Jeff Wickler</u>	RECEIVED BY: (Signature)	DATE/TIME <u>6/19 19:00</u>
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) <u>B. Sample</u>
METHOD OF SHIPMENT <u>lab courier / NCS</u>		DATE/TIME <u>6/20/91 0800</u>

CHAIN OF CUSTODY FORM

8221

Lab: Net Active

Job Number: 20194.006.02
 Name/Location: Carnation - Oakland
 Project Manager: Bruce Sheibach

Samplers: Rick Erdman
 Recorder: Rick Erdman
 (Signature Required)

SOURCE CODE	MATRIX				#CONTAINERS & PRESERV.			SAMPLE NUMBER OR LAB NUMBER			DATE			
	Water	Sediment	Soil	Oil	Unpres.	H ₂ SO ₄	HNO ₃	Yr	Wk	Seq	Yr	Mo	Dy	Time
50			X				9	106	2013	9	106	20	13	03
									2015					1310
									2016					1317
									2017					1327
									2018					1400
									2019					1410
									2020					1421

ANALYSIS REQUESTED										
EPA 601/8010	EPA 602/8020	EPA 624/8240	EPA 625/8270	ICP METALS	EPA 8015/ITPH - gas, diesel	DIE - SO3 DIE #	EPA 8080, PCBs			
					X	X				
					X					
					X					
					X					
								X	X	
								X	X	
									X	

CUSTODY SEALED 6/20/91
 19:00 J.W.
 @

LAB NUMBER			DEPTH IN FEET	COL MTD CD	QA CODE	MISCELLANEOUS
Yr	Wk	Seq				
						X Oil & grease, polar & non-polar; EPA methods DIE

CHAIN OF CUSTODY RECORD		
RELINQUISHED BY: (Signature) <u>Rick Erdman</u>	RECEIVED BY: (Signature) <u>Jeff Weibull</u>	DATE/TIME 6/20/91 17:20
RELINQUISHED BY: (Signature) <u>Jeff Weibull</u>	RECEIVED BY: (Signature)	DATE/TIME 6/20 19:00
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) <u>Sample</u>
METHOD OF SHIPMENT lab courier / NCS		DATE/TIME 6/21/91 0800



Hardy 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

8279

Lab: Net Pacific

Job Number: 10294.006.02

Name/Location: Carnation - Oakland

Project Manager: Bruce Sheitach

Samplers: Doreen

Recorder: D. Meyer
 (Signature Required)

ANALYSIS REQUESTED										
EPA 601/8010	EPA 602/8020	EPA 624/8240	EPA 625/8270	ICP METALS	EPA 8015M/TPH - gas. diesel					

SOURCE CODE	MATRIX					#CONTAINERS & PRESERV.			SAMPLE NUMBER OR LAB NUMBER			DATE			
	Water	Sediment	Soil	Oil		Unpres.	H ₂ SO ₄	HNO ₃	Yr	Wk	Seq	Yr	Mo	Dy	Time
	M 0		X							9	1	SB 1265	9	1	06
									9	1	SB 1210	9	1	06	21
									9	1	SB 1213	9	1	06	21
									9	1	SB 1215	9	1	06	21
									9	1	SB 1221	9	1	06	21

STATION DESCRIPTION/
NOTES

✓
✓
✓
✓
✓

(CUSTODY SEALED 6/24/91)
@ 1400

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

CHAIN OF CUSTODY RECORD		
RELINQUISHED BY: (Signature) <u>D Meyer</u>	RECEIVED BY: (Signature) <u>Mike Lamm</u>	DATE/TIME 6/24/91 1145
RELINQUISHED BY: (Signature) <u>Mike Lamm</u>	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) <u>Kemp</u> 6/15/91 0800
METHOD OF SHIPMENT <u>net</u>		



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

8279

Lab: West Pacific

Job Number: 10294.013.02

Samplers: Pick Erdman

Name/Location: Carnation - Oakland

Recorder: Pick Erdman
 (Signature Required)

Project Manager: Raise Shabach

SOURCE CODE	MATRIX				#CONTAINERS & PRESERV.			SAMPLE NUMBER OR LAB NUMBER			DATE				
	Water	Sediment	Soil	Oil	Unpres.	H ₂ SO ₄	HNO ₃	Yr	Wk	Seq	Yr	Mo	Dy	Time	
48			X		4			91	06	21	01	91	06	21	0730
48			X		4			91	06	21	02	91	06	21	0800

ANALYSIS REQUESTED										
EPA 601/8010										
EPA 602/8020	X									
EPA 624/8240	X									
EPA 625/8270										
ICP METALS										
EPA 8015M/TPH										

6/24/91
 out in lab

CUSTODIAN SEALED
 @@ 1900 WPT

LAB NUMBER			DEPTH IN FEET	COL MTD CD	QA CODE	MISCELLANEOUS
Yr	Wk	Seq				
						4 - samples provided from each location. please composite into 2 - total samples for above analysis

CHAIN OF CUSTODY RECORD		
RELINQUISHED BY: (Signature) <u>Pick Erdman</u>	RECEIVED BY: (Signature) <u>D Meyer</u>	DATE/TIME 6/21 1:30
RELINQUISHED BY: (Signature) <u>D Meyer</u>	RECEIVED BY: (Signature) <u>M. Tolson</u>	DATE/TIME 6/24/91 1145
RELINQUISHED BY: (Signature) <u>M. Tolson</u>	RECEIVED BY: (Signature)	DATE/TIME
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
DISPATCHED BY: (Signature)	DATE/TIME	RECEIVED FOR LAB BY: (Signature) <u>Sample</u> 6/25/91 0800
METHOD OF SHIPMENT <u>lab courier</u>		

Appendix D

**GROUNDWATER CHEMISTRY LABORATORY RESULTS
AND CHAIN OF CUSTODY FORMS**



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
Client Name: Harding Lawson Associates
NET Log No: 8296

Date: 07-16-91
Page: 2

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 *				
DATE ANALYZED				
METHOD GC FID/5030				
as Gasoline				
		0.05	ND	mg/L
PETROLEUM HYDROCARBONS				
EXTRACTABLE (WATER)				
DILUTION FACTOR *				
DATE EXTRACTED				
DATE ANALYZED				
METHOD GC FID/3510				
as Diesel				
as Motor Oil				
		0.05	ND	mg/L
		0.5	ND	mg/L



NET Pacific, Inc.

Client Acct: 281
Client Name: Harding Lawson Associates
NET Log No: 8296

Date: 07-16-91
Page: 3

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.



NET Pacific, Inc.

Client Acct: 281
Client Name: Harding Lawson Associates
NET Log No: 8296

Date: 07-16-91
Page: 4

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
as Motor Oil			0.5	ND
				mg/L



NET Pacific, Inc.

Client Acct: 281
Client Name: Harding Lawson Associates
NET Log No: 8296

Date: 07-16-91
Page: 5

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
Client Name: Harding Lawson Associates
NET Log No: 8296

Date: 07-16-91
Page: 6

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



NET Pacific, Inc.

Client Acct: 281
Client Name: Harding Lawson Associates
NET Log No: 8296

Date: 07-16-91
Page: 7

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.



NET Pacific, Inc.

Client Acct: 281
Client Name: Harding Lawson Associates
NET Log No: 8296

Date: 07-16-91
Page: 8

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
as Motor Oil			0.5	ND
				mg/L



NET Pacific, Inc.

Client Acct: 281
 Client Name: Harding Lawson Associates
 NET Log No: 8296

Date: 07-16-91
 Page: 9

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.



NET Pacific, Inc.

Client Acct: 281
Client Name: Harding Lawson Associates
NET Log No: 8296

Date: 07-16-91
Page: 10

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
Client Name: Harding Lawson Associates
NET Log No: 8296

Date: 07-16-91
Page: 11

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



NET Pacific, Inc.

Client Acct: 281
Client Name: Harding Lawson Associates
NET Log No: 8296

Date: 07-16-91
Page: 12

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	mg/L
METHOD 602			--	
DILUTION FACTOR *			1	
DATE ANALYZED			07-08-91	
Benzene			0.5	ug/L
Ethylbenzene			0.5	ug/L
Toluene			0.5	ug/L
Xylenes, total			0.5	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	mg/L
as Motor Oil			0.5	mg/L



NET Pacific, Inc.

Client Acct: 281
Client Name: Harding Lawson Associates
NET Log No: 8296

Date: 07-16-91
Page: 13

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	
METHOD 602			--	mg/L
DILUTION FACTOR *			1	
DATE ANALYZED			07-08-91	
Benzene			0.5	ug/L
Ethylbenzene			0.5	ug/L
Toluene			0.5	ug/L
Xylenes, total			0.5	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	mg/L
as Motor Oil			0.5	mg/L



NET Pacific, Inc.

Client Acct: 281
Client Name: Harding Lawson Associates
NET Log No: 8296

Date: 07-16-91
Page: 14

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



NET Pacific, Inc.

Client Acct: 281
Client Name: Harding Lawson Associates
NET Log No: 8296

Date: 07-16-91
Page: 15

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
Client Name: Harding Lawson Associates
NET Log No: 8296

Date: 07-16-91
Page: 16

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 *			--	
DATE ANALYZED			1	
METHOD GC FID/5030			07-08-91	
as Gasoline			--	
		0.05	ND	mg/L
PETROLEUM HYDROCARBONS				
EXTRACTABLE (WATER)			--	
DILUTION FACTOR *			--	
DATE EXTRACTED			1	
DATE ANALYZED			06-28-91	
METHOD GC FID/3510			07-02-91	
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: 8296

Date: 07-16-91
Page: 17

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-Dichloroethane		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.



NET Pacific, Inc.

Client Acct: 281
Client Name: Harding Lawson Associates
NET Log No: 8296

Date: 07-16-91
Page: 18

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



NET Pacific, Inc.

Client Acct: 281
Client Name: Harding Lawson Associates
NET Log No: 8296

Date: 07-16-91
Page: 19

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



NET Pacific, Inc.

Client Acct: 281
 Client Name: Harding Lawson Associates
 NET Log No: 8296

Date: 07-16-91
 Page: 20

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

Client Name: Harding Lawson Associates

NET Log No: 8296

Date: 07-16-91

Page: 21

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 *				
DATE ANALYZED				
METHOD GC FID/5030				
as Gasoline				
		0.05	ND	mg/L
PETROLEUM HYDROCARBONS				
EXTRACTABLE (WATER)				
DILUTION FACTOR *				
DATE EXTRACTED				
DATE ANALYZED				
METHOD GC FID/3510				
as Diesel				
		0.05	ND	mg/L
as Motor Oil				
		0.5	ND	mg/L



Client Acct: 281
 Client Name: Harding Lawson Associates
 NET Log No: 8296

Date: 07-15-91
 Page: 22

NET Pacific, Inc.

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, $100 \text{ [Value 1 - Value 2] / mean value}$.
- 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.

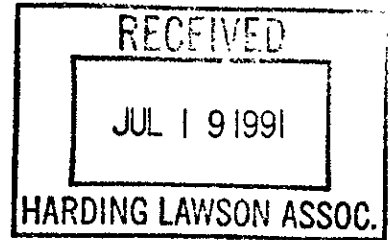
Methods 1000 through 9999: see "Test Methods for Evaluating Solid Waste", U.S. EPA SW-846, 3rd edition, 1986.

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



NATIONAL
ENVIRONMENTAL
TESTING, INC.

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



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

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
Client Name: Harding Lawson Associates
NET Log No: 8324

Date: 07-17-91
Page: 2

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
Client Name: Harding Lawson Associates
NET Log No: 8324

Date: 07-17-91
Page: 3

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
Client Name: Harding Lawson Associates
NET Log No: 8324

Date: 07-17-91
Page: 5

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
METHOD 602			--	mg/L
Benzene			0.5	1.8
Ethylbenzene			0.5	ND
Toluene			0.5	ND
Xylenes, total			0.5	ND
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
as Motor Oil			0.5	ND



NET Pacific, Inc.

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

Date: 07-17-91
Page: 6

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 *				
DATE ANALYZED				
METHOD GC FID/5030				
as Gasoline		0.05	ND	mg/L
PETROLEUM HYDROCARBONS				
EXTRACTABLE (WATER)				
DILUTION FACTOR *				
DATE EXTRACTED				
DATE ANALYZED				
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: 7

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.



NET Pacific, Inc.

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

Date: 07-17-91
Page: 8

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
Page: 9

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.



NET Pacific, Inc.

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

Date: 07-17-91
Page: 10

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 *			--	
DATE ANALYZED			1000	
METHOD GC FID/5030			07-08-91	
as Gasoline			--	
		0.05	300	mg/L
PETROLEUM HYDROCARBONS				
EXTRACTABLE (WATER)			--	
DILUTION FACTOR *			--	
DATE EXTRACTED			1	
DATE ANALYZED			06-28-91	
METHOD GC FID/3510			06-30-91	
as Diesel			--	
		0.05	2.1	mg/L
as Motor Oil			--	
		0.5	1.6	mg/L



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

Date: 07-17-91
 Page: 11

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.



NET Pacific, Inc.

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

Date: 07-17-91
Page: 12

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 *				
DATE ANALYZED				
METHOD GC FID/5030				
as Gasoline				
		0.05	14	mg/L
PETROLEUM HYDROCARBONS				
VOLATILE (WATER)				
DILUTION FACTOR *				
DATE ANALYZED				
METHOD GC FID/5030				
as Gasoline				
		0.05	85	mg/L
PETROLEUM HYDROCARBONS				
EXTRACTABLE (WATER)				
DILUTION FACTOR *				
DATE EXTRACTED				
DATE ANALYZED				
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
 Page: 13

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

Page: 14

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
METHOD 602			--	mg/L
Benzene			0.5	22
Ethylbenzene			0.5	0.5
Toluene			0.5	ND
Xylenes, total			0.5	ND
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
as Motor Oil			0.5	ND



NET Pacific, Inc.

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

Date: 07-17-91
Page: 15

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 *				
DATE ANALYZED				
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 *				
DATE EXTRACTED				
DATE ANALYZED				
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: 16

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 *				
DATE ANALYZED				
METHOD GC FID/5030				
as Gasline		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 *				
DATE EXTRACTED				
DATE ANALYZED				
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: 17

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 *				
DATE ANALYZED				
METHOD GC FID/5030				
as Gasoline		0.05	ND	mg/L
METHOD 602				
DILUTION FACTOR *				
DATE ANALYZED				
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



NET Pacific, Inc.

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

Date: 07-15-91
 Page: 19

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, $100 \text{ [(Value 1 - Value 2)]/mean value}$.
- 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.



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

8296

Lab: Net Pacific

Job Number: 20294.003.02

Name/Location: Cornation - Oakland

Project Manager: Bruce Sheibach

Samplers: Rick Erdman

Dave Evans

Recorder: Rick Erdman

(Signature Required)

SOURCE CODE	MATRIX				#CONTAINERS & PRESERV.				SAMPLE NUMBER OR LAB NUMBER			DATE				STATION DESCRIPTION/NOTES									
	Water	Sediment	Soil	Oil	Unpres.	H ₂ SO ₄	HNO ₃	HCL	Yr	Wk	Seq	Yr	Mo	Dy	Time										
23	X				2	1	6		9	10	6	2	5	0	1	9	10	6	2	5	0	9	3	0	
					2	1	6																		
					2		3																		
					2		3																		
					2		3																		
					2	1	6																		
					2		6																		
					2		6																		
					2	1	6																		
					2		6																		
					2	1	6																		
					2		6																		
					2	1	6																		
					2		6																		
					2	1	6																		
					2		6																		
					2	1	6																		
					2		6																		
					2	1	6																		
					2		6																		
					2	1	6																		
					2		6																		
					2	1	6																		
					2		6																		
					2	1	6																		
					2		6																		
					2	1	6																		
					2		6																		
					2	1	6																		
					2		6																		
					2	1	6																		
					2		6																		
					2	1	6																		
					2		6																		
					2	1	6																		
					2		6																		
					2	1	6																		
					2		6																		
					2	1	6																		
					2		6																		
					2	1	6																		
					2		6																		
					2	1	6																		
					2		6																		
					2	1	6																		
					2		6																		
					2	1	6																		
					2		6																		
					2	1	6																		
					2		6																		
					2	1	6																		
					2		6																		
					2	1	6																		
					2		6																		
					2	1	6																		
					2		6																		
					2	1	6																		
					2		6																		
					2	1	6																		
					2		6																		
					2	1	6																		
					2		6																		
					2	1	6																		
					2		6																		
					2	1	6																		
					2		6																		
					2	1	6																		
					2		6																		
					2	1	6																		
					2		6																		
					2	1	6																		
					2		6																		
					2	1	6																		
					2		6																		
					2	1	6																		
					2		6																		
					2	1	6																		
					2		6																		
					2	1	6																		
					2		6																		
					2	1	6	</																	

CHAIN OF CUSTODY FORM

8324

Lab: Net Pacific

Job Number: 70194-003-02

Samplers: Rick Erdman

Name/Location: Cannation - Oakland

Dave Evans

Project Manager: Bruce Sheibach

Recorder: Rick Erdman
 (Signature Required)

ANALYSIS REQUESTED										
EPA 601/8010	EPA 602/8020	EPA 624/8240	EPA 625/8270	ICP METALS	EPA 8015M/TPH gas. distal	D/Lg. water - sample 503015				
X	X			X	X					
	X			X	X					
X				X	X					
	X			X	X					
X				X	X					
X				X	X					
X				X	X					
X				X	X					
X				X	X					

SOURCE CODE	MATRIX				#CONTAINERS & PRESERV.				SAMPLE NUMBER OR LAB NUMBER			DATE				STATION DESCRIPTION/NOTES								
	Water	Sediment	Soil	Oil	Unpres.	H ₂ SO ₄	HNO ₃	HCL	Yr	Wk	Seq	Yr	Mo	Dy	Time									
23	X				2		3		9	10	6	2	6	0	1	9	10	6	2	6	0	8	15	
					2		1																	
					2		3																	
					2		1																	
					2		1																	
					2		1																	
					2		1																	
					2		1																	
					2		1																	
					2		1																	
					2		1																	
					2		1																	
					2		1																	
					2		1																	
					2		1																	
					2		1																	
					2		1																	
					2		1																	
					2		1																	
					2		1																	
					2		1																	
					2		1																	
					2		1																	
					2		1																	
					2		1																	
					2		1																	
					2		1																	
					2		1																	
					2		1																	
					2		1																	
					2		1																	
					2		1																	
					2		1																	
					2		1																	
					2		1																	
					2		1																	
					2		1																	
					2		1																	
					2		1																	
					2		1																	
					2		1																	
					2		1																	
					2		1																	
					2		1																	
					2		1																	
					2		1																	
					2		1																	
					2		1																	
					2		1																	
					2		1																	
					2		1																	
					2		1																	
					2		1																	
					2		1																	
					2		1																	
					2		1																	
					2		1																	
					2		1																	
					2		1																	
					2		1																	
					2		1																	
					2		1																	
					2		1																	
					2		1																	
					2		1																	
					2		1																	
					2		1																	
					2		1																	
					2		1																	
					2		1																	
					2		1																	
					2		1																	
					2		1																	
					2		1																	
					2		1																	
					2		1																	
					2		1																	
					2		1																	
					2		1																	

Appendix E
MICROBIOLOGICAL EVALUATION

INTRODUCTION

This report presents the findings of Harding Lawson Associates' (HLA) evaluation study to assess the feasibility of using biological treatment to remediate soil and groundwater containing petroleum hydrocarbons (gasoline and diesel) at Carnation's facility in Oakland, California.

The purpose of this study was to evaluate inorganic chemistry and microbiological constituents that would require enhancement in order to optimize the biological degradation of the petroleum hydrocarbons present in the soil and groundwater and to perform a laboratory study to evaluate the effectiveness of several nutrient solutions to enhance biological degradation of the hydrocarbons. The laboratory evaluation was designed to:

- o Evaluate the existing microbial populations capable of degrading petroleum hydrocarbons
- o Evaluate soil chemistry factors that could influence the rate of biological degradation of petroleum hydrocarbons
- o Evaluate the stability of hydrogen peroxide in soil
- o Evaluate nutrient supplements required to stimulate the indigenous microbial populations to accelerate the degradation of the petroleum hydrocarbons.

SOIL AND GROUNDWATER SAMPLES

The soil and groundwater sampling areas were selected to provide representative hydrocarbon concentrations and soil stratigraphy at the Carnation facility. Seven soil samples, each weighing approximately 500 grams, and three groundwater samples, each approximately one liter in volume, were collected from the facility by HLA field

personnel during site visits in June and July, 1991. These samples were utilized in the microbial and inorganic chemistry evaluations.

SAMPLE ANALYSIS AND INTERPRETATION OF RESULTS

Microbial Populations in Soil and Groundwater

Soil and groundwater samples were analyzed at HLA's bioremediation laboratory to estimate the total heterotrophic microbial population and the microbial population capable of utilizing petroleum hydrocarbons (gasoline) as a source of carbon and energy.

The evaluation provided an estimate of the total number of microorganisms per gram (milliliter) of sample and, of these, those microorganisms that have the metabolic capability to use hydrocarbons as a primary source of carbon and energy.

Microorganisms capable of degrading petroleum hydrocarbons were present in each sample. The percentage of hydrocarbon-utilizers as a portion of the total population ranged from 0.3 to 52.5 percent in the soil and 11.5 to 70 percent in the groundwater. Results of the microbial evaluation of the soil and groundwater samples are within a range acceptable for biological degradation (Table E-1).

The results indicate that the existing microbial population in soil and groundwater includes a subpopulation of microorganisms capable of degrading petroleum hydrocarbons. Stimulation of the hydrocarbon-utilizing microorganisms with the proper nutrients should result in an increase of their percentage of the total microbial population and result in a significant decrease in the concentration of petroleum hydrocarbons in soil and groundwater.

Microenvironmental Factors in Soil and Groundwater

A soil chemistry profile, which includes pH, the concentration of nitrogen as ammonia and nitrate, phosphorus as orthophosphate, sulfate and water soluble iron,

manganese, magnesium, calcium, and potassium was developed for a composite soil sample consisting of equal portions of samples from Soil Borings SB-1, SB-4, SB-6, SB-12, SB-16, and SB-17. The results of the soil chemistry analysis are summarized in Table 2.

A groundwater chemistry profile, which includes the concentration of nitrogen as ammonia and nitrate, phosphorus as orthophosphate, sulfate and dissolved iron, manganese, magnesium, calcium, and potassium, was developed for a composite groundwater sample. The composite groundwater sample was prepared by mixing groundwater samples collected from Monitoring Wells MW-3, MW-25, and MW-26. The results of the groundwater chemistry analyses are summarized in Table 3.

Generally, acceptable concentrations of key inorganic nutrients necessary to sustain microbial metabolism are as follows:

- nitrogen as nitrate or ammonia - 20 milligrams (mg) per 100 mg hydrocarbon
- phosphorus as orthophosphate - 5 mg per 100 mg hydrocarbon

Comparison of the analytical results to these requirements indicates that the low concentrations of nitrogen as nitrate or ammonia and phosphorus as orthophosphate in the soil and groundwater are probably limiting the potential for microbial degradation of the petroleum hydrocarbons. Therefore, stimulation of the indigenous microbial population capable of degrading petroleum hydrocarbons will require the addition of nitrate or ammonia and phosphorus, in a form usable by the microorganisms.

Hydrogen Peroxide Stability

The ability to add oxygen at high concentrations to the subsurface environment will be crucial to the success of the bioremediation project. The most effective way to introduce large amounts of oxygen to the subsurface environment is through the

application or injection of a stabilized hydrogen peroxide solution. Hydrogen peroxide is converted to oxygen and water as it diffuses through the soil. The rate of conversion of hydrogen peroxide to oxygen and water is site-dependent.

Soil composites were prepared from the site soil samples and slurried with a composite site groundwater sample. In each test, 37.5 grams of soil were placed in a flask with 112 milliliters (ml) of site groundwater and supplemented with 100 parts per million (ppm) of the nutrient formulation and an initial hydrogen peroxide concentration of approximately 600 ppm. Periodically, aliquots were removed and analyzed for hydrogen peroxide by a spectrophotometric method. The results of the evaluation (Table E-4), indicate that hydrogen peroxide stability is generally constant across the site. The percentage of hydrogen peroxide remaining in samples after 12 hours ranged from 24 to 38 percent. In all cases, the loss of hydrogen peroxide was accomplished by the release of oxygen. In order for hydrogen peroxide and ultimately oxygen to be adequately distributed throughout the site, the placement of injection wells or trenches and injection application strategies should take into account the observed conversion rate as well as additional subsurface characteristics.

Nutrient Stimulation

Optimum nutrient conditions are necessary to stimulate the indigenous microbial population to degrade the site contaminants. Three nutrient formulations, with hydrogen peroxide as an oxygen source, were evaluated to determine the effect of each formulation on the rate of degradation of hydrocarbon.

Soil composites were prepared from the site soil samples and slurried with a composite sample of site groundwater. In each test, 9 grams of soil were placed in a glass vial along with 25 ml of groundwater that had been amended with the appropriate

nutrient formulation and an initial hydrogen peroxide concentration of 50 ppm. After all additions were completed, headspace was minimized (less than 0.5 ml) and the vial capped with a Teflon-faced silicon septum. Periodically, hydrogen peroxide was injected through the septum to provide an estimated residual of 10 ppm dissolved oxygen. The results of this evaluation (Table E-5), indicate that each nutrient formulation stimulated the microbial degradation of hydrocarbons, resulting in significant removal of petroleum hydrocarbons as TPH and BTEX during the 28-day incubation period. The control group, which received no nutrient or oxygen additions but was exposed to the same laboratory conditions, revealed no significant change in TPH concentration during the incubation period. Additionally, the evaluation results indicate that the 500 ppm nutrient formulation should be selected for future laboratory or field studies based on the efficiency of TPH and BTEX removal.

SUMMARY AND RECOMMENDATIONS

The results of the laboratory evaluation study performed by HLA indicate that biological treatment is technically feasible and effective for reducing petroleum hydrocarbon concentrations in soil and groundwater at the Carnation facility. A summary of the laboratory evaluation results are presented below.

- o The microbial evaluation indicates that the existing microbial population in the soil contains a subpopulation of hydrocarbon-utilizing microorganisms and this subpopulation is within a range acceptable for biological degradation.
- o Evaluation of soil inorganic chemistry evaluation indicates that low concentrations of the inorganic nutrients nitrogen and phosphorus could be limiting the metabolism of the existing microorganisms capable of degrading hydrocarbons in the soil and groundwater environment. The addition of these limiting nutrients in conjunction with oxygen should stimulate the growth of hydrocarbon-utilizing microorganisms, resulting in a reduction in the concentration of petroleum hydrocarbons in the soil and groundwater.

- Evaluation of hydrocarbon peroxide stability evaluation indicates that decomposition of hydrogen peroxide is generally constant in the soil samples that were evaluated. Since approximately 30 percent of the hydrocarbon peroxide remains after 12 hours, the placement of injection wells or trenches will be critical to achieve adequate distribution of oxygen for efficient biological degradation.
- The nutrient stimulation evaluation indicates that the addition of the proper nutrients and oxygen enhanced the growth of the hydrocarbon-utilizing microbial population, producing a decrease in TPH and BTEX concentrations of approximately 99.9 percent and 99 percent, respectively during a 28-day incubation period. These results indicate that biological treatment of soil and groundwater contamination is technically feasible.

**Table E-1. Enumeration of Total and Hydrocarbon-Utilizing
Microorganisms in Soil
Carnation Facility
Oakland, California**

Sample Designation/ Sample Depth	HLA Lab No.	Sample Type	Total Microorganisms	Hydrocarbon-Utilizing Microorganisms (percent of total)
SB-1, 11.0 to 11.5'	91-3041	soil	3.5×10^5 cfu/gram*	2.6×10^4 cfu/gram* (7.4)
SB-4, 10.5 to 11.0'	91-3042	soil	4.0×10^4 cfu/gram*	3.3×10^3 cfu/gram* (8.3)
SB-12, 11.0 to 11.5'	91-3043	soil	4.0×10^2 cfu/gram*	2.1×10^2 cfu/gram* (52.5)
SB-6, 11.0 to 11.5'	91-3047	soil	5.0×10^4 cfu/gram*	3.3×10^3 cfu/gram* (6.6)
SB-15, 13.5'	91-3048	soil	7.3×10^5 cfu/gram*	2.2×10^3 cfu/gram* (0.3)
SB-16, 11.0'	91-3049	soil	7.3×10^3 cfu/gram*	2.0×10^1 cfu/gram* (0.3)
SB-17, 11.0'	91-3050	soil	5.0×10^4 cfu/gram*	6.1×10^2 cfu/gram* (1.2)
MW-3, NA	91-3062	groundwater	2.0×10^2 cfu/ml**	1.4×10^2 cfu/ml** (70)
MW-26, NA	91-3063	groundwater	6.2×10^4 cfu/ml**	7.9×10^3 cfu/ml** (12.7)
MW-25, NA	91-3064	groundwater	9.6×10^4 cfu/ml**	1.1×10^4 cfu/ml** (11.5)

* cfu/gram. Colony forming units per gram.

** cfu/ml. Colony forming units per milliliter.

NA Not applicable.

**Table E-2. Soil Chemistry Profile
Carnation Facility
Oakland, California**

Harding Lawson Associates

Parameter	Sample Designation ⁽¹⁾ <u>Soil Composite</u>
pH	7.2
Ammonia-N (mg/kg) ⁽²⁾	1.3
Nitrate-N (mg/kg)	1.8
Orthophosphate (mg/kg)	10.1
Sulfate (mg/kg)	90
Water Soluble Iron (mg/kg)	7.4
Water Soluble Manganese (mg/kg)	0.7
Water Soluble Magnesium (mg/kg)	79.7
Water Soluble Potassium (mg/kg)	1.8
Water Soluble Calcium (mg/kg)	35.2
Cation Exchange Capacity (meq ⁽³⁾ /100 gm)	12.5

- (1) Samples taken by HLA in June and July, 1991, and analyzed by Environmental Technical Services Laboratories.
- (2) Milligram per kilogram - equivalent to parts per million.

Table E-3. Groundwater Chemistry Profile
Carnation Facility
Oakland, California

Parameter	Sample Designation ⁽¹⁾ <u>Groundwater Composite</u>
pH	6.5
Ammonia-N (mg/l) ⁽²⁾	0.4
Nitrate-N (mg/l)	2.9
Orthophosphate (mg/l)	4.5
Sulfate (mg/l)	47
Dissolved Iron (mg/l)	1.9
Dissolved Manganese (mg/l)	1.7
Dissolved Magnesium (mg/l)	41.8
Dissolved Potassium (mg/l)	4.5
Dissolved Calcium (mg/l)	54.1

(1) Samples taken by HLA in June and July, 1991, and analyzed by ETS Laboratories.

(2) Milligram per liter - equivalent to parts per million.

**Table E-4. Hydrogen Peroxide Stability Results
Carnation Facility
Oakland, California**

Sample Designation	<u>Hydrogen Peroxide Concentration (ppm)¹</u>			
	Initial	4 hours	8 hours	12 hours
SB-1	590	378	270	164
SB-4	590	358	220	139
SB-12	610	378	244	151
SB-6	635	390	220	130
SB-15	650	515	378	247
SB-16	610	473	320	213
SB-17	610	433	302	205
Control ²	525	525	505	505

- (1) Tests were conducted using 30% slurries and hydrogen peroxide was determined by a spectrophotometer.
- (2) Control was a distilled water sample receiving the same volume of hydrogen peroxide and exposed to same laboratory conditions as the soil samples.

**Table E-5. Nutrient Stimulation Results
Carnation Facility
Oakland, California**

Group No.	Nutrient Solution (ppm)	<u>Percent Removal of Total Petroleum Hydrocarbons as Gasoline and BTEX</u>			
		Day 7	Day 14	Day 21	Day 28
1	100	18	65	84	99.9
	100	42	85	87	98
2	200	23	67	84	99.9
	200	56	83	86	99.4
3	500	20	86	96	99.9
	500	38	95	97	99.9

DISTRIBUTION

SITE CHARACTERIZATION REPORT
CARNATION FACILITY
OAKLAND, CALIFORNIA
September 17, 1991

Copy No. 5

Copy No.

4 copies:	Carnation Company 800 North Brand Boulevard Glendale, California 91203 Attention: Mr. Richard Flaget	1-4
1 copy:	Alameda County Health Agency Division of Hazardous Materials Department of Environmental Health 80 Swan Way, Room 200 Oakland, California 94621 Attention: Mr. Dennis Byrne	5
1 copy:	California Regional Water Quality Control Board San Francisco Bay Region 2101 Webster Street, Suite 500 Oakland, California 94612 Attention: Mr. Richard Hiatt	6
1 copy:	Project File	7
1 copy:	Master File	8
1 copy:	QC/Bound Report File	9

DJC/RBS/amw/T19015-H

QUALITY CONTROL REVIEWER



David F. Leland, P.E.
Associate Engineer

TABLES

Table 1. Monitoring and Product Recovery Well Completion Details

Harding Lawson Associates

Well Number	Northing	Easting	Ground Surface Elevation (ft AMSL [1])	Measuring Point Elevation (ft ASML)	Date Drilled	Total Depth (ft)	Bentonite Seal Interval (ft BGS [2])	Screened Interval (ft BGS)	Slot Size (inches)	Sand Pack Size
Monitoring Wells										
MW- 1	2227.7	3067.1	16.82	16.49	3/15/89	47.0	3.5 - 5.5	7.5 - 47.0	0.030	#3 sand
MW- 2	2500.9	3233.9	15.52	15.11	3/22/89	25.0	4.0 - 5.0	7.0 - 25.0	0.030	#3 sand
MW- 3	2613.2	3114.7	14.66	14.30	3/21/89	25.0	4.0 - 5.0	7.0 - 25.0	0.030	#3 sand
MW- 4	2484.9	3023.1	14.84	14.42	3/20/89	44.0	4.0 - 5.5	7.0 - 44.0	0.030	#3 sand
MW- 5	2616.5	3310.7	14.82	14.41	3/21/89	25.0	3.5 - 4.5	7.0 - 22.0	0.030	#3 sand
MW- 6	2634.0	3259.1	14.79	14.12	3/17/89	17.0	4.0 - 5.0	7.0 - 17.0	0.030	#3 sand
MW- 7	2650.0	3199.2	14.74	14.29	3/16/89	17.0	4.0 - 5.0	7.0 - 17.0	0.030	#3 sand
MW- 8	2672.3	3129.8	14.77	14.20	3/17/89	17.0	4.0 - 5.0	7.0 - 17.0	0.030	#3 sand
MW- 9	2289.9	2956.1	15.77	14.96	3/17/89	25.0	4.0 - 5.0	7.0 - 25.0	0.030	#3 sand
MW-10	2373.5	2933.6	16.04	15.73	3/16/89	25.0	4.0 - 5.0	7.0 - 25.0	0.030	#3 sand
MW-11	2431.9	3127.6	15.06	14.55	3/21/89	25.0	na [3]	7.0 - 25.0	0.030	#3 sand
MW-12	2450.8	3230.5	15.70	15.28	3/21/89	25.0	4.0 - 5.0	7.0 - 25.0	0.030	#3 sand
MW-13	2489.7	3290.0	15.48	14.85	3/21/89	25.0	4.0 - 5.0	7.0 - 25.0	0.030	#3 sand
MW-14	2619.1	3055.0	14.80	14.10	3/17/89	22.0	4.0 - 5.0	7.0 - 22.0	0.030	#3 sand
MW-15	2566.3	3041.6	14.82	14.17	3/17/89	22.0	4.0 - 5.0	7.0 - 22.0	0.030	#3 sand
MW-16	2689.0	3067.6	14.78	14.11	3/22/89	25.0	4.0 - 5.0	6.5 - 22.0	0.030	#3 sand
MW-17	na	na	na	na	na	na	na	na	na	na
MW-18	na	na	na	na	na	na	na	na	na	na
MW-19	na	na	na	na	na	na	na	na	na	na
MW-20	na	na	na	na	na	na	na	na	na	na
MW-21	na	na	na	na	na	na	na	na	na	na
MW-22	2649.2	3160.6	na	14.44	na	na	na	na	na	na
MW-23	2623.6	3155.3	na	14.48	na	na	na	na	na	na
MW-24	2611.3	3208.8	na	14.67	na	na	na	na	na	na
MW-OS25	2694.8	3150.6	13.25	12.86	8/23/89	22.5	5.0 - 6.5	7.5 - 22.5	0.020	#2/16 sand
MW-OS26	2676.8	3206.4	13.55	12.71	8/24/89	25.0	7.5 - 9.0	10.0 - 25.0	0.020	#2/16 sand
MW-OS27	2666.4	3271.2	14.33	14.04	8/28/89	24.5	6.5 - 8.0	9.0 - 24.0	0.020	#2/16 sand
MW-OS28	2704.7	3220.1	13.90	13.45	8/29/89	27.0	6.5 - 8.0	9.0 - 27.0	0.020	#2/16 sand
MW-OS29	2729.2	3146.2	13.38	12.60	8/30/89	25.0	6.5 - 8.0	9.0 - 25.0	0.020	#2/16 sand
MW-30	2681.5	3096.0	na	14.54	na	na	na	na	na	na
MW-31	2460.8	3167.9	na	14.92	na	na	na	na	na	na
MW-32	2487.4	3168.3	na	14.76	na	na	na	na	na	na
MW-33	2481.9	3185.1	15.23	na	na	na	na	na	na	na
Product Recovery Wells										
PR- 1	2216.9	3056.0	16.73	na	2/28/89	15.0	4.0 6.0	8.0 15.0	0.125	Coarse Aquarium
PR- 2	2234.2	2977.6	15.80	na	2/22/89	15.5	4.0 6.0	8.0 15.5	0.125	Coarse Aquarium
PR- 3	2310.4	2960.1	15.90	na	2/22/89	15.5	4.0 6.0	8.0 15.5	0.125	Coarse Aquarium
PR- 4	2297.4	3027.7	16.34	na	2/22/89	15.5	4.0 6.0	8.0 15.5	0.125	Coarse Aquarium
PR- 5	2294.6	3094.0	16.64	na	2/22/89	15.5	4.0 6.0	8.0 15.0	0.125	Coarse Aquarium

Table 1. Monitoring and Product Recovery Well Completion Details

Harding Lawson Associates

Well Number	Northing	Easting	Ground Surface Elevation (ft AMSL [1])	Measuring Point Elevation (ft ASML)	Date Drilled	Total Depth (ft)	Bentonite Seal Interval (ft BGS [2])	Screened Interval (ft BGS)	Slot Size (inches)	Sand Pack Size
PR-90	na	na	na	na	na	na	na	na	na	na
PR-91	na	na	na	na	na	na	na	na	na	na
PR-92	na	na	na	na	na	na	na	na	na	na
PR-93	na	na	na	na	na	na	na	na	na	na
PR-94	na	na	na	na	na	na	na	na	na	na
PR-95	na	na	na	na	na	na	na	na	na	na
PR-96	na	na	na	na	na	na	na	na	na	na
PR-97	na	na	na	na	na	na	na	na	na	na
PR-98	na	na	na	na	na	na	na	na	na	na
PR-98	na	na	na	na	na	na	na	na	na	na
PR-100	na	na	na	na	na	na	na	na	na	na
PR-101	na	na	na	na	na	na	na	na	na	na
PR-102	na	na	na	na	na	na	na	na	na	na
PR-103	na	na	na	na	na	na	na	na	na	na

[1] ASML = Above Mean Sea Level

[2] BGS = Below Ground Surface

[3] na = Not Available

Table 2. Petroleum Hydrocarbon Concentrations in Soil Samples

Harding Lawson Associates

Boring Number	Sample Depth (feet)	Sample Number	Hydrocarbon Concentrations (mg/kg)				
			TPH as gasoline	TPH as diesel	TPH as motor oil	Oil and Grease (Total)	Oil and Grease (Nonpolar)
SB-1	5.0 - 5.5	91061701	<1	26*	220	270	230
SB-1	10.0 - 10.5	91061702	<1	<1	<10	<50	<50
SB-1	12.5 - 13.0	91061703	<1	<1	<10	NT	NT
SB-1	15.0 - 15.5	91061704	<1	<1	<10	NT	NT
SB-1	20.0 - 20.5	91061705	<1	<1	<10	NT	NT
SB-2	5.0 - 5.5	91061819	<1	<1	<10	NT	NT
SB-2	10.0 - 10.5	91061820	<1	<1	<10	NT	NT
SB-2	12.5 - 13.0	91061821	<1	<1	<10	NT	NT
SB-2	15.0 - 15.5	91061822	<1	<1	<10	NT	NT
SB-2	20.0 - 20.5	91061823	<1	<1	<10	NT	NT
SB-4	5.0 - 5.5	91061801	<1	<1	<10	<50	<50
SB-4	10.0 - 10.5	91061802	<1	<1	<10	<50	<50
SB-4	12.5 - 13.0	91061804	<1	<1	<10	NT	NT
SB-4	15.0 - 15.5	91061805	<1	<1	<10	NT	NT
SB-4	20.0 - 20.5	91061806	<1	<1	<10	NT	NT
SB-5	5.0 - 5.5	91061706	<1	<1	<10	NT	NT
SB-5	10.0 - 10.5	91061707	<1	<1	<10	NT	NT
SB-5	12.5 - 13.0	91061708	<1	<1	<10	NT	NT
SB-5	15.0 - 15.5	91061709	<1	<1	<10	NT	NT
SB-5	20.0 - 20.5	91061710	<1	<1	<10	NT	NT
SB-6	5.0 - 5.5	91062012	600	15	<10	150	120
SB-6	10.0 - 10.5	91062013	1900	170	<10	330	250
SB-6	13.0 - 13.5	91062015	350	86	<10	NT	NT
SB-6	15.0 - 15.5	91062016	180	37	22	NT	NT
SB-6	20.0 - 20.5	91062017	<1	23	<10	NT	NT
SB-10	5.0 - 5.5	91061711	26	17*	<10	<50	<50
SB-10	10.0 - 10.5	91061712	1200	260*	<10	<50	<50
SB-10	12.5 - 13.0	91061713	<1	<1	<10	NT	NT
SB-10	15.0 - 15.5	91061714	<1	<1	<10	NT	NT

Table 2. Petroleum Hydrocarbon Concentrations in Soil Samples

Harding Lawson Associates

Boring Number	Sample Depth (feet)	Sample Number	Hydrocarbon Concentrations (mg/kg)				
			TPH as gasoline	TPH as diesel	TPH as motor oil	Oil and Grease (Total)	Oil and Grease (Nonpolar)
SB-10	20.0 - 20.5	91061715	<1	<1	<10	NT	NT
SB-11	5.0 - 5.5	91062018	NT	NT	NT	85	81
SB-11	11.0 - 11.5	91062019	NT	NT	NT	290	160
SB-12	5.0 - 5.5	91061807	<1	<1	<10	<50	<50
SB-12	10.0 - 10.5	91061808	<1	<1	<10	<50	<50
SB-12	12.5 - 13.0	91061810	<1	<1	<10	NT	NT
SB-12	15.0 - 15.5	91061811	<1	<1	<10	NT	NT
SB-12	20.0 - 20.5	91061812	<1	<1	<10	NT	NT
SB-13	5.0 - 5.5	91062007	320	27	<10	NT	NT
SB-13	12.5 - 13.0	91062009	2.0	<1	<10	NT	NT
SB-13	15.5 - 16.0	91062010	1.6	<1	<10	NT	NT
SB-13	20.0 - 20.5	91062011	<1	<1	<10	NT	NT
SB-14	5.0 - 5.5	91062001	2500	470	<10	NT	NT
SB-14	10.0 - 10.5	91062002	1400	670	<10	NT	NT
SB-14	12.5 - 13.0	91062004	6.9	6.6	<10	NT	NT
SB-14	15.0 - 15.5	91062005	1.1	<1	<10	NT	NT
SB-14	20.0 - 20.5	91062006	<1	<1	<10	NT	NT
SB-15	5.0 - 5.5	91SB1555	<1	<1	<10	NT	NT
SB-15	10.0 - 10.5	91SB1510	3.2	57	45	NT	NT
SB-15	13.0 - 13.5	91SB1513	<1	<1	<10	NT	NT
SB-15	15.0 - 15.5	91SB1515	<1	<1	<10	NT	NT
SB-15	20.0 - 20.5	91SB1521	<1	<1	<10	NT	NT
SB-16	5.0 - 5.5	91SB1655	550	21	<10	130	130
SB-16	10.0 - 10.5	91SB1610	6400	940	280	250	240
SB-16	13.0 - 13.5	91SB1613	100	45	<10	NT	NT
SB-16	15.0 - 15.5	91SB1615	1900	59	44	NT	NT
SB-16	20.0 - 20.5	91SB1621	260	2.8	<10	NT	NT
SB-17	6.0 - 6.5	91SB1765	1.1	110	80	NT	NT
SB-17	10.0 - 10.5	91SB1710	10000	810	<10	NT	NT
SB-17	12.5 - 13.0	91SB1713	88	45	37	NT	NT

Table 2. Petroleum Hydrocarbon Concentrations in Soil Samples

Harding Lawson Associates

Boring Number	Sample Depth (feet)	Sample Number	Hydrocarbon Concentrations (mg/kg)				
			TPH as gasoline	TPH as diesel	TPH as motor oil	Oil and Grease (Total)	Oil and Grease (Nonpolar)
SB-17	15.0 - 15.5	91SB1715	130	130	69	NT	NT
SB-17	20.0 - 20.5	91SB1721	<1	<1	<10	NT	NT
SB-18	5.0 - 5.5	91061813	<1	<1	<10	<50	<50
SB-18	10.0 - 10.5	91061815	<1	<1	<10	<50	<50
SB-18	12.5 - 13.0	91061816	<1	<1	<10	NT	NT
SB-18	15.0 - 15.5	91061817	<1	<1	<10	NT	NT
SB-18	20.0 - 20.5	91061818	<1	<1	<10	NT	NT
SB-19	5.0 - 5.5	91062103	<1	<1	<10	<50	<50
SB-19	10.0 - 10.5	91062104	<1	<1	<10	<50	<50
SB-19	12.5 - 13.0	91062105	<1	<1	<10	NT	NT
SB-19	15.5 - 16.0	91062106	<1	<1	<10	NT	NT
SB-19	20.0 - 20.5	91062107	<1	<1	<10	NT	NT
SB-20	5.0 - 5.5	91062108	<1	17	25	57	<50
SB-20	10.0 - 10.5	91062109	820	65	34	<50	<50
SB-20	12.5 - 13.0	91062110	<1	<1	<10	NT	NT
SB-20	15.5 - 16.0	91062111	<1	<1	<10	NT	NT
SB-20	20.0 - 20.5	91062112	<1	<1	<10	NT	NT

* Note: The analytical laboratory reported that for the results for petroleum hydrocarbons as diesel analyses for these samples, the actual hydrocarbon extracted appeared to be a lighter hydrocarbon than diesel (NET Laboratories, 1991).

< 1 - Chemical not detected above reporting limit.

NT - Not Tested.

Table 3. PCB Concentrations in Soil and Product Samples

Boring Number	Sample Depth (feet)	Sample Number	PCB Concentrations (ug/kg)						
			Aroclor1016	Aroclor1221	Aroclor1232	Aroclor1242	Aroclor1248	Aroclor1254	Aroclor1260
SB-3	5.0 - 5.5	91061901	<100	<500	<200	<100	<100	<50	<50
SB-3	11.0 - 11.5	91061902	<100	<500	<200	<100	<100	<50	<50
SB-3	15.5 - 16.0	91061903	<100	<500	<200	<100	<100	<50	<50
SB-6	10.0 - 10.5	91062013	<100	<500	<200	<100	<100	<50	<50
SB-7	5.0 - 5.5	91061911	<100	<500	<200	<100	<100	100	<50
SB-7	11.0 - 11.5	91061912	<100	<500	<200	<100	<100	<50	<50
SB-7	15.0 - 15.5	91061913	<100	<500	<200	<100	<100	<50	<50
SB-8	5.5 - 6.0	91061907	<100	<500	<200	<100	<100	<50	<50
SB-8	10.5 - 11.0	91061908	<100	<500	<200	<100	<100	55	<50
SB-8	15.0 - 15.5	91061909	<100	<500	<200	<100	<100	130	<50
SB-9	5.0 - 5.5	91061904	<100	<500	<200	<100	<100	260	<50
SB-9	11.0 - 11.5	91061905	<100	<500	<200	<100	<100	<50	<50
SB-9	15.0 - 15.5	91061906	<100	<500	<200	<100	<100	<50	<50
SB-11	5.0 - 5.5	91062018	<100	<500	<200	<100	<100	<50	<50
SB-11	11.0 - 11.5	91062019	<100	<500	<200	<100	<100	<50	<50
SB-11	15.5 - 16.0	91062020	<100	<500	<200	<100	<100	<50	<50
Liquid Product*	10.0 - 11.0	91061910	<1000	<1000	<1000	<1000	<1000	49,000	<1000

* Note: Oily liquid sample from Boring SB-8 at approximately 10.0 to 11.0 feet bgs.
 <500 - Chemical not detected above reporting limit.

Table 4. 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 4. 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 4. 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 4. 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 4. 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 5. Product Thicknesses Before and After Well Redevelopment

Date	MW-7	MW-22	PR-20	PR-53
16-Apr-91	2.90	5.06	NM	NM
16-May-91	3.07	5.28	1.84	2.20
24-Jun-91	3.59	1.64	1.73	2.22
26-Jun-91	1.00	0.76	0.98	1.57
9-Jul-91	1.97	5.16	1.33	1.75
15-Aug-91	2.64	5.16	1.29	1.53

Notes: Product thicknesses in feet. NM - Not Measured.

Table 6. Aquifer Test Results

Harding Lawson Associates

Drawdown Data

Well Number	Distance from Pumping Well (ft)	Flow Rate (gpm)	Drawdown at End of Test (ft)	Aquifer Transmissivity (ft ² /day)	Aquifer Thickness (ft)	Hydraulic Conductivity (ft/day)	Storage Coefficient
MW-13	0	2.00	5.60	24	7	3.4	Not Calculated
MW-2	57.2	2.00	0.30	280	7	40	1.10E-04

Recovery Data

Well Number	Distance from Pumping Well (ft)	Flow Rate (gpm)	Aquifer Transmissivity (ft ² /day)	Aquifer Thickness (ft)	Hydraulic Conductivity (ft/day)
MW-13	0	2.00	230	7	32
MW-2	57.2	2.00	220	7	31

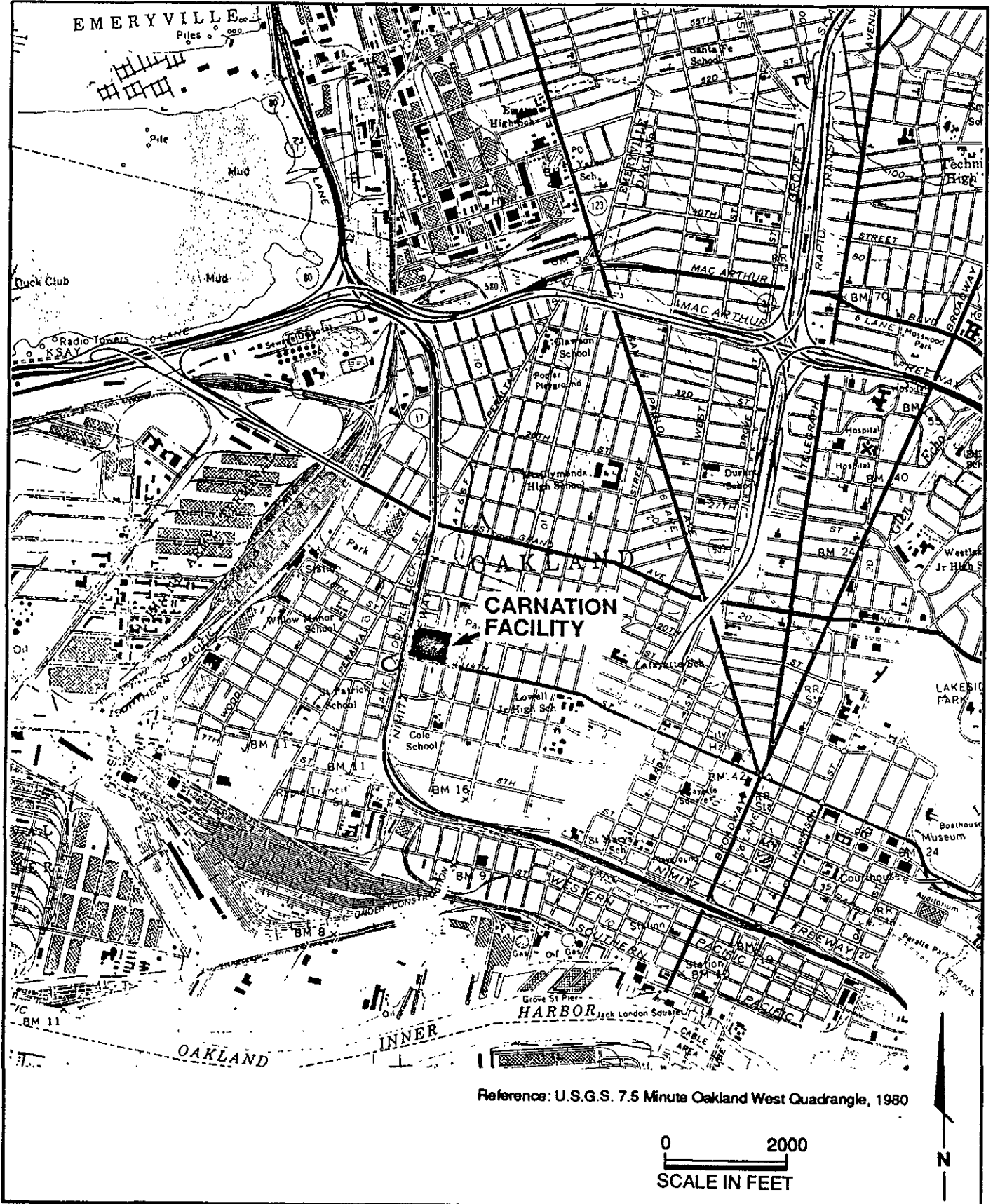
Averages of Reliable Drawdown and Recovery Data	Aquifer Transmissivity (ft ² /day)	Hydraulic Conductivity (ft/day)	Storage Coefficient
	240	34	1.10E-04

Table 7. 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



Reference: U.S.G.S. 7.5 Minute Oakland West Quadrangle, 1980



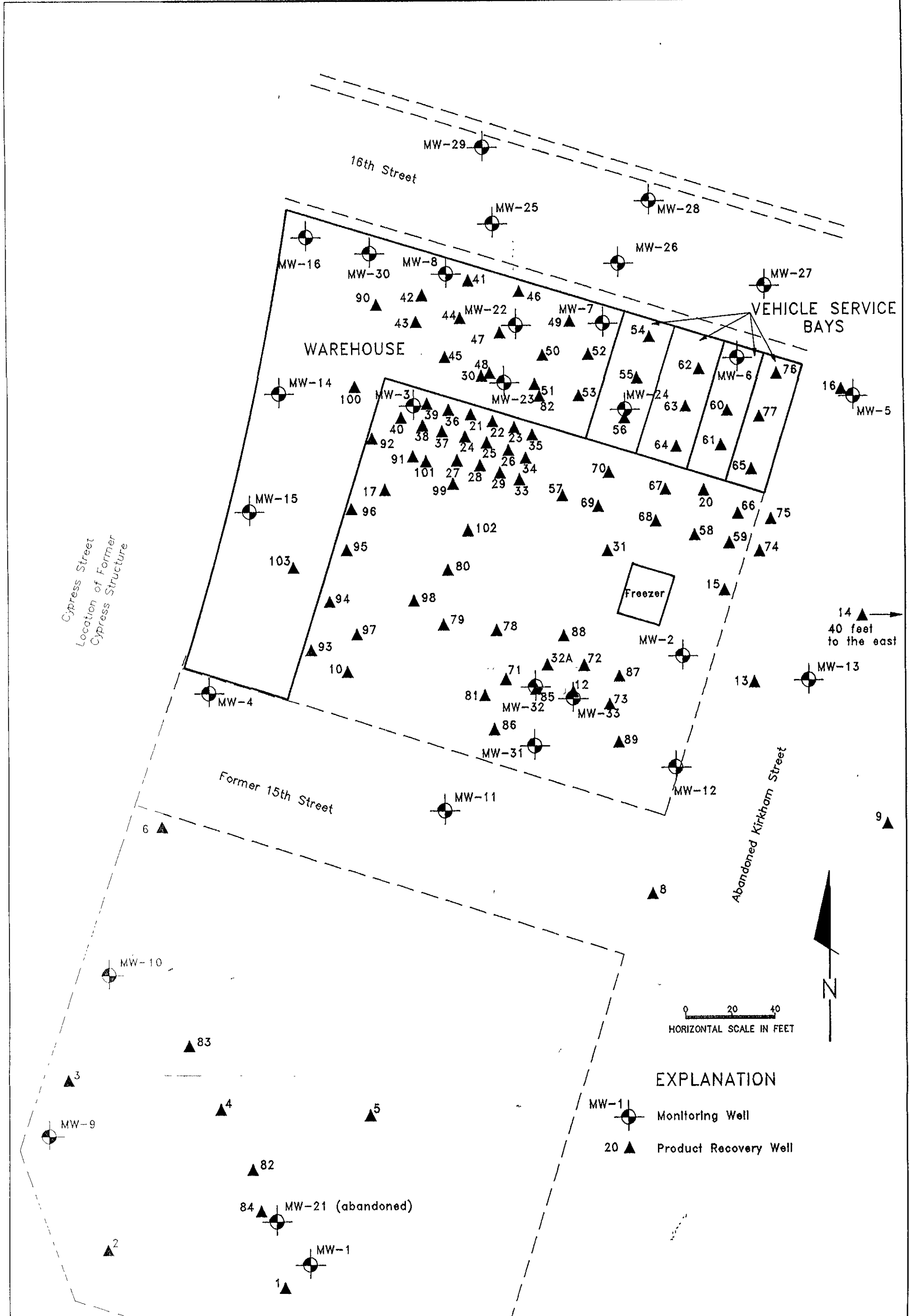
Harding Lawson Associates
 Engineering and
 Environmental Services

Site Location Map
Carnation Facility
Oakland, California

PLATE

1

DRAWN NJB	JOB NUMBER 20294,011.02	APPROVED <i>D. A. Craig</i>	DATE 9/91	REVISED DATE
--------------	----------------------------	--------------------------------	--------------	--------------



0 20 40
HORIZONTAL SCALE IN FEET

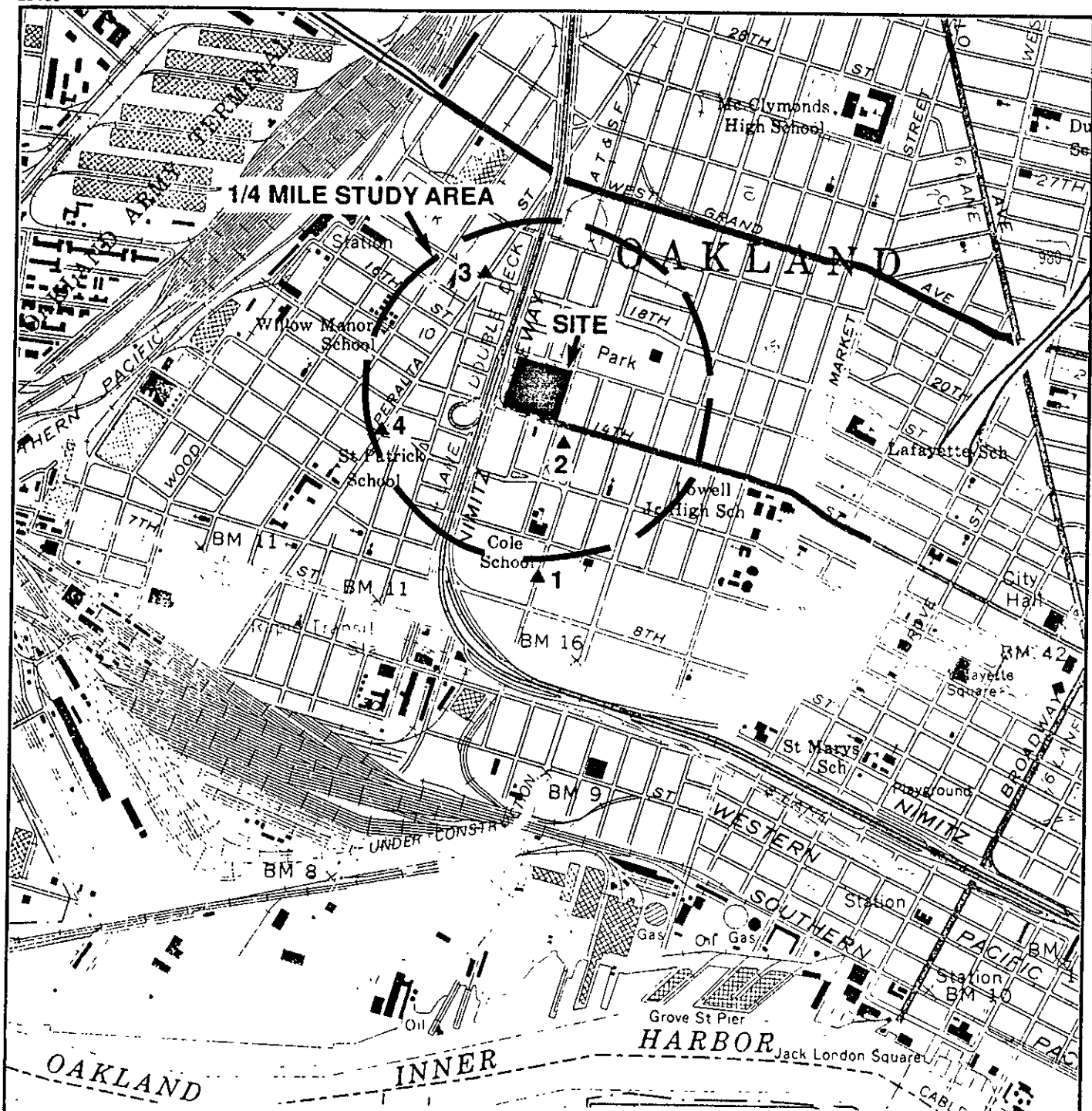
EXPLANATION

- MW-1 Monitoring Well
- 20 Product Recovery Well

HLA Harding Lawson Associates
Engineering and Environmental Services

Well Location Map
Carnation Facility
Oakland, California

PLATE
2



Reference: U.S.G.S. 7.5 Minute Oakland West Quadrangle, 1980

EXPLANATION

- 1. City of Oakland Housing Authority
- 2. Nabisco Brands
- 3. Cademartori Trucking
- 4. Doyle Property



Harding Lawson Associates
Engineering and Environmental Services

Site Vicinity Map and Listed Environmental Properties
Carnation Facility
Oakland, California

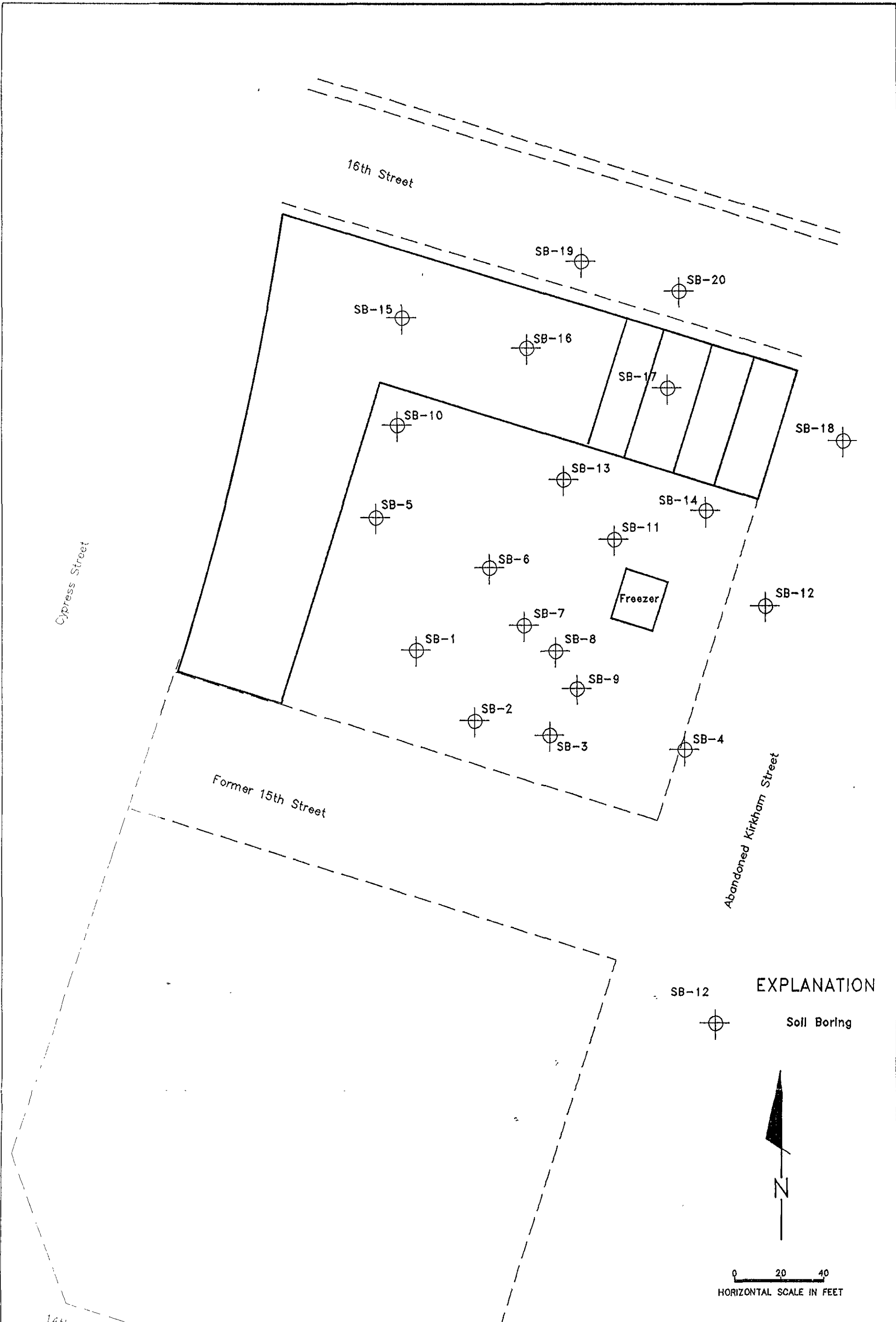
PLATE
3

DRAWN NJB
JOB NUMBER 20294,011.02

APPROVED,
D. J. Crang

DATE 9/91

REVISED DATE



Harding Lawson Associates
Engineering and
Environmental Services

Locations of Soil Borings
Carnation Facility
Oakland, California

PLATE
4

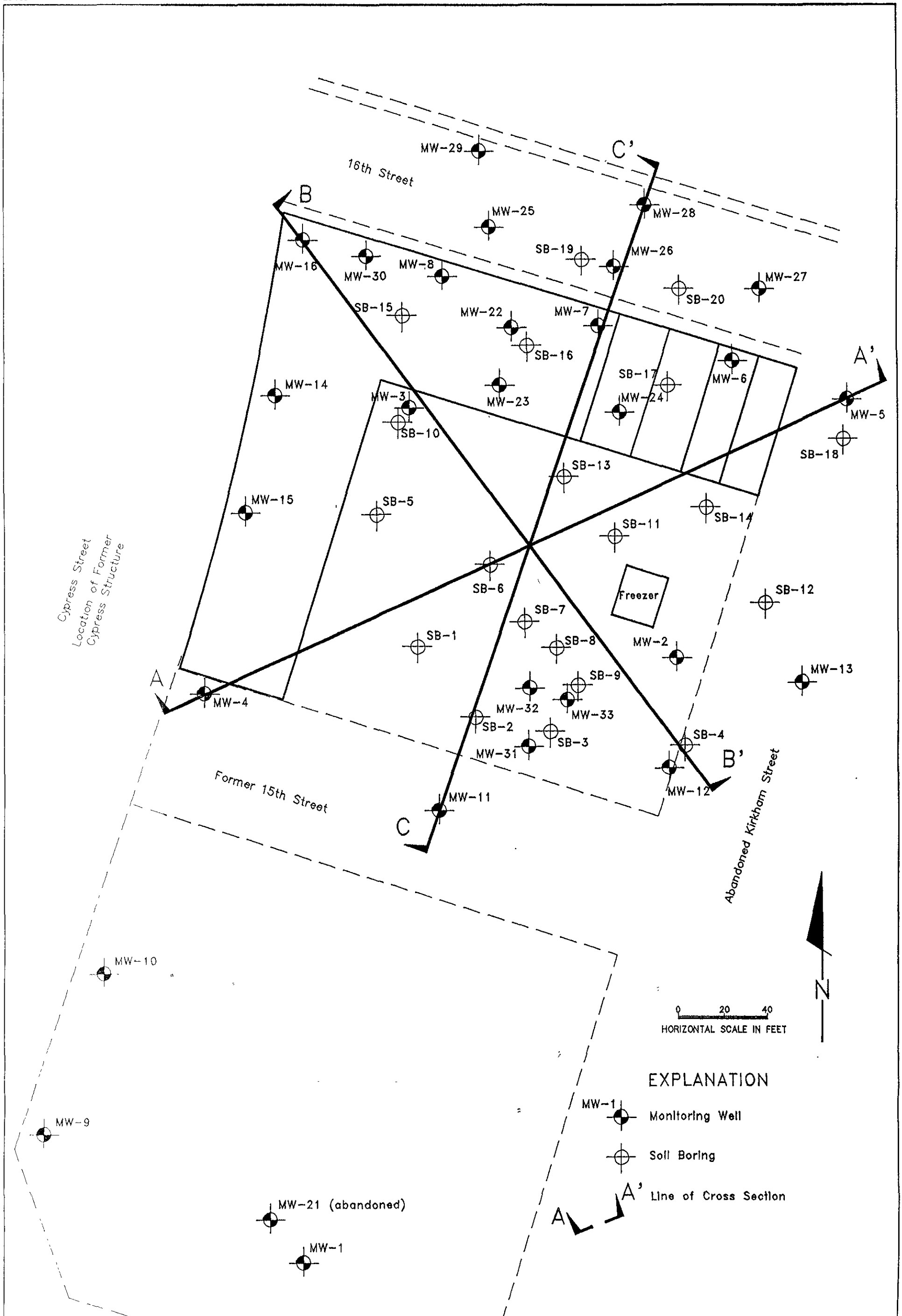
DRAWN
RWS

JOB NUMBER
20294,011.02




APPROVED
D. A. Cray

DATE
8/91

REVISED DATE



EXPLANATION

- MW-1  Monitoring Well
-  Soil Boring
- A-A'  Line of Cross Section



Harding Lawson Associates
 Engineering and
 Environmental Services

Locations of Geologic Cross Sections
 Carnation Facility
 Oakland, California

PLATE 5

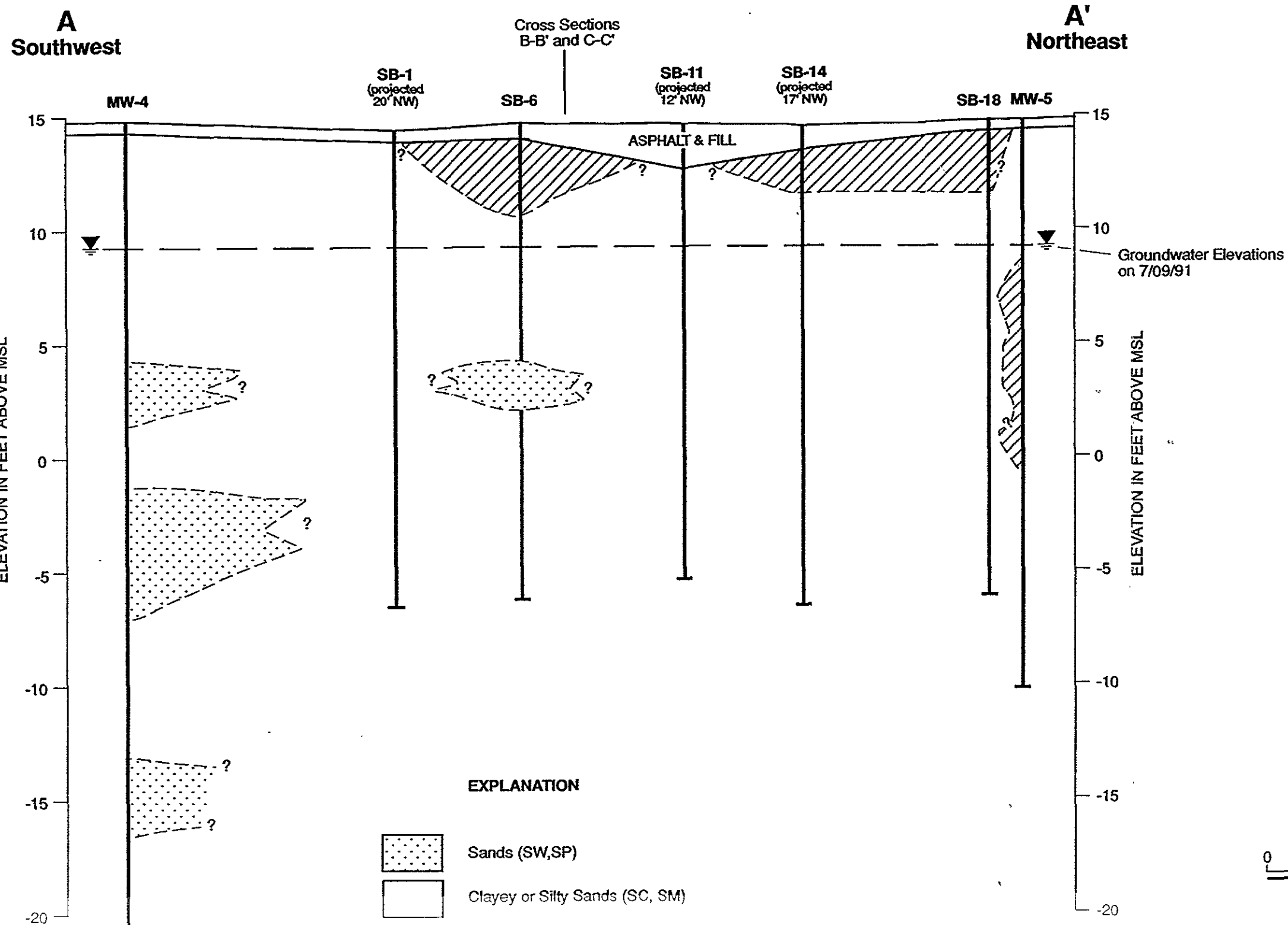
DRAWN
RWS

JOB NUMBER
20294,011.02

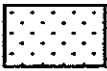
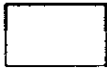
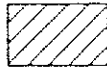
APPROVED
D. J. Crang

DATE
8/91

REVISED DATE

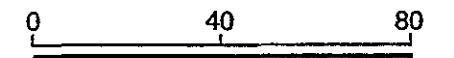


EXPLANATION

-  Sands (SW,SP)
-  Clayey or Silty Sands (SC, SM)
-  Silts (ML)

SB-1 Boring Designation

Geologic Contact



HORIZONTAL SCALE IN FEET

Vertical Exaggeration = 8x

0913PM



Harding Lawson Associates
 Engineering and
 Environmental Services

Geologic Cross Section A-A'
 Carnation Facility
 Oakland, California

PLATE

6

DRAWN: PMc
 JOB NUMBER: 20294,011.02

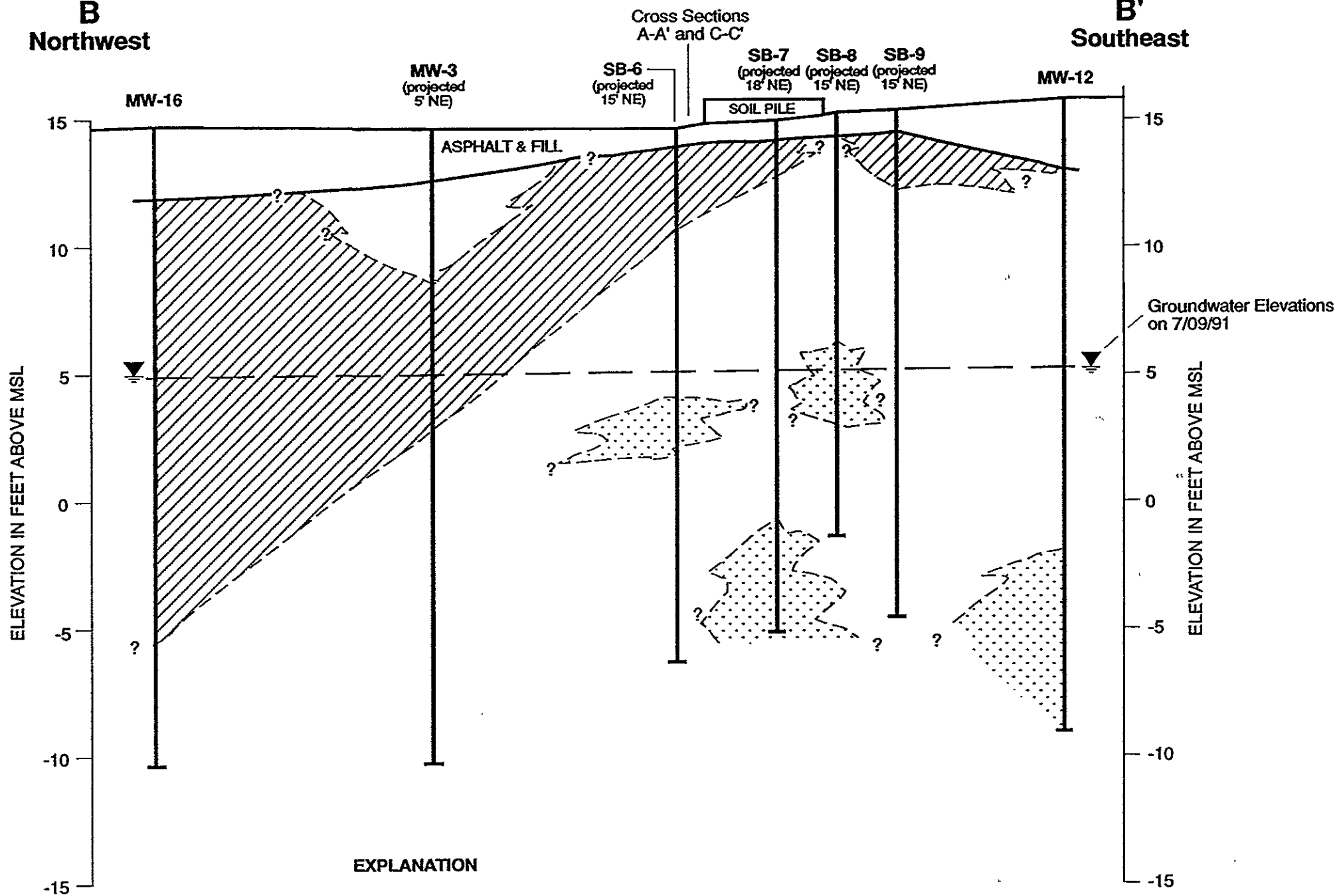
APPROVED: *D. A. Gray*

DATE: 8/91

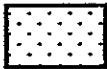




REVISED DATE

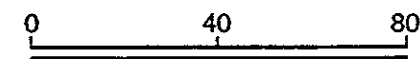
B
Northwest

B'
Southeast



EXPLANATION

-  Sands (SW,SP)
-  Clayey or Silty Sands (SC, SM)
-  Silts (ML)
-  Boring Designation
-  Geologic Contact



HORIZONTAL
SCALE IN FEET

Vertical Exaggeration = 8x

0913PM



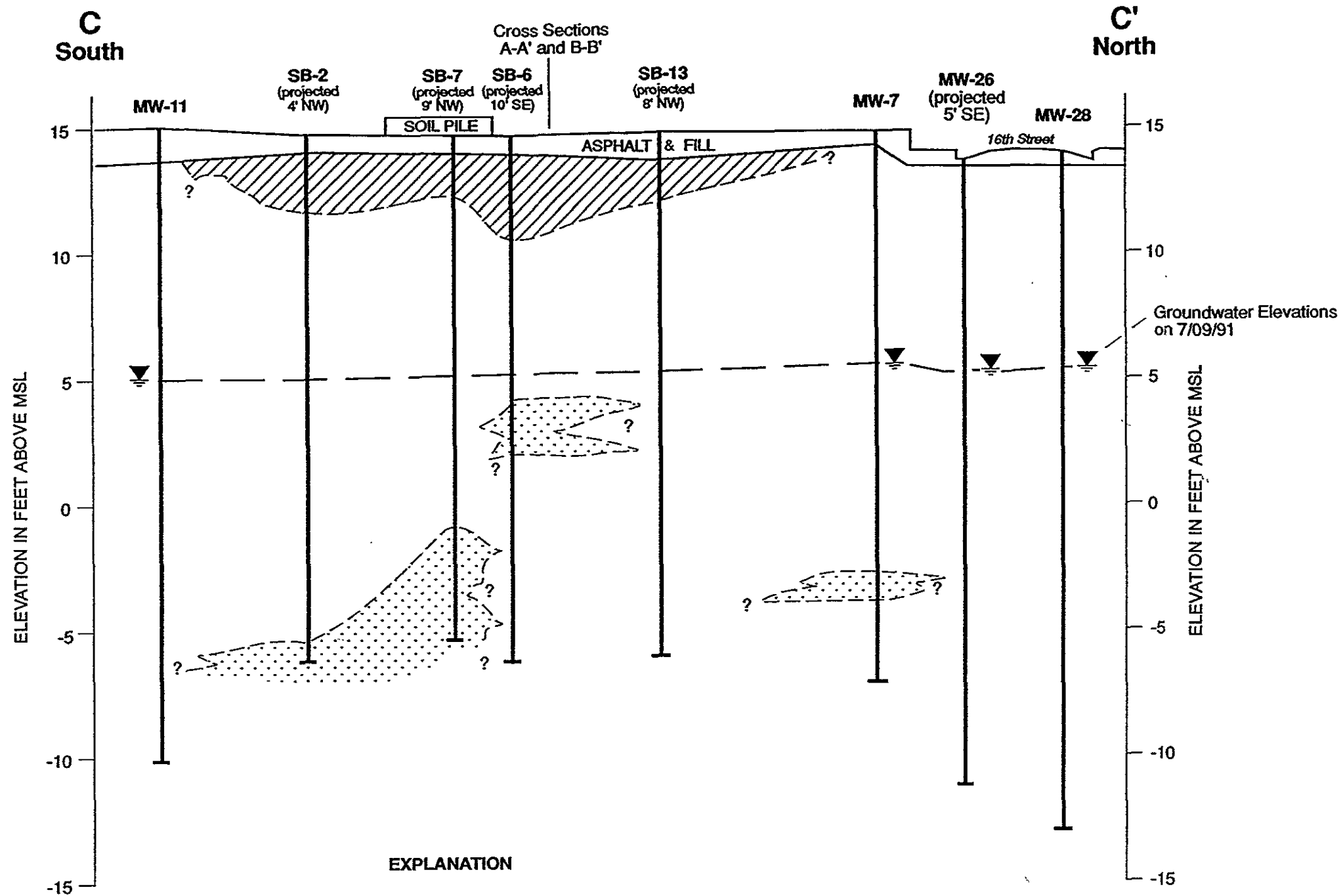
Harding Lawson Associates
Engineering and
Environmental Services

Geologic Cross Section B-B'
Carnation Facility
Oakland, California

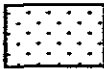
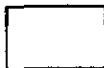
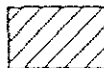


PLATE

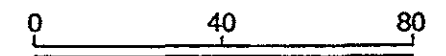
7

DRAWN PMc	JOB NUMBER 20294,011.02	APPROVED <i>D. J. Cross</i>	DATE 8/91	REVISED DATE
--------------	----------------------------	--------------------------------	--------------	--------------



EXPLANATION

-  Sands (SW,SP)
-  Clayey or Silty Sands (SC, SM)
-  Silts (ML)
-  Boring Designation
-  Geologic Contact



HORIZONTAL SCALE IN FEET

Vertical Exaggeration = 8x

0913PM



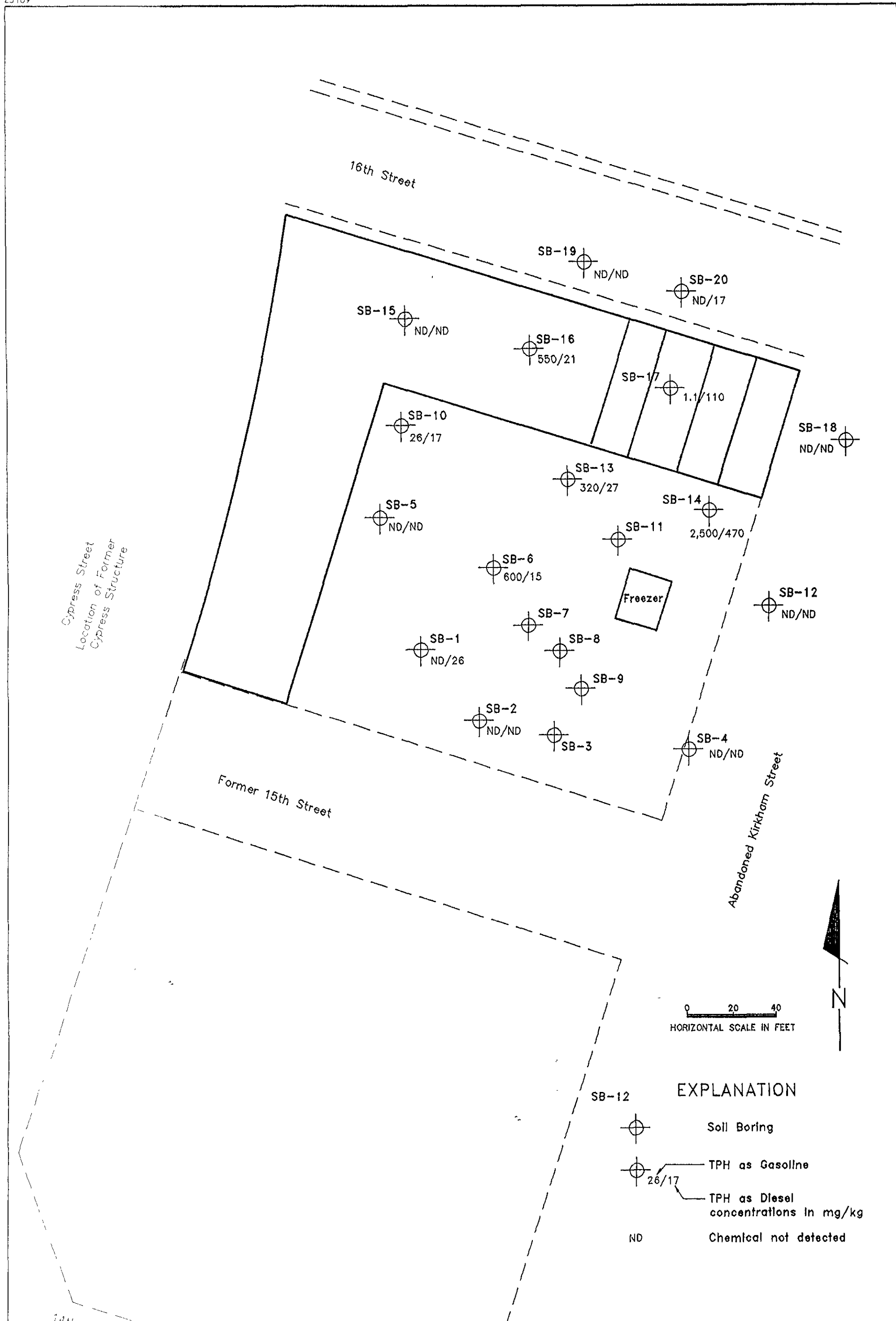
Harding Lawson Associates
Engineering and Environmental Services

Geologic Cross Section C-C'
Carnation Facility
Oakland, California

PLATE

8

DRAWN Pmc	JOB NUMBER 20294,011.02	APPROVED <i>D. J. Conroy</i>	DATE 8/91	REVISED DATE
--------------	----------------------------	---------------------------------	--------------	--------------



Cypress Street
Location of Former
Cypress Structure

Abandoned Kirkham Street

0 20 40
HORIZONTAL SCALE IN FEET



SB-12

EXPLANATION

- Soil Boring
- TPH as Gasoline
- TPH as Diesel concentrations in mg/kg
- ND Chemical not detected

14th Street



Harding Lawson Associates
Engineering and
Environmental Services

TPH in Soil at Approximately
5 Feet
Carnation Facility
Oakland, California

PLATE
9

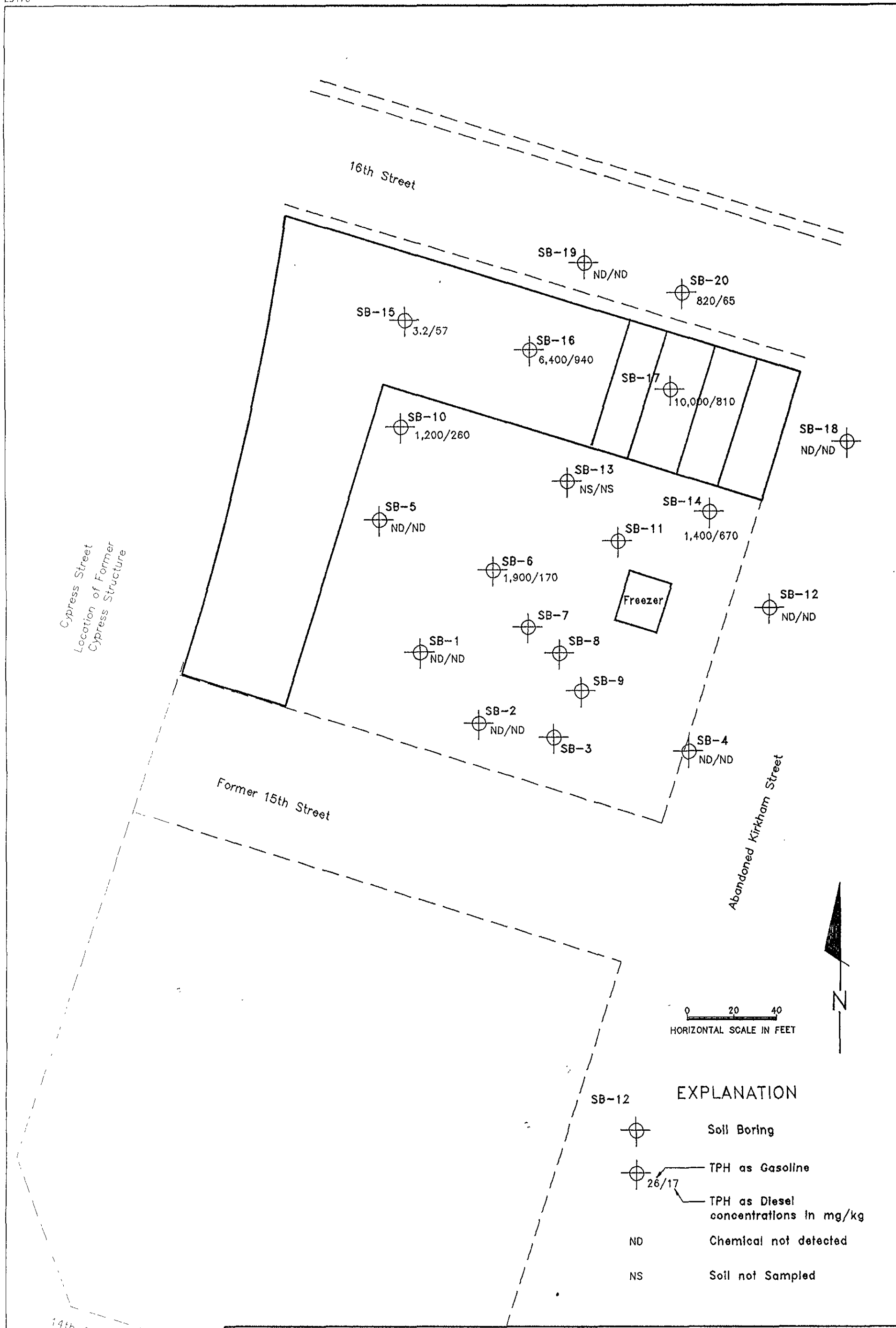
DRAWN
RWS

JOB NUMBER
20294,011.02

APPROVED
D.A. Craig

DATE
8/91

REVISED DATE



Cypress Street
Location of Former
Cypress Structure

Abandoned Kirkham Street

0 20 40
HORIZONTAL SCALE IN FEET



EXPLANATION

- SB-12 Soil Boring
- TPH as Gasoline
- TPH as Diesel concentrations in mg/kg
- ND Chemical not detected
- NS Soil not Sampled

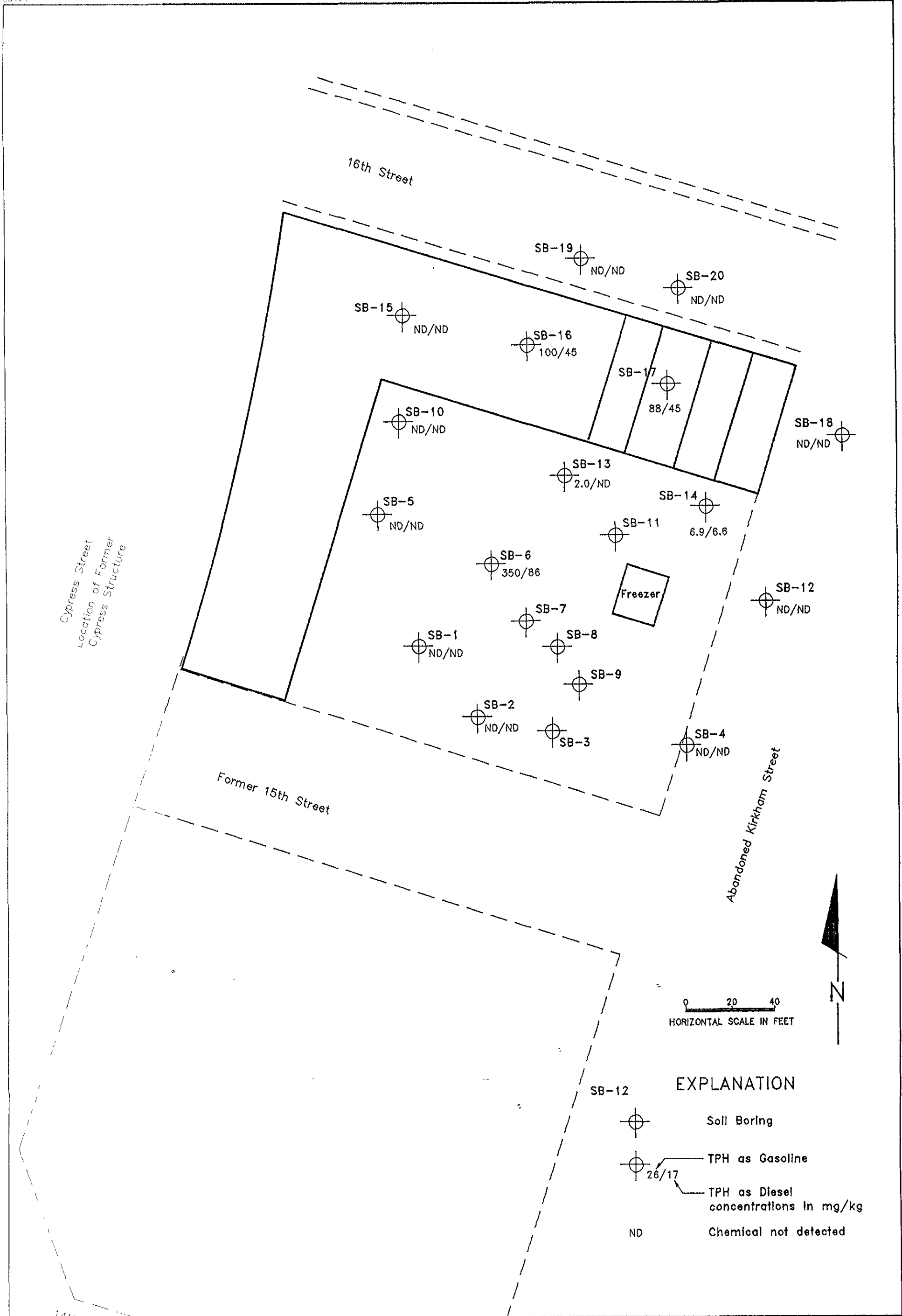
14th Street

HLA Harding Lawson Associates
Engineering and
Environmental Services

TPH in Soil at Approximately
10 Feet
Carnation Facility
Oakland, California

PLATE
10




DRAWN RWS	JOB NUMBER 20294.011.02	APPROVED <i>D. J. Craig</i>	DATE 8/91	REVISED DATE
--------------	----------------------------	--------------------------------	--------------	--------------



0 20 40
HORIZONTAL SCALE IN FEET



EXPLANATION

- SB-12  Soil Boring
-  TPH as Gasoline
-  TPH as Diesel concentrations in mg/kg
- ND Chemical not detected

HLA Harding Lawson Associates
Engineering and Environmental Services

TPH in Soil at Approximately
12.5 Feet
Carnation Facility
Oakland, California

PLATE
11

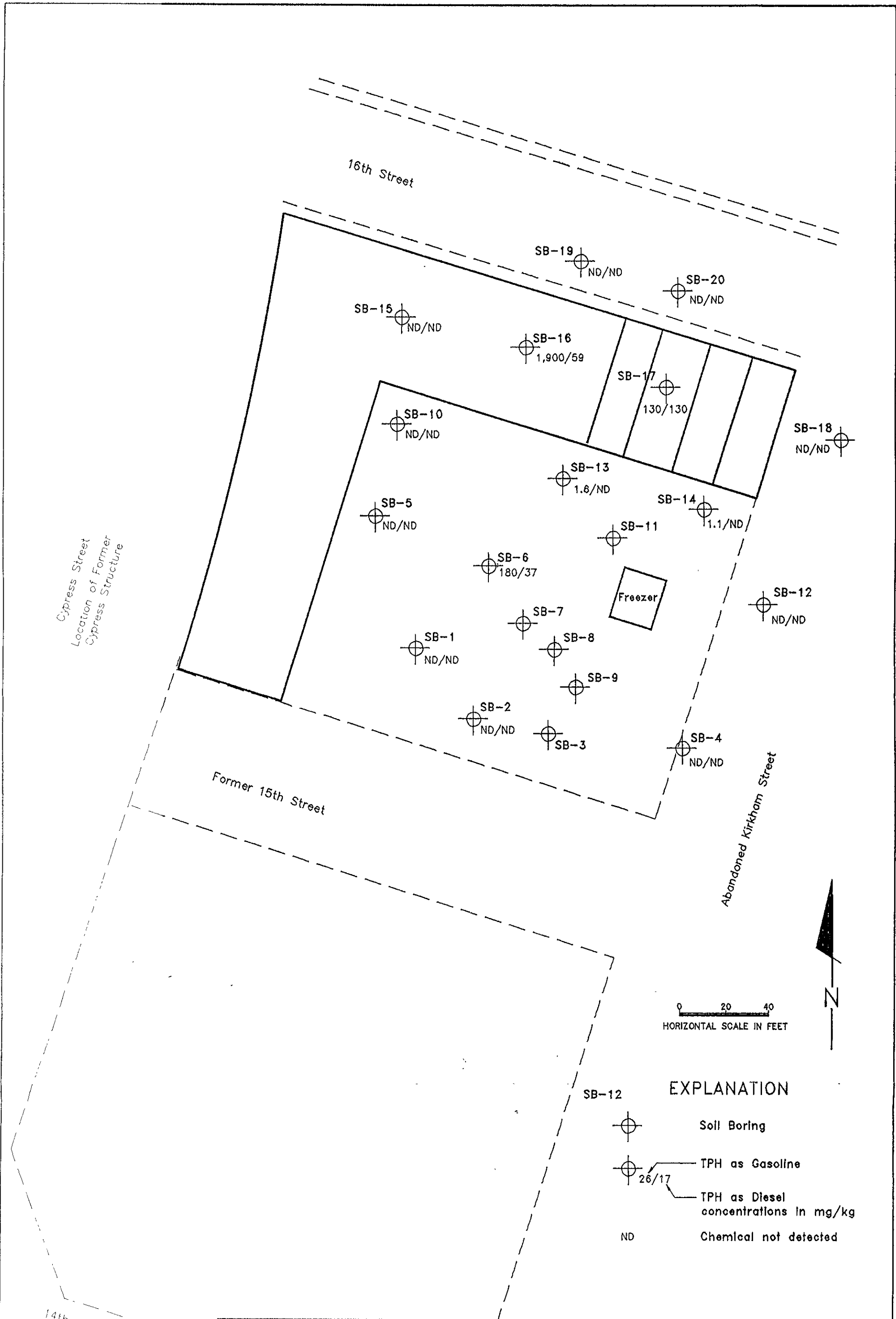
DRAWN
RWS

JOB NUMBER
20294,011.02

APPROVED
D. J. Craig

DATE
8/91

REVISED DATE



0 20 40
HORIZONTAL SCALE IN FEET



EXPLANATION

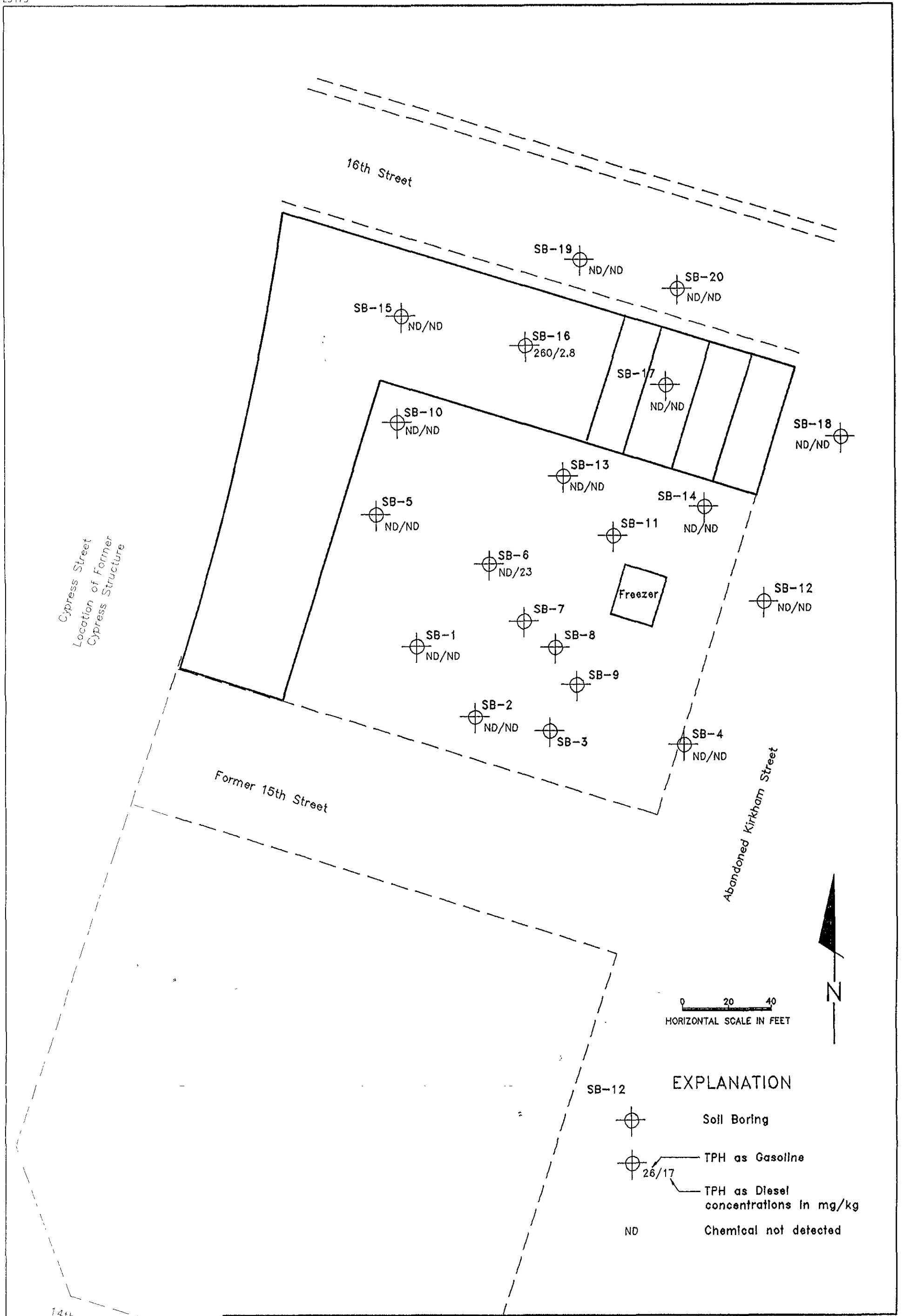
- SB-12 Soil Boring
- TPH as Gasoline
- TPH as Diesel concentrations in mg/kg
- ND Chemical not detected

HLA Harding Lawson Associates
Engineering and Environmental Services

TPH in Soil at Approximately 15 Feet
Carnation Facility
Oakland, California

PLATE
12

DRAWN RWS	JOB NUMBER 20294,011.02	APPROVED <i>D.A. Chung</i>	DATE 8/91	REVISED DATE
--------------	----------------------------	-------------------------------	--------------	--------------



Cypress Street
Location of Former
Cypress Structure

Freezer

0 20 40
HORIZONTAL SCALE IN FEET



EXPLANATION

- SB-12 Soil Boring
- TPH as Gasoline
- TPH as Diesel concentrations in mg/kg
- ND Chemical not detected

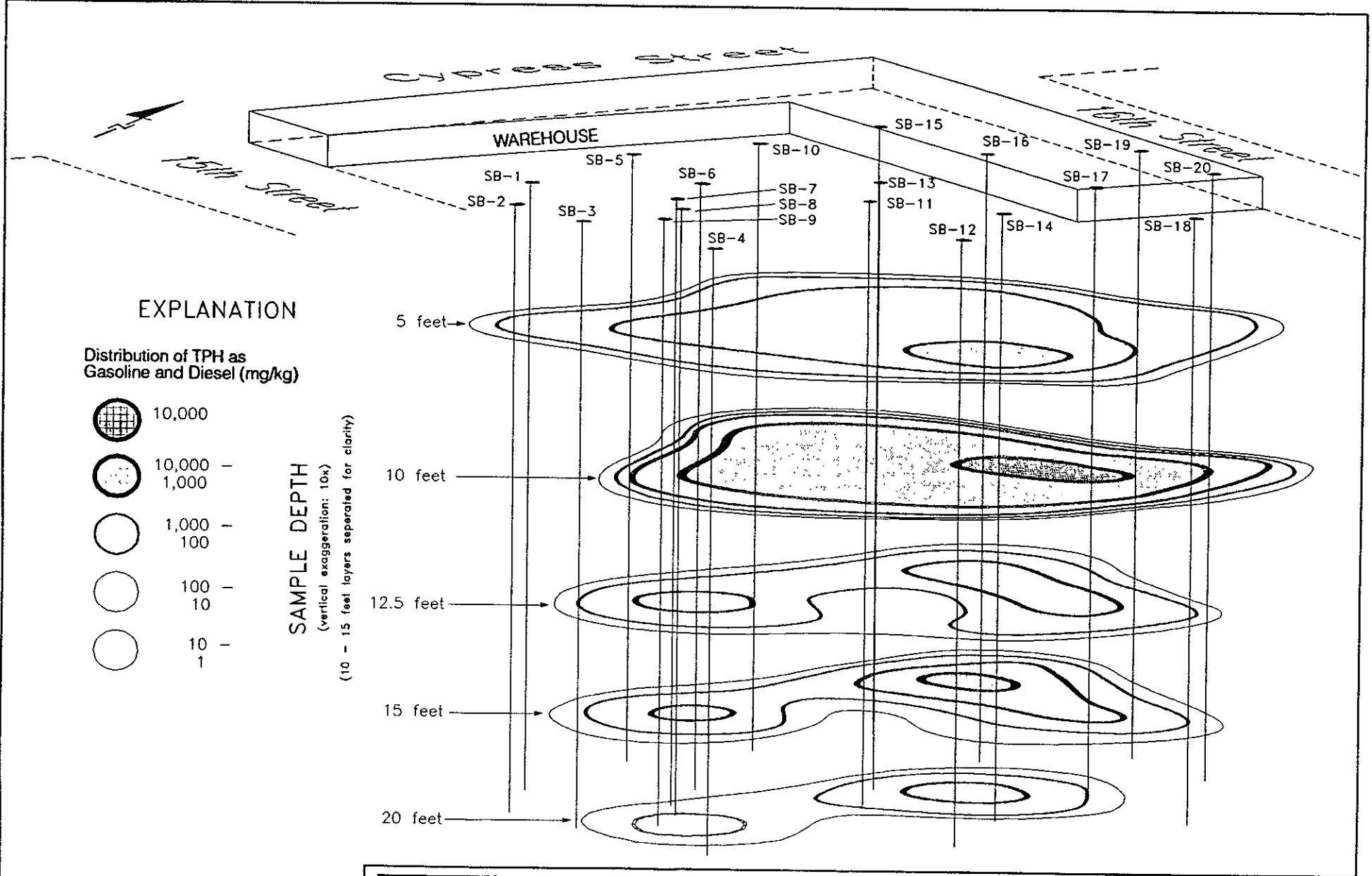
14th Street

HLA Harding Lawson Associates
Engineering and
Environmental Services

TPH in Soil at Approximately
20 Feet
Carnation Facility
Oakland, California

PLATE
13

DRAWN RWS	JOB NUMBER 20294,011.02	APPROVED <i>D.A. [Signature]</i>	DATE 8/91	REVISED DATE
--------------	----------------------------	-------------------------------------	--------------	--------------



Harding Lawson Associates
Engineering and Environmental Services

TPH in Soil with Depth
Carnation Facility
Oakland, California

PLATE

14

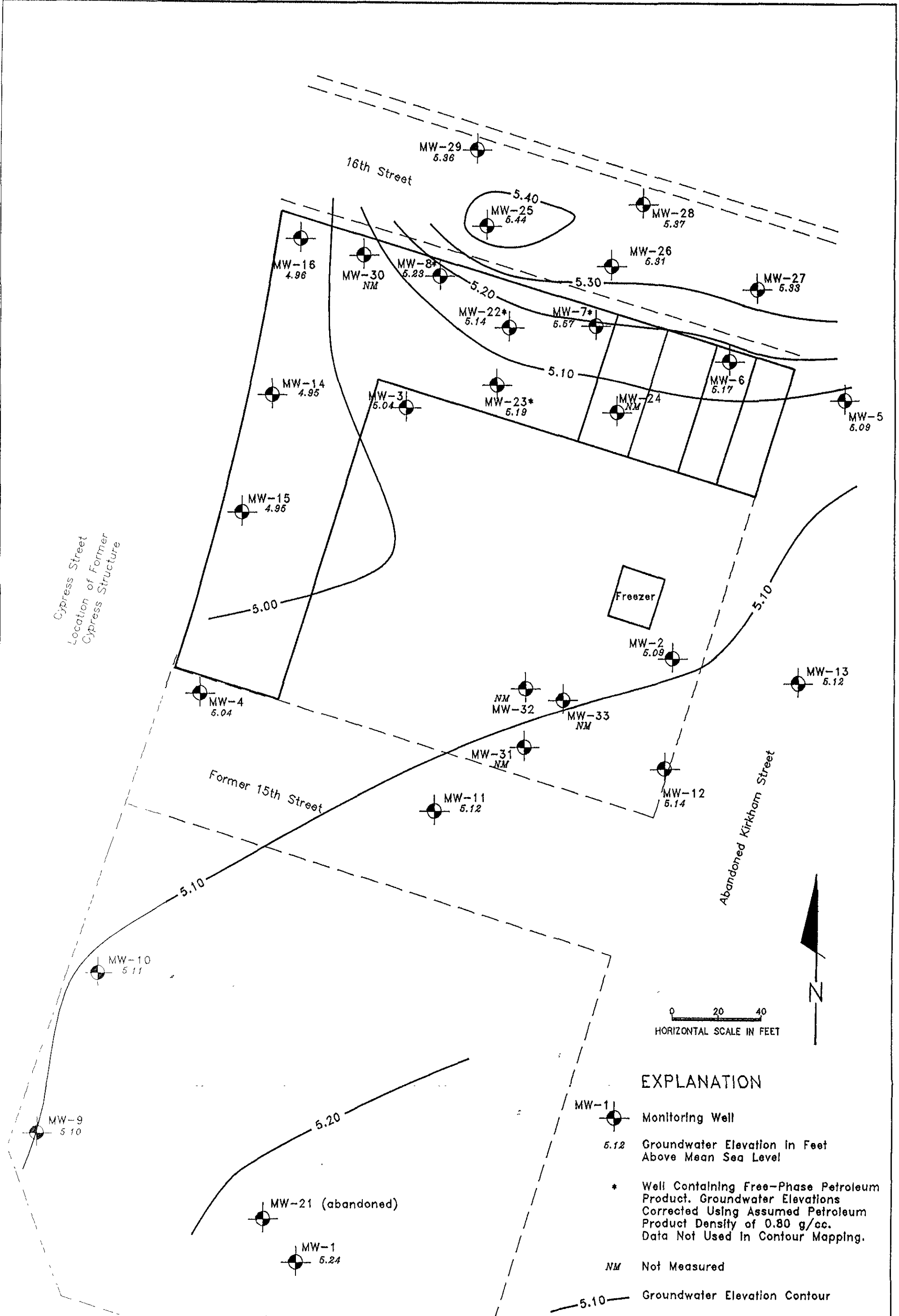
DRAWN
RWS

JOB NUMBER
202994,011.02





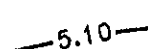
APPROVED
D. J. Cronin

DATE
8/91

REVISED DATE



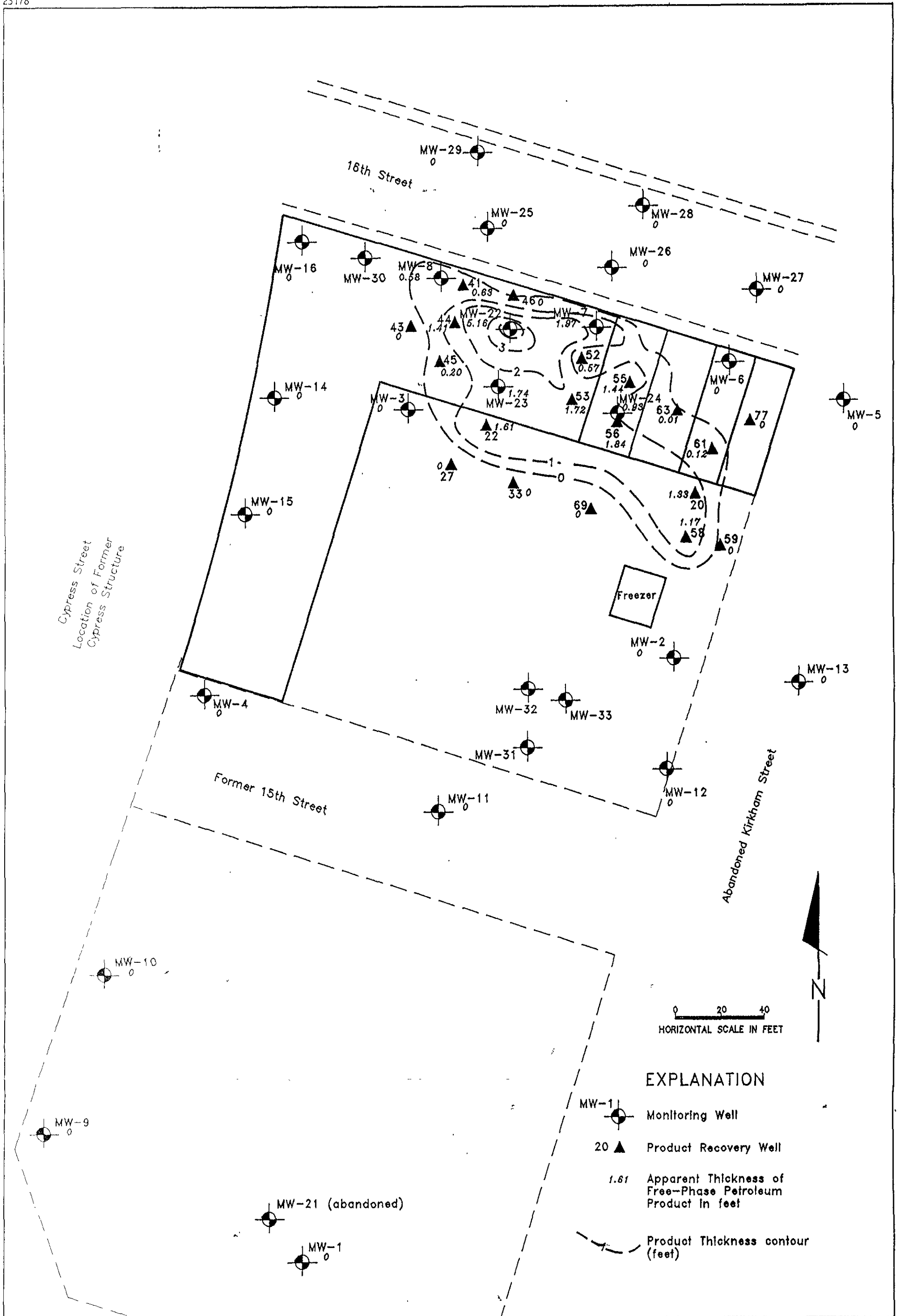
EXPLANATION

-  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

HLA Harding Lawson Associates
Engineering and Environmental Services

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

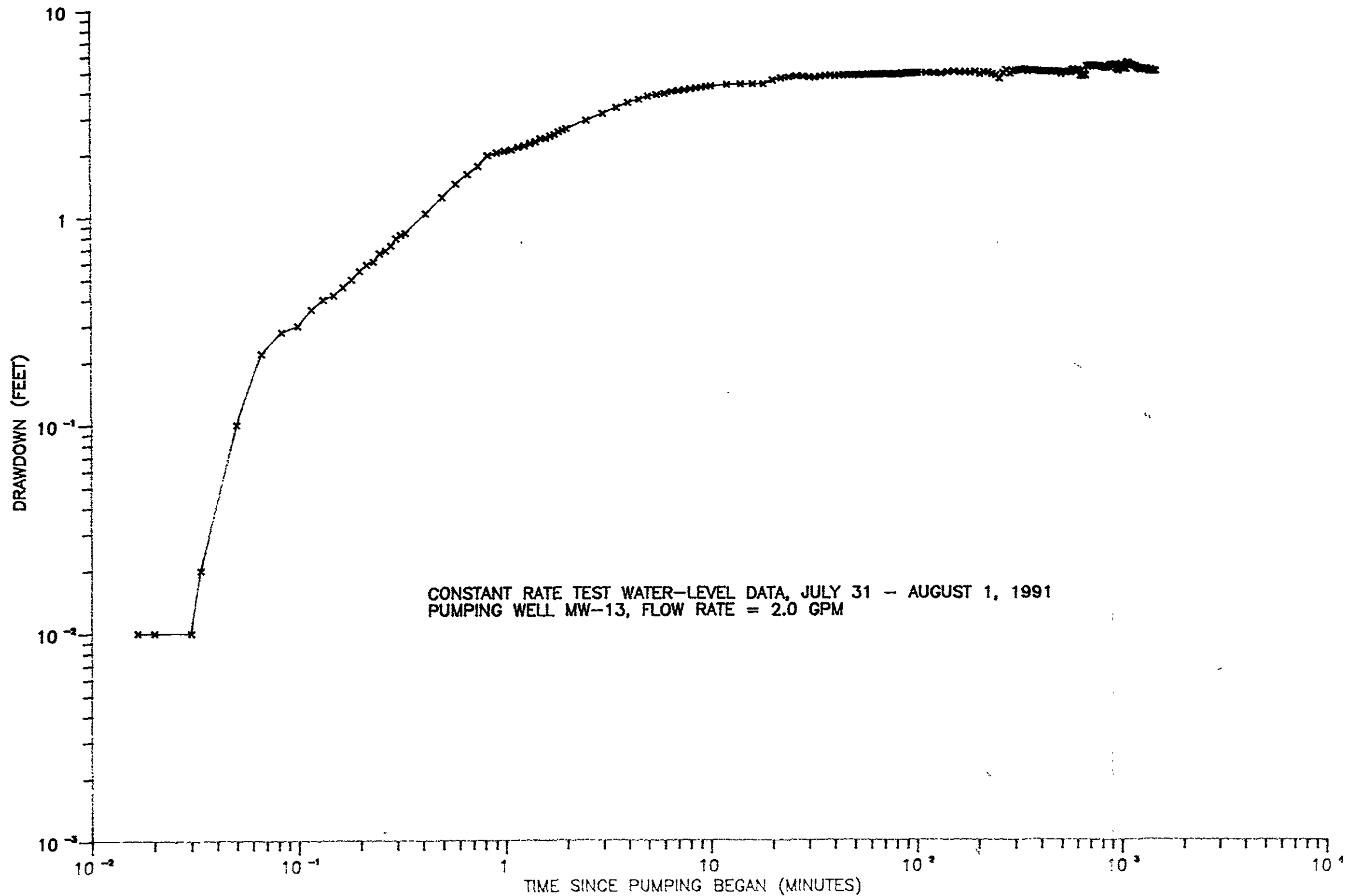
PLATE
15





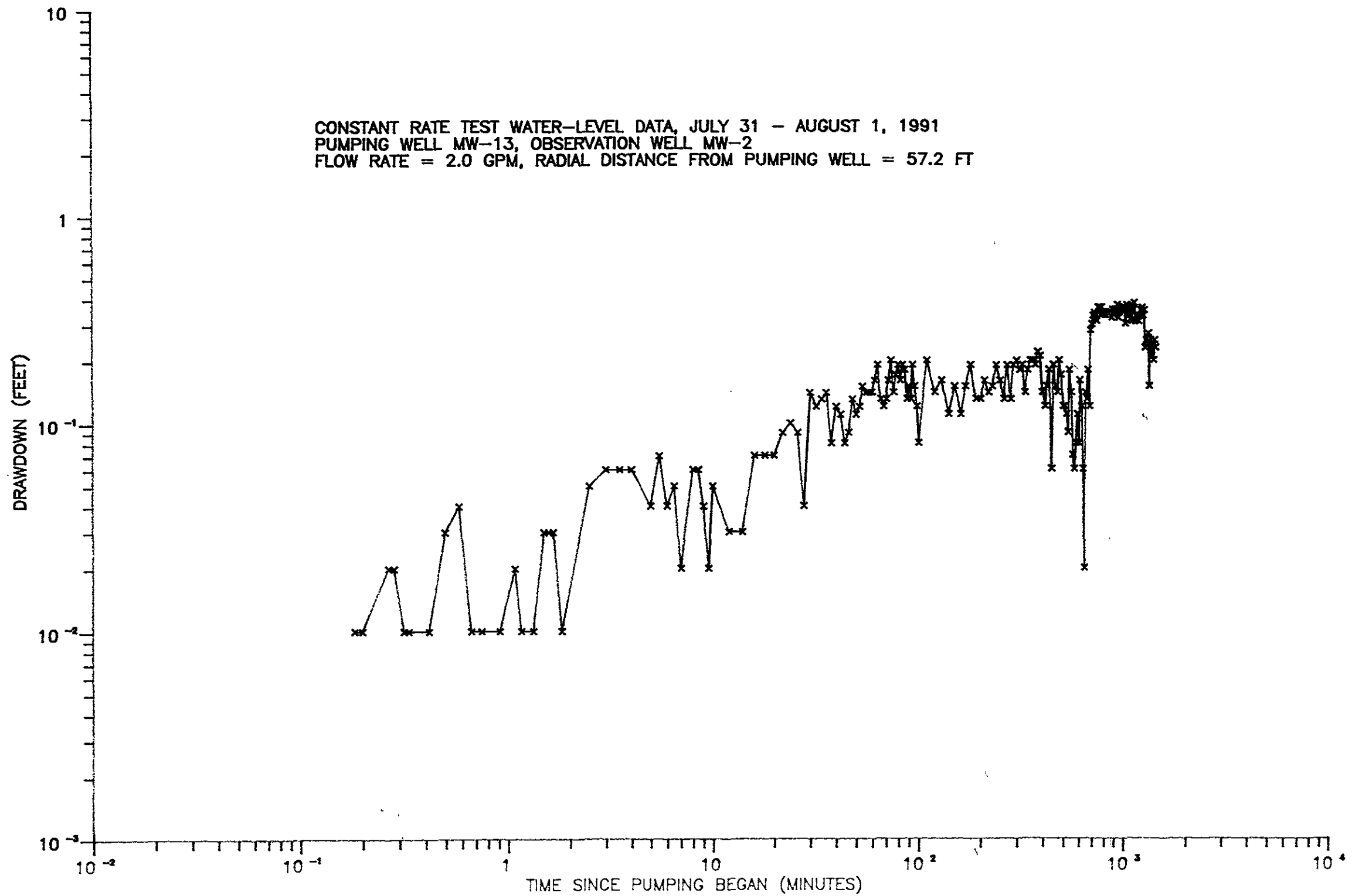
EXPLANATION

- MW-1 Monitoring Well
- 20 Product Recovery Well
- 1.61 Apparent Thickness of Free-Phase Petroleum Product in feet
- Product Thickness contour (feet)

	Harding Lawson Associates Engineering and Environmental Services	Apparent Thickness of Free-Phase Petroleum Product July 9, 1991 Carnation Facility Oakland, California	PLATE 16
	DRAWN RWS	JOB NUMBER 20294,011.02	APPROVED
		DATE 8/91	REVISED DATE



	Harding Lawson Associates Engineering and Environmental Services	Drawdown Over Time, Pumping Well MW-13 Carnation Facility Oakland, California	PLATE 17
	DRAWN _____ JOB NUMBER 20294,011.02	APPROVED 	DATE 8/91



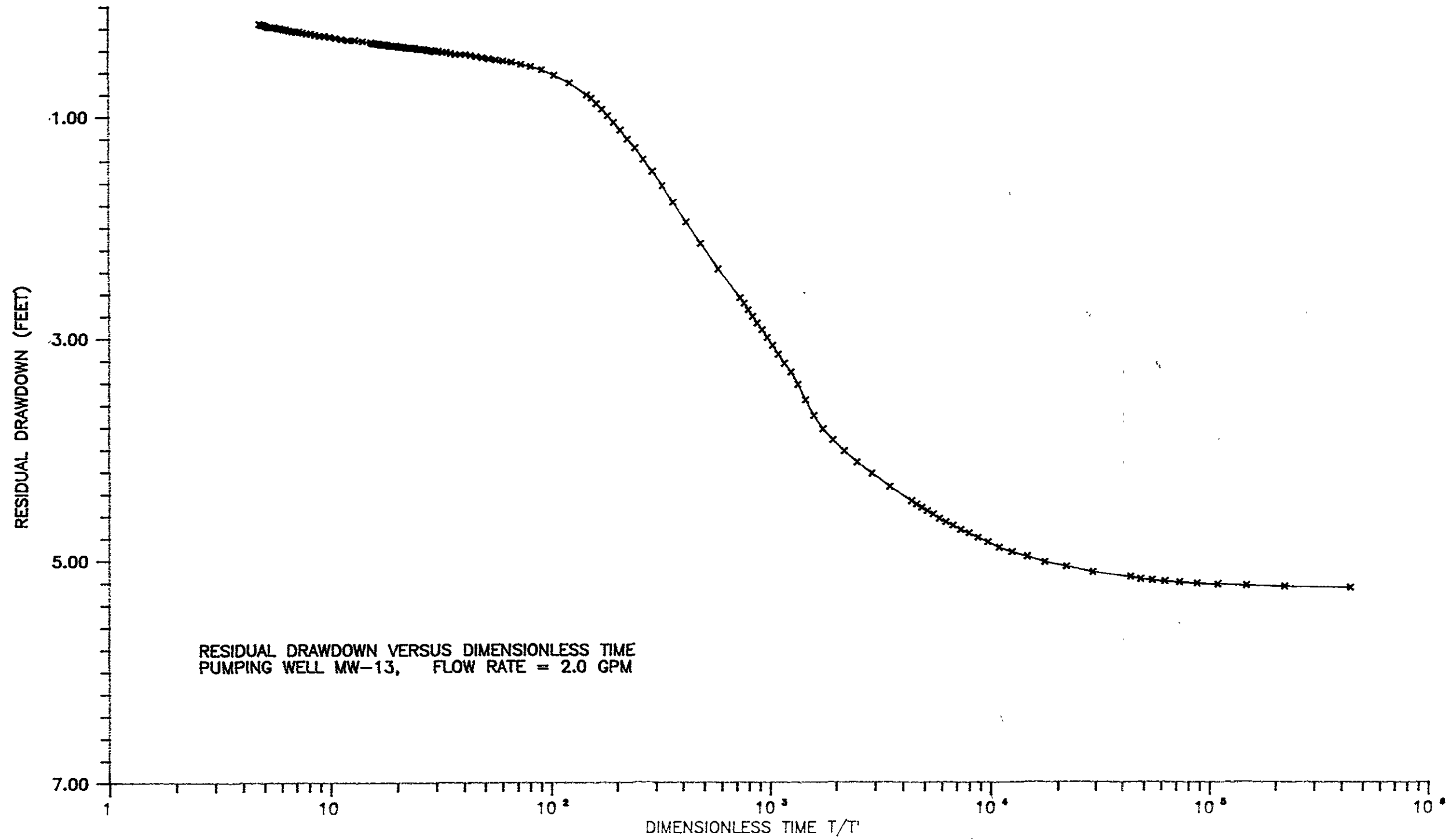
Harding Lawson Associates
 Engineering and
 Environmental Services

Drawdown Over Time,
 Observation Well MW-2
 Carnation Facility
 Oakland, California

PLATE

18

DRAWN	JOB NUMBER 20294,011.02	APPROVED <i>D. J. Wong</i>	DATE 8/91	REVISED DATE
-------	----------------------------	-------------------------------	--------------	--------------



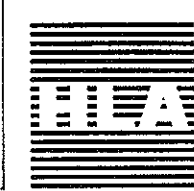
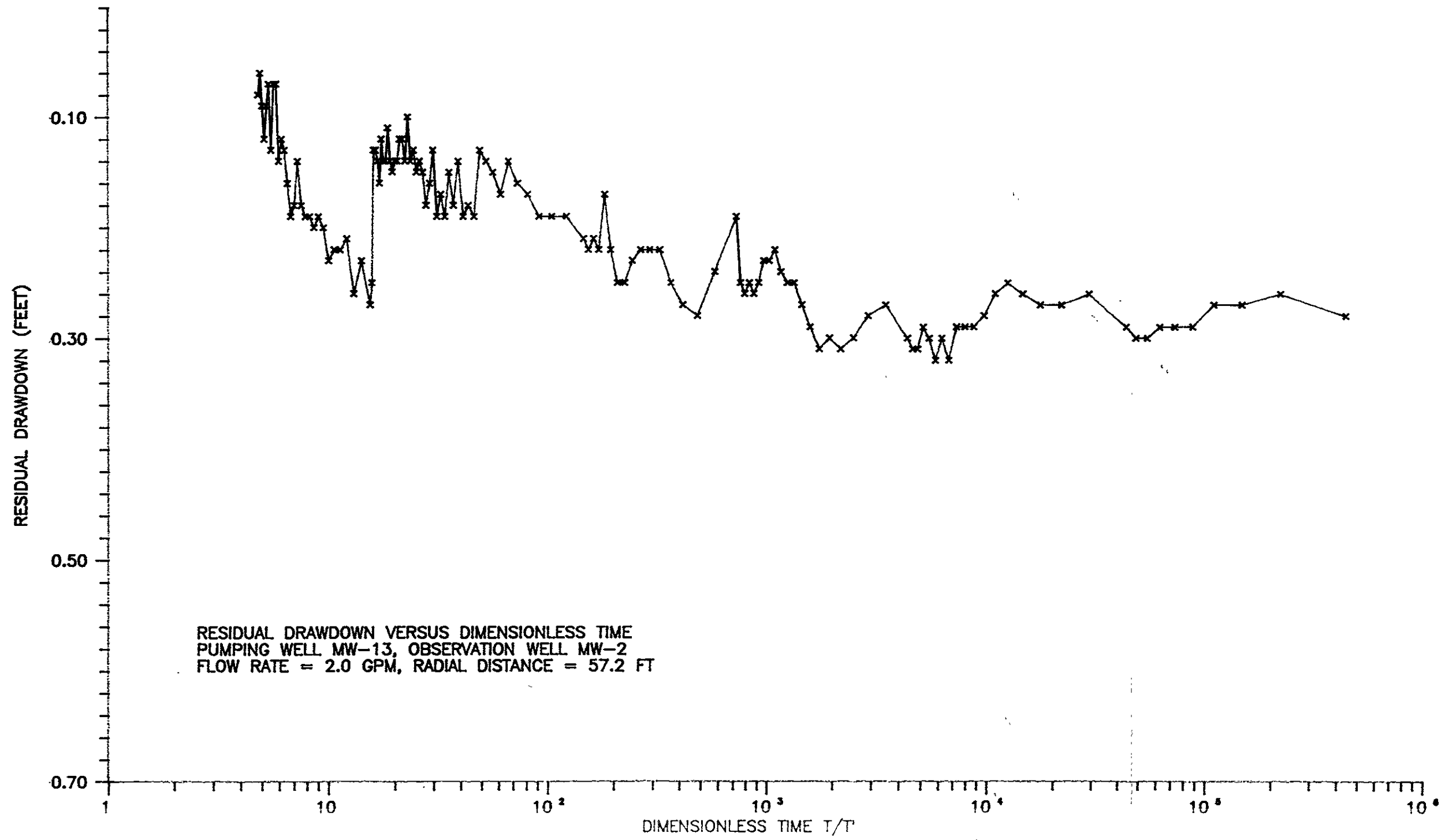
Harding Lawson Associates
Engineering and
Environmental Services

Residual Drawdown Over Time,
Pumping Well MW-13
Carnation Facility
Oakland, California

PLATE

19

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
	20294,011.02	<i>D. J. [Signature]</i>	8/91	



Harding Lawson Associates
 Engineering and
 Environmental Services

Residual Drawdown Over Time,
 Observation Well MW-2
 Carnation Facility
 Oakland, California

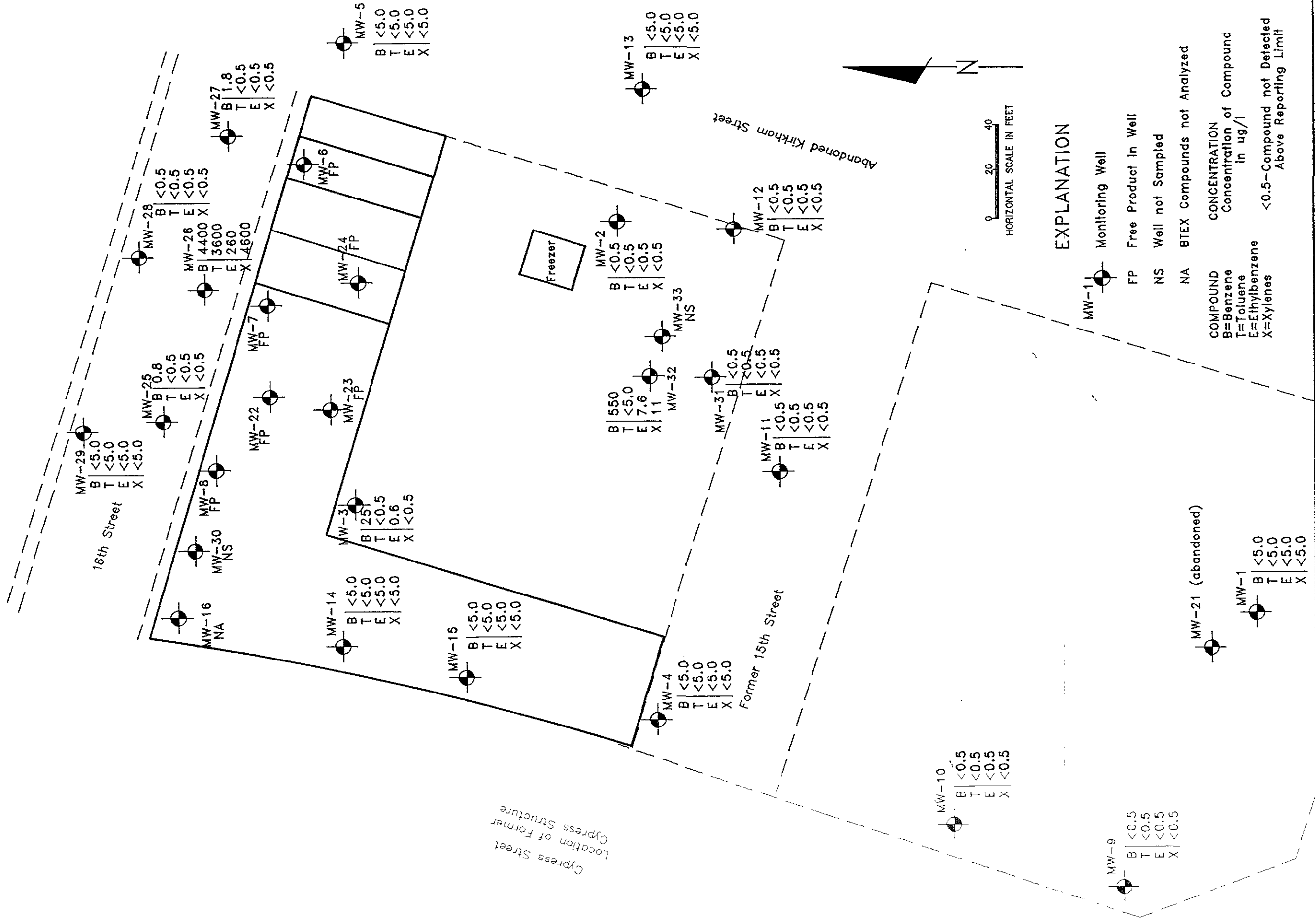
PLATE

20

DRAWN
 JOB NUMBER
 20294,011.02

APPROVED
E. A. O'Brien

DATE
 8/91
 REVISED DATE



EXPLANATION

- MW-1 Monitoring Well
- FP Free Product In Well
- NS Well not Sampled
- NA BTEX Compounds not Analyzed
- COMPOUND CONCENTRATION of Compound in ug/l
- B=Benzene
- T=Toluene
- E=Ethylbenzene
- X=Xylenes
- <0.5-Compound not Detected Above Reporting Limit



Harding Lawson Associates
Engineering and
Environmental Services

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

DRAWN
RWS

JOB NUMBER
20294.011.02

APPROVED
D.A. [Signature]

DATE
8/91

REVISED DATE