HARTCROWSER

Earth and Environmental Technologies

SUPPLEMENTAL SITE INVESTIGATION

GRAND AUTO FACILITY
4240 E. 14TH STREET
OAKLAND, CALIFORNIA

J-6077

HART CROWSER, INC.

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SUPPLEMENTAL SITE INVESTIGATION
GRAND AUTO FACILITY
4240 E. 14th STREET, OAKLAND, CA.

EXECUTIVE SUMMARY

Hart Crowser has prepared this Supplemental Site Investigation for PACCAR Automotive, Inc. (PAI) for their Grand Auto facility located at 4240 East 14th Street in Oakland, California. This supplemental report was prepared for PAI in response to findings made during our preliminary investigation which was summarized in a report titled, "Preliminary Site Investigation Report, Grand Auto/Super Tire Facilities", dated November 20, 1992. Our supplemental work was performed according to our work plan. dated February 9, 1993.

During this investigation, we drilled five soil borings (B-8 to B-12) and converted three of them to groundwater monitoring wells (MW-2, MW-3, MW-4). We analyzed a total of nine soil samples for: total petroleum hydrocarbons (TPH) as gasoline and diesel; benzene, toluene, ethylbenzene, xylenes (BTEX), chlorinated volatile organics; and the five metals - chromium, cadmium, lead, nickel, and zinc. In addition, the wells were developed and sampled (including the existing MW-1) for TPH as gasoline, BTEX, oil and grease (MW-2 only), chlorinated volatile organics, and the five metals mentioned above.

Petroleum hydrocarbons were not detected in any of the soil samples submitted for analysis. The only chlorinated volatile organic compound detected in any of the samples was tetrachloroethene (PCE), at concentrations ranging from 0.005 to 0.030 milligrams per kilogram (ppm). Background concentrations of four of the five metals were detected in most of the soil samples.

Some relatively low concentrations of petroleum hydrocarbons were detected in two of the monitoring wells (MW-1 and MW-2). Seven different chlorinated volatile organic compounds were detected in the groundwater samples. Drinking water standards were exceeded for dichloroethene (DCE), trichloroethene (TCE), dichloroethane (DCA), and PCE. In addition, chromium, nickel and zinc were detected in MW-3 and MW-4. The drinking water standard for chromium was exceeded in both wells.

The measured groundwater gradient was relatively flat, however, there is a very slight southwestern gradient. Therefore, MW-2 would be the most upgradient well and, based on the detections found from this well, there is the potential that several constituents found in onsite groundwater originated from an offsite source(s). There does not appear to be any impact on the groundwater from the former USTs onsite.

1.0 INTRODUCTION AND OVERVIEW

Hart Crowser has prepared this Supplementary Site Investigation Report for PACCAR Automotive, Inc. (PAI) for the Grand Auto facility (the site) at 4240 East 14th Street in Oakland, California. The site is located at the corner of East 14th Street and High Street in Oakland, California, as shown on the Site Location Map (Figure 1). The property is leased by PAI.

The following paragraphs include: the purpose of the supplemental site investigation, a summary of the site background, and the scope of the field activities. The investigation was conducted according to the "Work Plan, Supplemental Site Investigation, Grand Auto Facility" (Hart Crowser, February 9, 1993).

1.1 *Purpose of the Supplemental Site Investigation*

A preliminary investigation was performed at the site by Hart Crowser in July and August of 1992. The results of this investigation, summarized in a report dated November 20, 1992, showed the presence of halogenated hydrocarbons, primarily dichloroethene (DCE), trichloroethene (TCE), and tetrachloroethylene (PCE), in subsurface soils and groundwater beneath a former car wash sump located to the southeast of the building (Figure 2). The purpose of this additional field investigation was to determine the nature and extent of soil and groundwater contamination in the area of this sump. This data will also be used to evaluate the need for future remedial activities.

1.2 *Site Background*

The Grand Auto retail facility is located on an approximate 1.2 acre site. The site is currently used as an auto service and retail merchandise facility. The site was previously used for retail gasoline sales with underground fuel storage tanks and a car wash with an associated drainage sump. The underground fuel tanks were removed in 1986. In July 1992, Hart Crowser drilled two borings (B-4 and B-5) in the vicinity of the former location of the underground fuel storage tanks (Figure 2). Relatively minor concentrations of petroleum hydrocarbons were present in subsurface soil samples collected from these borings.

The car wash sump was removed on August 7, 1992. A soil sample (S2C) was collected from beneath the sump (Figure 2). Analytical results indicated the presence of petroleum hydrocarbons, halogenated hydrocarbons, and some metals in the soil beneath the sump. A groundwater monitoring well (MW-1) was installed within ten feet southwest of the sump, which, according to regional information, is the downgradient direction. Despite some slightly wet conditions encountered at eight feet below ground surface (BGS), free groundwater was not encountered until approximately 36 feet BGS. There appears to be a discontinuous perching layer at approximately 8 feet BGS.

Soil samples from this well showed non-detectable concentrations of petroleum hydrocarbons, however, the groundwater sample had detectable concentrations of petroleum hydrocarbons and halogenated hydrocarbons. The monitoring well was sampled again on January 19, 1993. The results of this sampling event were consistent with the results of the first sample.

1.3 *Scope of the Field Investigation*

Due to the previous identification of petroleum hydrocarbons, halogenated hydrocarbons, and metals in the former car wash sump area, subsurface soil sampling and monitoring well installation was performed to further characterize the soil and groundwater quality in this area. Prior to drilling, the sump excavation was backfilled with imported clean material. Two borings were drilled to collect data to assist in identifying the

vertical and horizontal extent of subsurface soil contamination. Three new groundwater monitoring wells were constructed to obtain additional data on the groundwater quality.

Details of the above field tasks are provided in the next section. All field investigation tasks were conducted in accordance with the Site Health and Safety Plan included in the Work Plan.

2.0 FIELD METHODOLOGY

This section describes the methodology for collecting the field data. The objectives of the additional investigation were to evaluate the horizontal and vertical extent of previously identified soil and groundwater contamination. A more detailed description of the methodology follows.

2.1 *Soil Boring and Monitoring Well Installation*

2.1.1 Soil Borings

A total of five subsurface soil borings (B-8 through B-12) were drilled on the site on April 14 - 16, 1993. The borings were drilled with a truck mounted drilling rig using hollow stem augers. The locations of the borings are shown on Figure 2. The following paragraphs describe the rationale for each of the soil borings and well locations.

- Boring B-8 was drilled through the backfill of the former car sump location, along the southern wall of the Grand Auto building. This boring provided information regarding the vertical extent of petroleum hydrocarbons, chlorinated solvents and metals previously identified. The boring was advanced to a depth of approximately 25 BGS.

- Boring B-9 was drilled within 10 feet of the former car sump toward the south. This boring provided additional information on lateral extent of contamination previously identified in the sump. The boring was advanced to a depth of approximately 25 feet BGS.

- Boring **B-10 (MW-2)** was placed along the northwest boundary of the site in the presumed upgradient groundwater flow direction of the sump and MW-1. A monitoring well was constructed in this boring to a depth of approximately 45 feet BGS.

- The two borings **B-11 (MW-3) and B-12 (MW-4)** were placed toward the southwest of the former car wash sump in the presumed downgradient groundwater flow direction of the car wash sump and MW-1. Monitoring wells were emplaced within these borings which were drilled to a total depth of approximately 45 feet BGS.

- Boring **HC-1** was drilled for the purpose of investigating the neighboring site, which formerly operated as a Super Tire store and is also leased by PAI. Boring **HC-1** was converted to a monitoring well.

For each boring, soil samples were collected at five foot intervals to the total depth of the boring. Each boring was logged by a Hart Crowser geologist, and all samples were screened using a field photoionization detector (PID) using a 10.2 eV lamp. The boring log was used to record materials encountered using the Unified Soil Classification System, depth of first groundwater, PID readings, and lithologic changes. Copies of the boring logs are included in Appendix A.

Undisturbed soil samples were obtained using a modified California split-spoon sampler. Stainless steel liners were placed in the sampler barrel to retrieve and store the sample. The soil sample liners were removed from the sampler and the bottom liner was sealed with Teflon tape, covered with tight fitting plastic caps, labeled, and placed in cool storage for potential analysis. Soil samples were selected for analysis based on visual observations and/or PID measurements. The samples intended for analysis were delivered via courier to a State-certified chemical testing laboratory. Strict chain-of-custody procedures were observed throughout transport.

All down-hole equipment was steam cleaned between wells to limit opportunities for cross-contamination.

2.1.3 Well Installation Procedures

Permits. Well construction permits were obtained from the Alameda County Zone 7 Water Resources Management District prior to commencement of drilling operations.

Monitoring Well Installation. Three of the borings (B-10, B-11, and B-12) were converted into groundwater monitoring wells. The monitoring wells were constructed of new 4-inch diameter, flush joint threaded Schedule 40 polyvinyl chloride (PVC) casing and factory-constructed well screen. The slot width of the well screen was 0.020 inches. All PVC casing included the National Sanitation Foundation (NSF) and/or American Society for Testing and Materials (ASTM) designation.

The well screen extended from the bottom of the boring to approximately five feet above where groundwater was encountered. The bottom of the screened section was fitted with a flush joint threaded bottom cap. The solid section of the well casing extended from the top of the screened section to approximately 4 inches below the ground surface.

Filter Pack Material After placement of the casing, a filter pack was placed in the annulus between the exploratory boring and the casing. The filter pack consisted of number 12/20 sand. The filter pack extends from the bottom of the well screen to approximately one to two feet above the top of the well screen.

The well was sealed by the placement of approximately one foot of water-charged bentonite pellets above the filter pack and cement grout to the ground surface. An Emco-Wheaton sealed traffic box was placed over the well head to protect the well while providing easy access.

Well Development. Prior to groundwater sampling and development, each well was checked for the presence of a floating petroleum product phase with an electronic interface probe and a transparent bailer. Both items were decontaminated in a non-phosphate detergent solution and rinsed in distilled water prior to each use.

Each well was developed by removing a minimum of eight well volumes of groundwater and until discharged water was reasonably free of sediment. A well volume is calculated using the following equation:

$$V_b = Pi \times [R_c^2 (1-n) + nR_b^2] \times H$$

Where:

V_b - volume of standing water in borehole, cubic feet (ft^3)
Pi - 3.14
R_c^2 - radius of casing, feet
R_b^2 - radius of soil boring, feet
n - porosity of filter pack, decimal fraction
H - height of standing water in well, feet.

The variable H is determined by subtracting the depth to water from the total well depth. The porosity, n, for this investigation was assumed to be 0.3. The borehole volume was converted to gallons by multiplying 7.48 gallons per ft^3. Water levels and well depths were obtained using an electric sounding device.

The wells were developed by use of a surge block, bailer, and submersible pump with a truck mounted development rig. All three wells were bailed dry initially and allowed to recharge before continuing.

Water discharged from the monitoring wells were stored in DOT-approved sealed head 55-gallon drums. Groundwater analytical results will be used to determine the appropriate disposal method.

2.2 *Groundwater Sampling*

2.2.1 Types, Locations, and Numbers of Samples

A groundwater sample was obtained from the existing onsite monitoring well (MW-1) and the three new monitoring wells (MW-2, MW-3, and MW-4). The samples were analyzed for TPH as gasoline with BTEX distinction by EPA Method 8015/8020, volatile organic compounds by EPA Method 8010, and Cadmium, Chromium, Lead, Nickel, and Zinc by EPA Method 6010. A duplicate sample was obtained at MW-1 and analyzed for these same parameters.

2.2.2 Well Purging Procedure

Prior to sampling, groundwater elevations were measured in all wells. An oil-water interface probe was used to determine the presence of and to measure the thickness of floating product, if present. Prior to obtaining a sample the monitoring wells, each well was purged of a minimum of three and a maximum of five casing volumes of water using a 2-inch submersible pump constructed of Teflon and stainless steel materials. A casing volume was calculated using the following equation:

$$V_c = Pi \times R_c^2 \times H$$

Where:

V_C - volume of standing water in well casing, cubic feet (ft^3)
Pi - 3.14
R_c^2 - radius of casing, feet
H - height of standing water in well, feet.

All purging equipment was properly decontaminated prior to use at each well. Water discharged during purging operations was stored as previously described.

2.2.3 Measurement of Field Parameters

Field parameters (pH, conductivity, and temperature) were measured at the start of purge water pumping and at each consecutive well volume until sequential measurements differed by no more than 10 percent. Field measurements were compared with data from previous sampling rounds and examined for significant discrepancies.

The following equipment will be used for measurements of ground water parameters in the field:

- pH/Temperature Orion 230 A
- Conductivity Orion 120

2.2.4 Groundwater Sampling Procedures

Water samples were collected using a pre-cleaned single-use disposable bailer. Water samples were placed in the appropriate laboratory containers. Details of the water sampling procedures

were recorded on a Groundwater Sampling Data report form. A laboratory prepared trip blank accompanied the groundwater samples, and was analyzed for similar chemical constituents.

All samples and blanks were placed in a cooler with ice packs to cool the samples below 4°C and transported via courier to a Superior Precision Analytical laboratory. Chain-of-custody procedures were observed and are included in Appendix B.

3.0 LABORATORY ANALYSIS

3.1 *Soil Samples*

A total of nine soil samples were submitted for chemical analysis. Soil samples collected at five foot intervals in boring B-8 were submitted for analysis with the exception of the samples collected in the upper ten feet of the boring which consisted of new imported fill material. The sample collected at 10 feet BGS in boring B-9 was submitted for analysis. This is the approximate depth where previous contaminants were identified. Two samples were submitted from MW-2, one from the 10.5 foot depth and one from the groundwater interface at 35 feet BGS. The groundwater interface sample was also selected for analysis from MW-3 and MW-4, approximately 36 feet BGS. All of the soil samples were submitted for the following analyses:

- TPH-gasoline/BTEX (EPA 8015/8020)
- TPH-Diesel (EPA 8015 modified)
- Volatile Chlorinated Organic Compounds (EPA 8010)
- Metals (Cd, Cr, Pb, Ni, Zn) (EPA 6010)

3.2 *Groundwater Samples*

All the groundwater samples collected, including the duplicate sample from MW-1 (MW-1A), were submitted for the following analyses:

- TPH-gasoline/BTEX (EPA 8015/8020)
- Volatile Chlorinated Organic Compounds (EPA 8010)

In addition, the samples from MW-1, MW-2, MW-3, and MW-4 were analyzed for the following:

- Metals (Cd, Cr, Pb, Ni, Zn) (EPA 6010)

The trip blank was analyzed for volatile chlorinated organic compounds only. Oil and grease analysis (EPA 5520F) was also performed on the sample from MW-2.

4.0 RESULTS

This section presents the results of our subsurface investigation. Included in this section are the subsurface materials encountered, groundwater flow direction findings, and laboratory results for soil and groundwater. The groundwater elevation measurements are found in Table 1. The results of the soil and groundwater samples are also summarized in Tables 2 and 3, respectively.

4.1 *Site Geology and Hydrogeology*

4.1.1 Site Geology

The site is located in an area underlain by Quaternary alluvial deposits which consist primarily of unconsolidated clays, silts, sands, and gravels. These deposits are underlain by the Franciscan formation at an undetermined depth.

The subsurface stratigraphy was based on materials encountered from drilling five soil borings onsite and from incorporating previous collected data. Descriptions of the subsurface materials encountered are provided on the boring logs, included in Appendix A of this report.

In general, the boring logs indicate that the site is underlain by an irregularly layered sequence of silty to gravely sands and clayey silt beds to the maximum depth explored, 46 feet BGS. Approximately the upper 20 feet of material appears to be artificial fill.

4.1.2 Site Hydrogeology

We encountered unconfined groundwater in MW-2, MW-3, and MW-4 at depths of approximately 35 feet BGS. Groundwater was not encountered in borings B-8 and B-9 (advanced to approximately 25 feet BGS), however very moist conditions were observed around 15 feet BGS, indicating a potential that a minor perching layer may be present.

Prior to groundwater sampling, we measured the groundwater levels in each onsite well. The depth to groundwater for each well and its corresponding elevation is presented in Table 1 and shown on Figure 3. In general, the groundwater elevations indicate a relatively flat groundwater gradient. However, by incorporating the data from a well installed on the neighboring property, the former Super Tire store, there appears to be a very slight southwestern gradient.

4.2 *Soil Results*

The only detected compound in the soil samples submitted for analysis was tetracholoethene (PCE), with the exception of background levels of chromium, lead, nickel, and zinc. PCE was detected in boring B-8 (11 and 25 feet BGS), MW-3 (35.5 feet BGS), and MW-4 (36 feet BGS) at concentrations ranging from 0.005 to 0.030 milligrams per kilogram [equivalent to parts per million (ppm)].

4.3 *Groundwater Results*

Petroleum hydrocarbons were detected in samples MW-1, MW-1A, and MW-2. Several chlorinated volatile organic compounds were detected in all five samples including freon, dichloroethene (DCE), chloroform, trichloroethane (TCA), dichloroethane (DCA), trichloroethene (TCE), and PCE. Chromium and zinc were also detected in MW-3 and MW-4. In addition, nickel was detected in MW-4.

The concentration of total petroleum hydrocarbons as gasoline ranged from 57 to 74 micrograms per liter [equivalent to parts per billion (ppb)]. Benzene, toluene, and xylenes were only detected in the sample from MW-2 at concentrations of 0.8, 1.1,

and 1.0 ppb, respectively. MW-2 was also analyzed for oil and grease, and was not detected above detection limits. The reported TPH concentrations appear to be associated with the chlorinated hydrocarbons compounds.

Of the seven detected chlorinated volatile organics, four of them were detected in all samples: freon, DCE, TCE, and PCE. Freon ranged in concentration from 28 to 110 ppb. DCE ranged in concentration from 3.9 to 9.7 ppb. TCE ranged in concentration from 17 to 32 ppb, and PCE ranged in concentration from 7.5 to 300 ppb.

Chloroform was detected in samples MW-1, MW-1A, MW-2, and MW-4 at concentrations ranging from 0.6 to 1.1 ppb. TCA was detected in samples from MW-1A, MW-2, and MW-3 at concentrations ranging from 0.6 to 0.8 ppb. DCA was only detected in sample MW-2 at a concentration of 0.6 ppb.

The three metals, chromium, zinc, and nickel, were only detected in MW-3 and MW-4, although nickel was not detected in MW-4. Chromium ranged in concentration from 60 to 170 ppb. Zinc ranged in concentration from 80 to 210 ppb. Nickel was detected at a concentration of 200 ppb.

5.0 DISCUSSION/CONCLUSIONS

Based on the analytical results of the soil samples collected from drilling, it appears as though some relatively low concentrations of PCE are present in the onsite subsurface soils. However, no petroleum hydrocarbons were detected in any of the samples. In addition, the metals detected in the subsurface soils appear to be within background levels, with the exception of nickel in the sample from B-8 at 11 feet BGS (U.S. Geological Survey, Boeragen and Shacklotte, 1981)

During the previous investigation, a soil sample was collected at eight feet BGS beneath the sump. The PCE concentration from this soil sample was 0.104 ppm. The sample from B-8, located at the sump, at a depth of 11 feet, had a PCE concentration of 0.005 ppm (the detection limit is 0.005 ppm). The next two samples

from this boring, taken at depths of 16 and 21 BGS, showed non-detected concentrations of PCE. However, the sample from 25 feet BGS, at the bottom of the boring, had a PCE concentration of 0.030 ppm. The PCE found at the groundwater interface in MW-3 and MW-4 were also at relatively low concentrations (0.009 and 0.012ppm).

The concentrations of total petroleum hydrocarbons in the groundwater samples from the two wells, MW-1 and MW-2, are relatively low at 57 to 74 ppb. Benzene, toluene, and xylenes were only detected in MW-2 at concentrations that are not significantly greater than the detection limit and are below drinking water standards. MW-2 is also located upgradient of the former underground storage tanks and sump.

Of the seven chlorinated volatile organic compounds detected in the groundwater samples, chloroform, TCA, and DCA were either non-detected or just above detection limits. The other four compounds were generally at relatively similar concentrations among all the samples with the exception of PCE which was higher in MW-1 than the others. The concentrations of DCA, DCE, TCE, and PCE were at or exceeded drinking water standards in some of the samples.

Although the groundwater gradient is relatively flat at the site, showing only a slight southwest gradient, other nearby site investigations confirm a southwest gradient. Therefore, MW-2 is the most upgradient well which shows the presence of all the detected chlorinated compounds indicating the potential for these compounds migrating from offsite. In addition, several of these compounds were detected at similar concentrations in all onsite wells, indicating the potential for regional problem.

Metals were only detected in the groundwater samples from MW-3 and MW-4. The drinking water standard for chromium was exceeded in both samples. The drinking water standard for zinc was not exceeded. There is no drinking water standards for nickel established at this time.

6.0 RECOMMENDATIONS

Based on the collected analytical data, it appears the groundwater has been impacted by several constituents. However, the source of these compounds does not appear to be entirely from the car wash sump. We recommend the four wells be placed on a quarterly groundwater monitoring and sampling program. The wells will be analyzed for TPH as gasoline, BTEX, chlorinated volatile organics, and chromium. The purpose of the sampling program would be to obtain more data on the site's subsurface conditions.

In addition, we recommend performing a record search of other potential offsite sources in the area of the site. This would include evaluating other site investigations in the area to determine the occurrence of chlorinated volatile organics in the groundwater.

7.0 LIMITATIONS

Work for this project was performed in accordance with generally accepted professional practices for the nature and conditions of the work completed in the same or similar localities, at the time the work was performed. This report has been prepared for PACCAR Automotive, Inc. for specific application to the Grand Auto Facilities at 4240 E. 14th Street in Oakland, California. Assumptions contained within this document are not intended to represent a legal opinion. No other warranty, express or implied, is made.

TABLES

TABLE 1
Monitoring Well Data
Grand Auto Supply
4240 East 14th Street
Oakland, California
May 5, 1993

Well # (a)	Total Depth (b)	Screened Interval (c)	Surface Elevation (d)	Top of Casing Elevation (d)	Depth to Ground Water (e)	Ground Water Elevation (f)
MW-1	43	33 - 43	30.8	30.53	35.45	-4.92
MW-2	45	31 - 45	30.7	30.41	35.32	-4.91
MW-3	45	30 - 45	30.7	30.31	35.22	-4.91
MW-4	45	30 - 45	29.5	29.08	33.98	-4.90
HC-1 (g)	42	30 - 42	28.7	28.33	33.26	-4.93

Notes:

(a) See Figure 2 for well locations.

(b) Feet below ground surface.

(c) Depth interval in feet.

(d) Feet above Oakland City Datum

(e) Measured from top of casing, 5/5/93

(f) Feet above Oakland City Datum, 5/5/93

(g) Data obtained from adjacent Super Tire property

TABLE 2

Summary of Soil Sample Results
Grand Auto Facility
Oakland, California
(in mg/kg)

Analyte	BORING	B-8				B-9	MW-2		MW-3	MW-4
	Depth (1) Method	11	16	21	25	10	10.5	35	35.5	36
TPH as Gasoline	8015/5030	ND 1	ND1	ND1	ND 1	ND 1	ND 1	ND 1	ND 1	ND 1
TPH as Diesel	8015 mod.	ND 10	ND10	ND10	ND 10	ND10	ND 10	ND 10	ND 10	ND10
Aromatic VOC's	8020									
Benzene	*	ND 0.003	ND0.003	ND0.003	ND 0.003	ND 0.003	ND 0.003	ND 0.003	ND 0.003	ND 0.003
Toluene	*	ND 0.003	ND0.003	ND0.003	ND 0.003	ND0.003	ND 0.003	ND 0.003	ND0.003	ND 0.003
Ethyl Benzene	*	ND 0.003	ND0.003	ND0.003	ND 0.003	ND0.003	ND 0.003	ND 0.003	ND 0.003	ND 0.003
Xylenes	*	ND 0.009	ND0.009	ND0.009	ND 0.009	ND0.009	ND 0.009	ND 0.009	ND0.009	ND 0.009
Chlorinated VOC's	8010		ND0.005	ND0.005		ND0.005	ND0.005	ND0.005		
Tetrachloroethene (PCE)		0.005			0.030				0.009	0.012
Metals	6010									
Cadmium 1.5/100	*	ND 1	ND1	ND1	ND1	ND1	ND1	ND1	ND1	ND1
Chromium 5/500	*	58	29	29	28	27	28	31	29	35
Lead 5/1000	*	9	ND5	ND5	6	6	5	ND5	ND5	ND5
Nickel 20/2000	*	150	53	43	41	72	61	47	42	59
Zinc 250/5000	*	61	45	37	48	40	39	49	47	34

NOTES: ND X - Denotes chemical not detected at a level of X.
NT - Test not performed on sample.
(1) - Sample Depth in feet below groundwater surface
(2) - Tetrachloroethene, only chlorinated VOC compound detected in sample.

TABLE 3

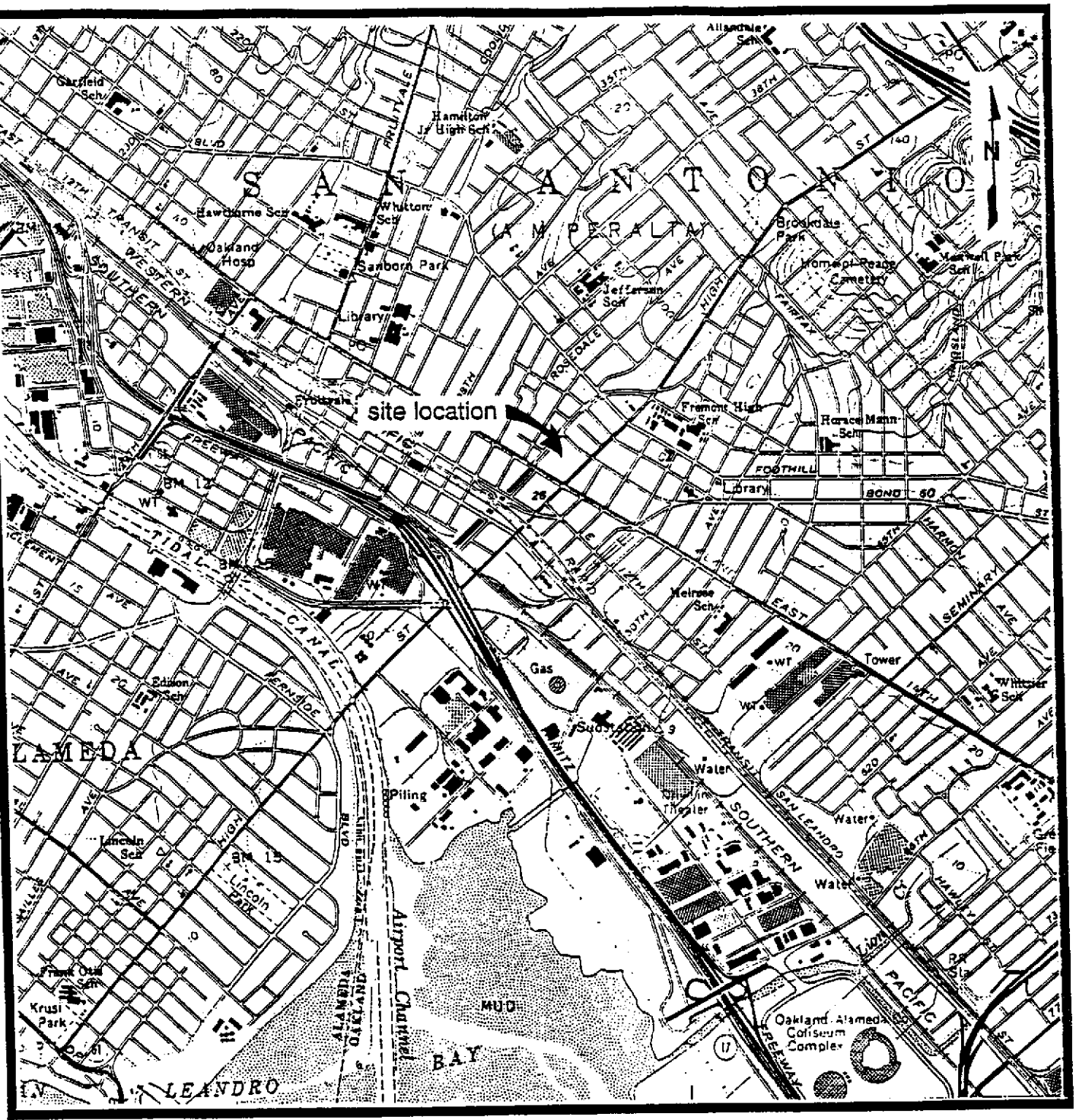
Summary of Groundwater Sample Results
Grand Auto Facility
Oakland, California
(in µg/L)

Analyte	Method	MW-1	MW-1A	MW-2	MW-3	MW-4	HC-1	Same as MW1 MW1A
TPH as Gasoline	8015 mod	~~57~~ 37	74	70	ND50	ND50		
Benzene	8020	ND 0.3	ND 0.3	0.8	ND 0.3	ND 0.3		
Toluene	8020	ND 0.3	ND 0.3	1.1	ND 0.3	ND 0.3		
Xylenes	8020	ND 0.9	ND 0.9	1.0	ND 0.9	ND 0.9		
Oil and Grease	5520F	NA	NA	ND5000	NA	NA		
Chlorinated VOC's	8010							
Freon 1,2		37	110	31	35	28	47	110
cis 1,2 - Dichloroethene		8.7	9.6	8.5	9.7	3.9	13	9.6
Chloroform		1.0	1.1	0.9	ND0.5	0.6	nd	1.1
Trichloroethane		ND0.5	0.6	0.6	0.8	ND0.5	nd	0.6
cis 1,2 - Dichloroethane		ND0.5	ND0.5	0.6	ND0.5	ND0.5	nd	*
Trichloroethene		22	25	32	21	17	22	25
Tetrachloroethene		300	290	7.5	79	98	46	290
Metals						Pb	6 mg/kg	
Chromium	6010	ND50	NT	ND50	170	60	nd	
Zinc		ND50	NT	ND50	210	80	nd	
Nickel		ND50	NT	ND50	200	ND50	nd	

Note: ND X - Denotes chemical not detected at a level of X. MW-1A - Duplicate sample from MW-1
All other compounds were not detected above detection limits.

* not analyzed

FIGURES



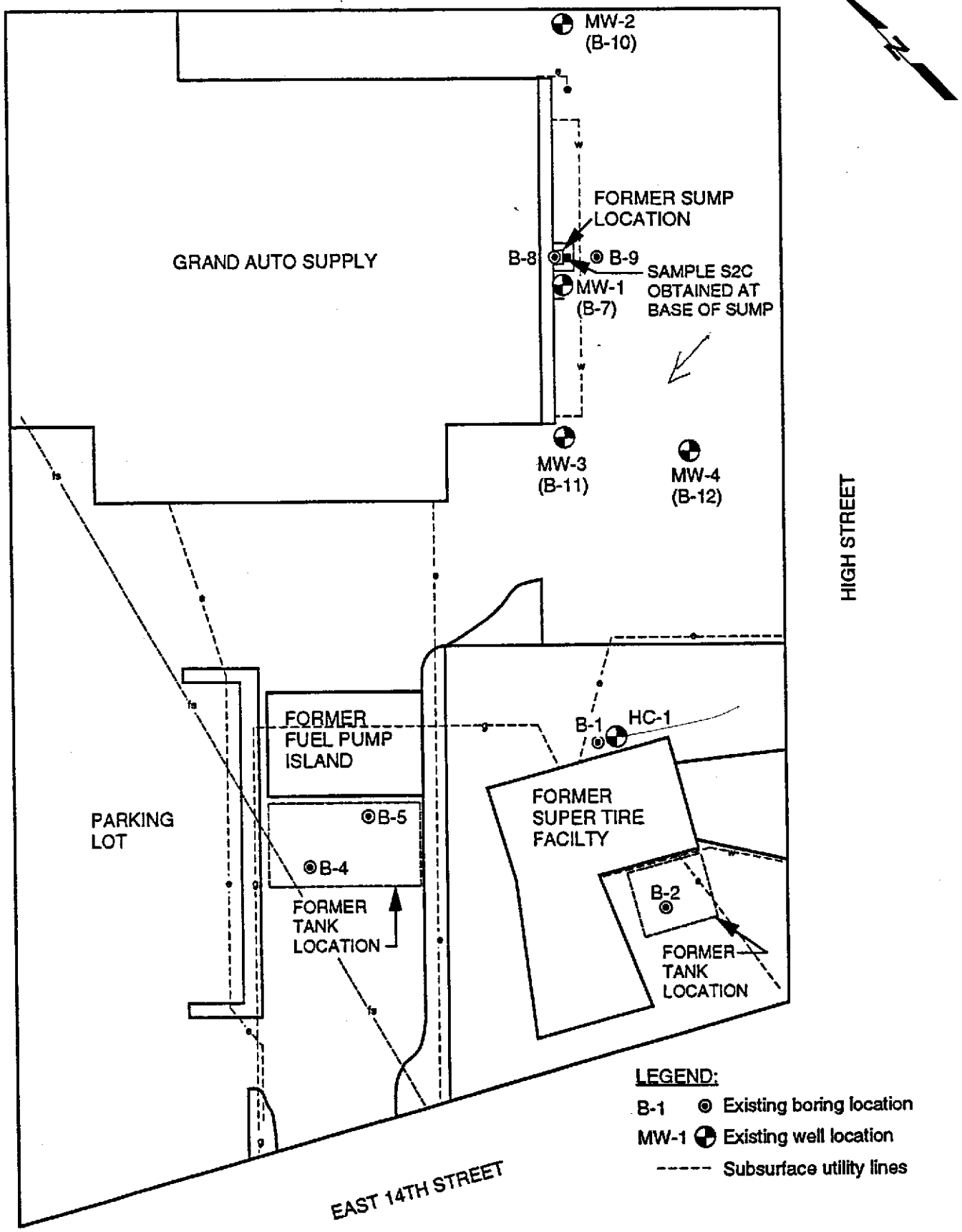
LOCATION MAP
Grand Auto/Former Super Tire Site
Oakland, California

HARTCROWSER

J-6077

Figure 1

MISSION AUTOMOTIVE



0 20 40 80

Scale, in Feet

SITE PLAN

GRAND AUTO RETAIL FACILITY
EAST 14TH & HIGH STREETS
OAKLAND, CALIFORNIA

HARTCROWSER

J-6077 5/93

Figure 2

md/pacmar oakland site v.1

GROUNDWATER ELEVATIONS

GRAND AUTO RETAIL FACILITY
EAST 14TH & HIGH STREETS
OAKLAND, CALIFORNIA

HARTCROWSER

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Figure 3

rad/paccar oakland site v.1

APPENDIX A
Boring Logs

Key to Exploration Logs

Sample Descriptions

Classification of soils in this report is based on visual field and laboratory observations which include density/consistency, moisture condition, grain size, and plasticity estimates, and should not be construed to imply field nor laboratory testing unless presented herein. Visual-manual classification methods of ASTM D 2488 were used as an identification guide.

Soil descriptions consist of the following:
Density/consistency, moisture, color, minor constituents, MAJOR CONSTITUENTS, additional remarks.

Density/Consistency

Soil density/consistency in borings is related primarily to the Standard Penetration Resistance. Soil density/consistency in test pits is estimated based on visual observation and is presented parenthetically on the test pit logs.

SAND and GRAVEL Density	Standard Penetration Resistance in Blows/Foot	SILT or CLAY Density	Standard Penetration Resistance in Blows/Foot	Approximate Sheer Strength in TSF
Very loose	0 - 4	Very soft	0 - 2	<0.125
Loose	4 - 10	Soft	2 - 4	0.125 - 0.25
Medium dense	10 - 30	Medium stiff	4 - 8	0.25 - 0.5
Dense	30 - 50	Stiff	8 - 15	0.5 - 1.0
Very Dense	>50	Very Stiff	15 - 30	1.0 - 2.0
		Hard	>30	>2.0

Moisture

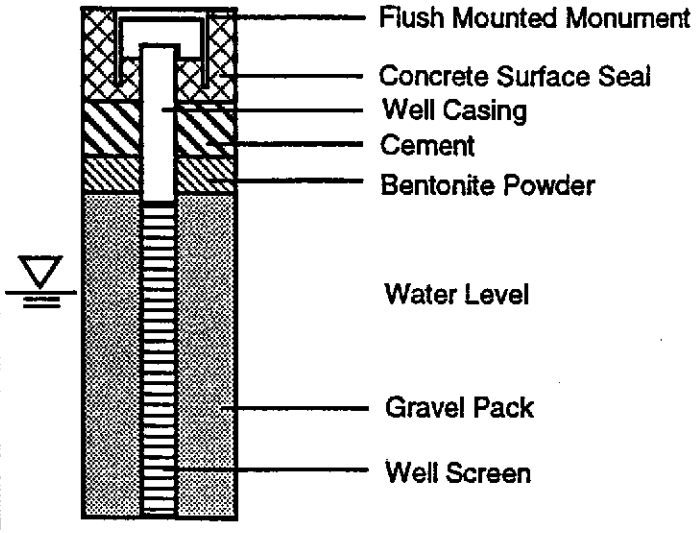
Dry	Little perceptible moisture.
Damp	Some perceptible moisture, probably below optimum.
Moist	Probably near optimum moisture content.
Wet	Much perceptible moisture, probably above optimum.

Minor Constituents

	Estimated Percentage
Not identified in description	0 - 5
Slightly (clayey, silty, etc.)	5 - 12
Clayey, silty, sandy, gravelly	12 - 30
Very (clayey, silty, etc.)	30 - 50

Legends

Groundwater Observations



Sampling

BORING SYMBOLS

	Spilt Spoon
	Shelby Tube
	Cuttings
	Core Run
*	No Sample Recovery
P	Tube Pushed, Not Driven

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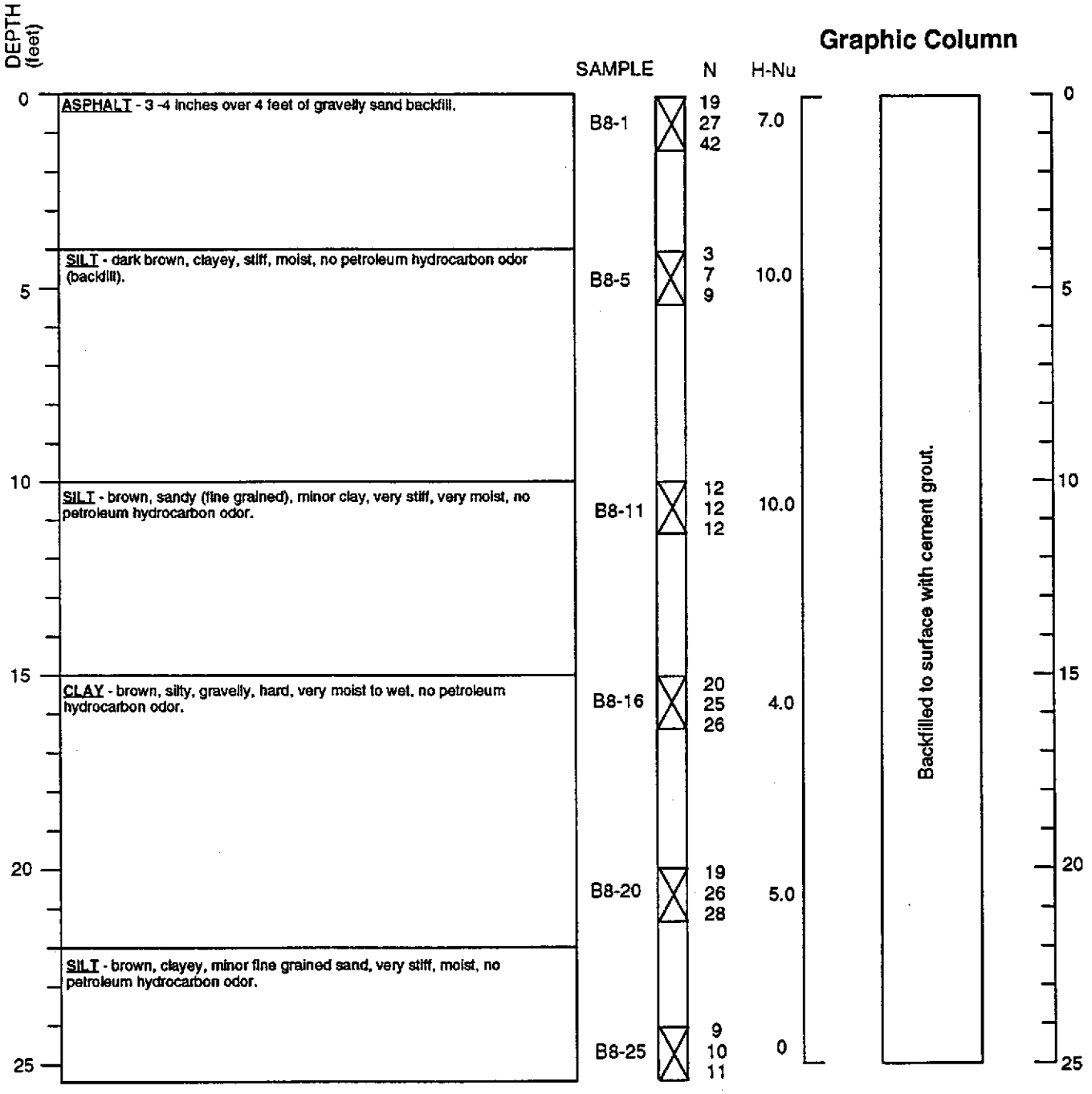
Figure A-1

Boring Log B-8

Geologic Log



Bottom of boring 25.5 feet BGS. Completed 4/16/93.

1. *Refer to Figure A-1 for explanation of descriptions and symbols.*
2. *Soil descriptions and stratum lines are interpretive and actual changes may be gradual.*

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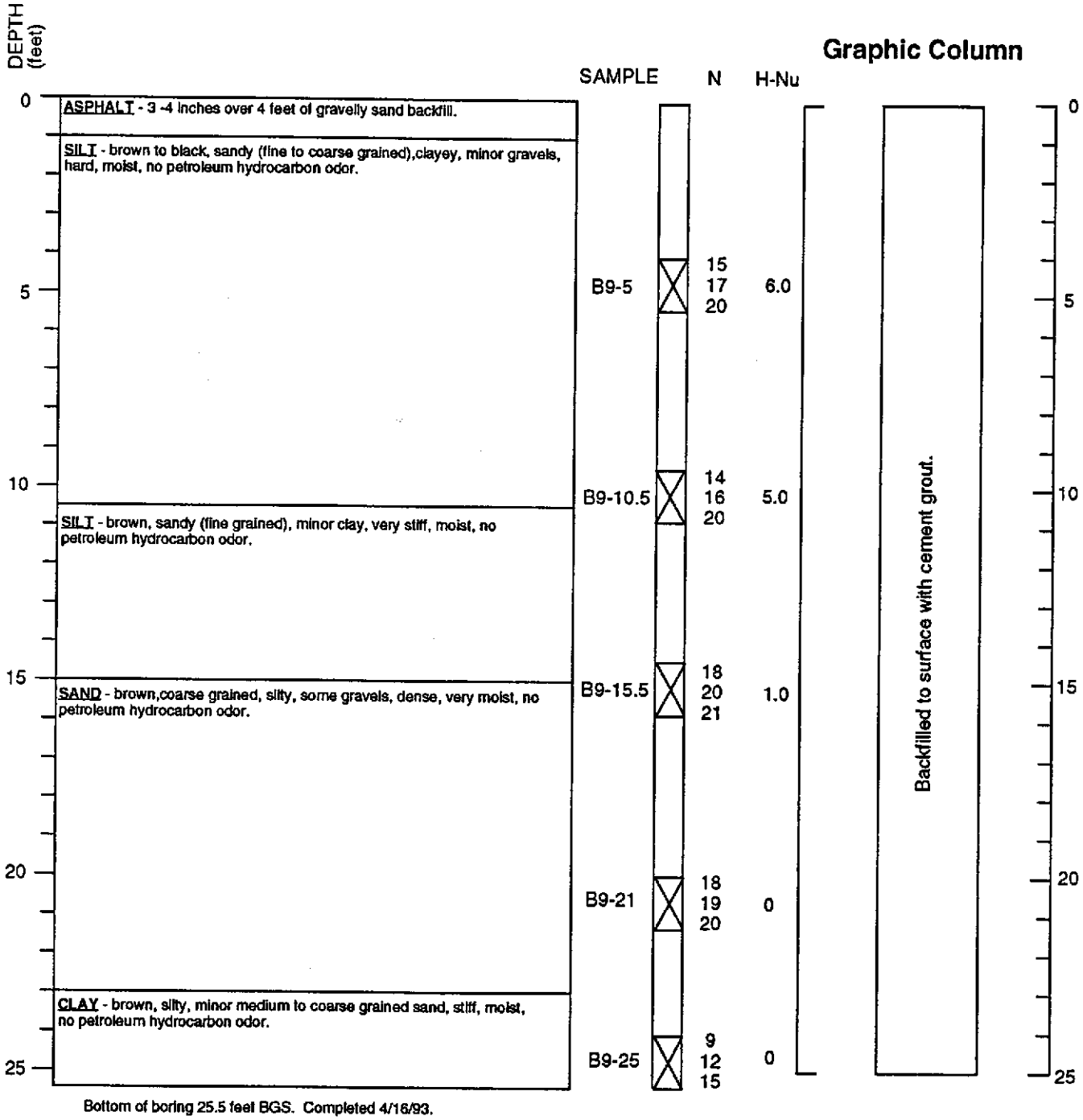
Figure A-2

Boring Log B-9

Geologic Log



Bottom of boring 25.5 feet BGS. Completed 4/16/93.

1. *Refer to Figure A-1 for explanation of descriptions and symbols.*
2. *Soil descriptions and stratum lines are interpretive and actual changes may be gradual.*

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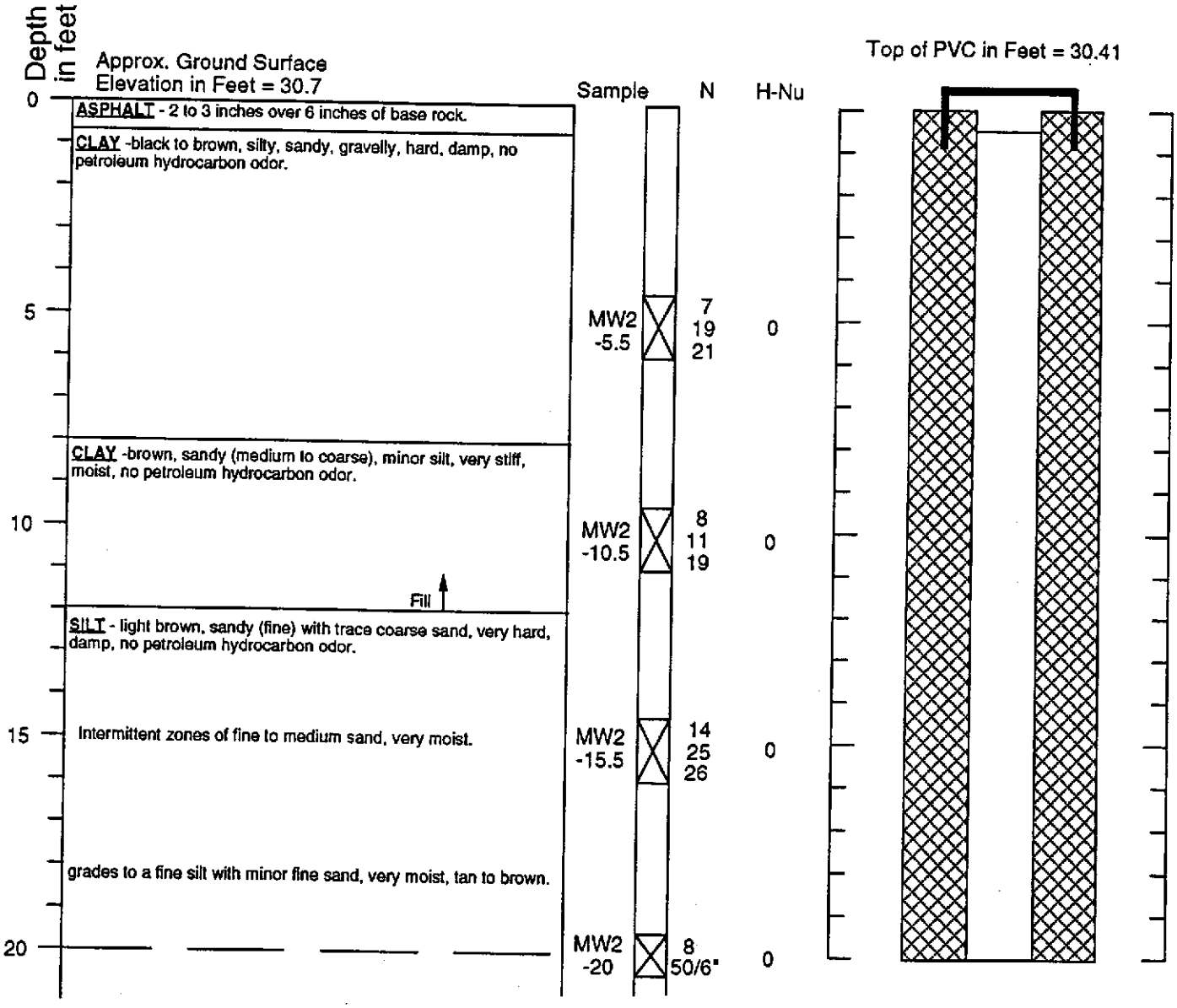
J-6077 *5/93*

Figure A-3

Boring Log and Construction Data for Monitoring Well MW-2

Geologic Log

Monitoring Well Design



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Ground water level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
4. Elevations referenced to the City of Oakland Datum.

HARTCROWSER

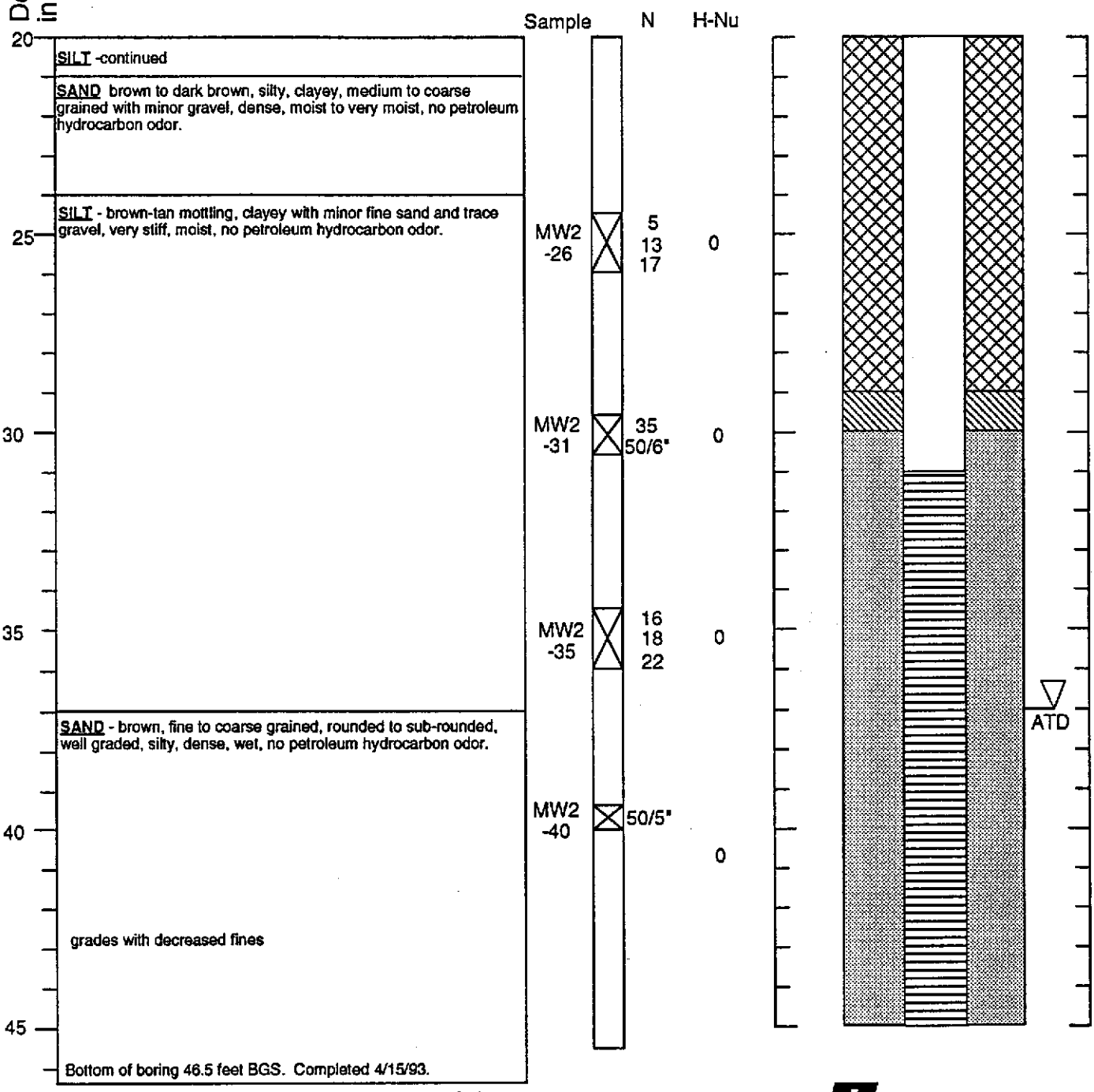
J-6077 *5/93*

Figure A-4

Boring Log and Construction Data for Monitoring Well MW-2

Geologic Log

Monitoring Well Design



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Ground water level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
4. Elevations referenced to the City of Oakland Datum.

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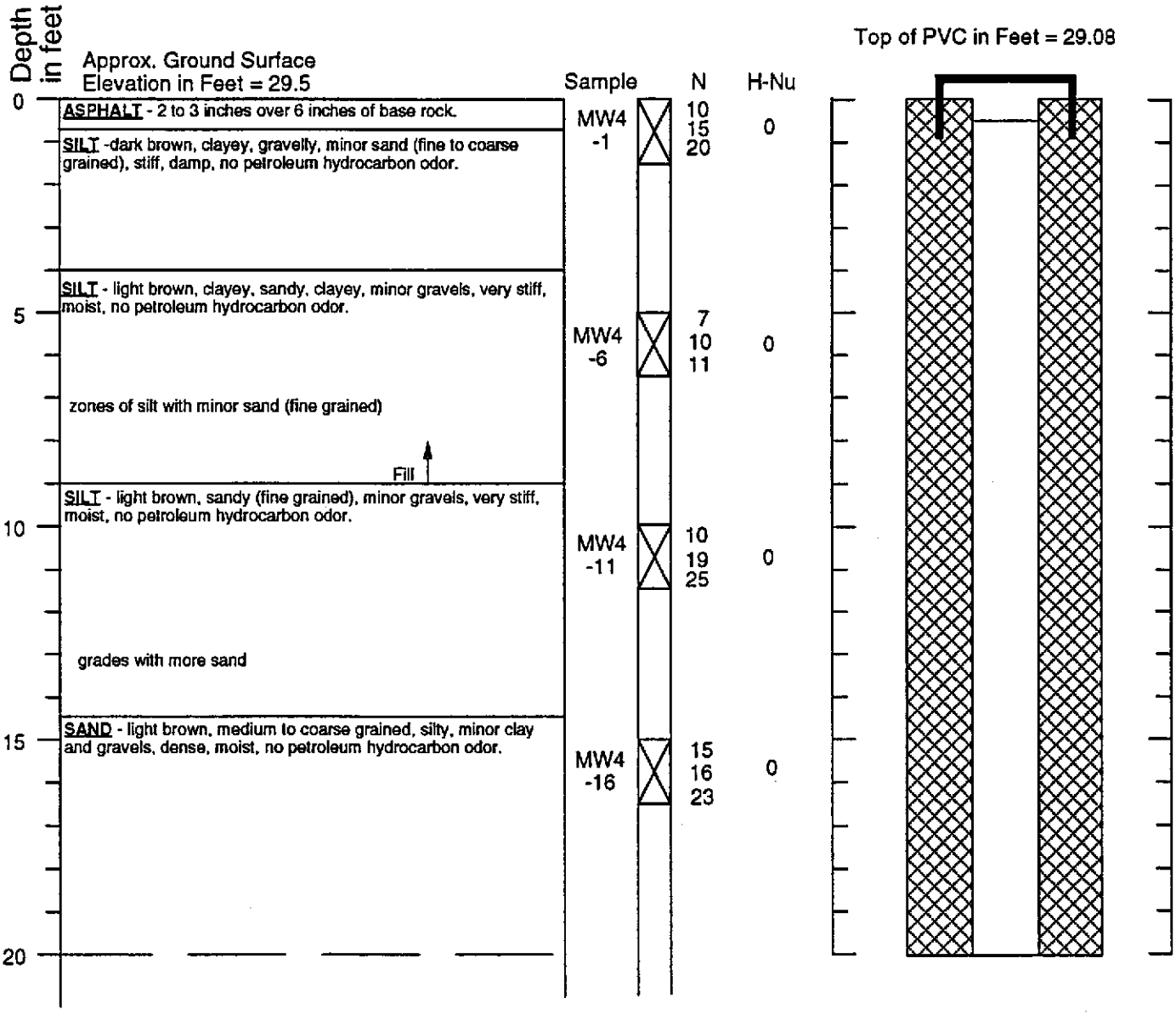
Figure A-5

Boring Log and Construction Data for Monitoring Well MW-4

Geologic Log

Monitoring Well Design



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Ground water level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
4. Elevations referenced to the City of Oakland Datum.

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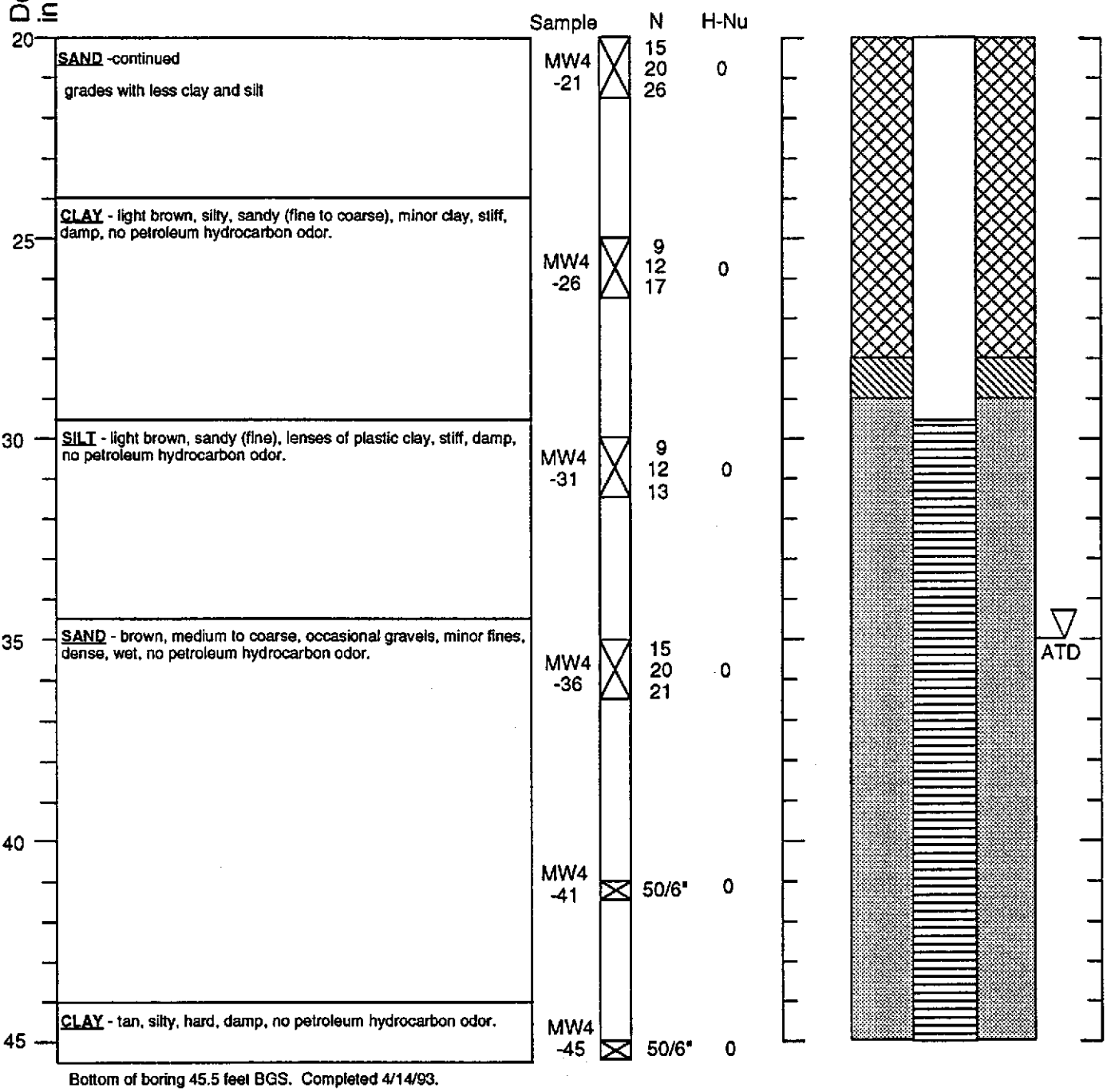
J-6077 *5/93*

Figure A-6

Boring Log and Construction Data for Monitoring Well MW-4

Geologic Log

Monitoring Well Design



Bottom of boring 45.5 feet BGS. Completed 4/14/93.

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Ground water level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
4. Elevations referenced to the City of Oakland Datum.

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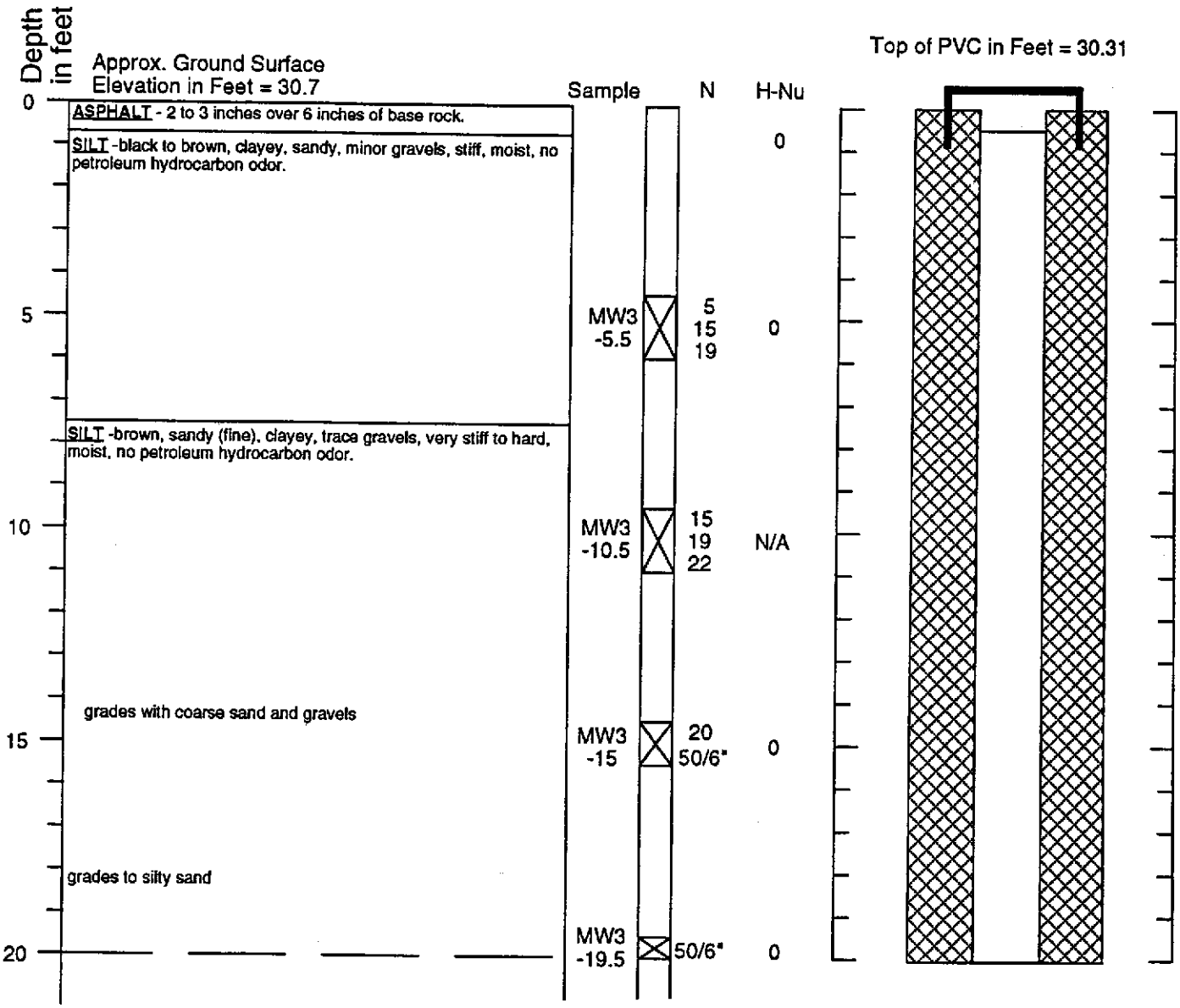
Figure A-7

Boring Log and Construction Data for Monitoring Well MW-3

Geologic Log

Monitoring Well Design



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Ground water level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
4. Elevations referenced to the City of Oakland Datum.

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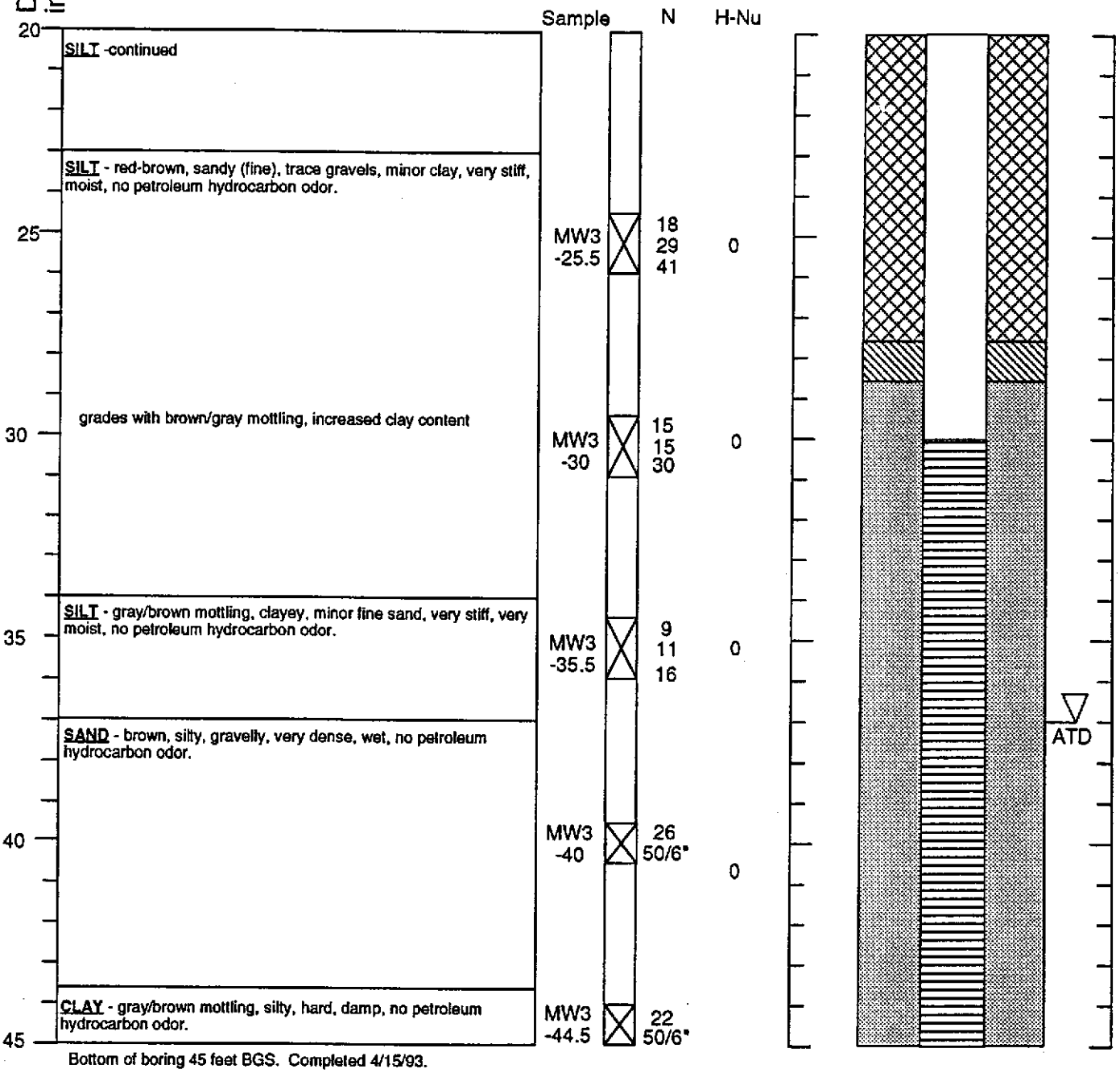
J-6077 *5/93*

Figure A-8

Boring Log and Construction Data for Monitoring Well MW-3

Geologic Log

Monitoring Well Design



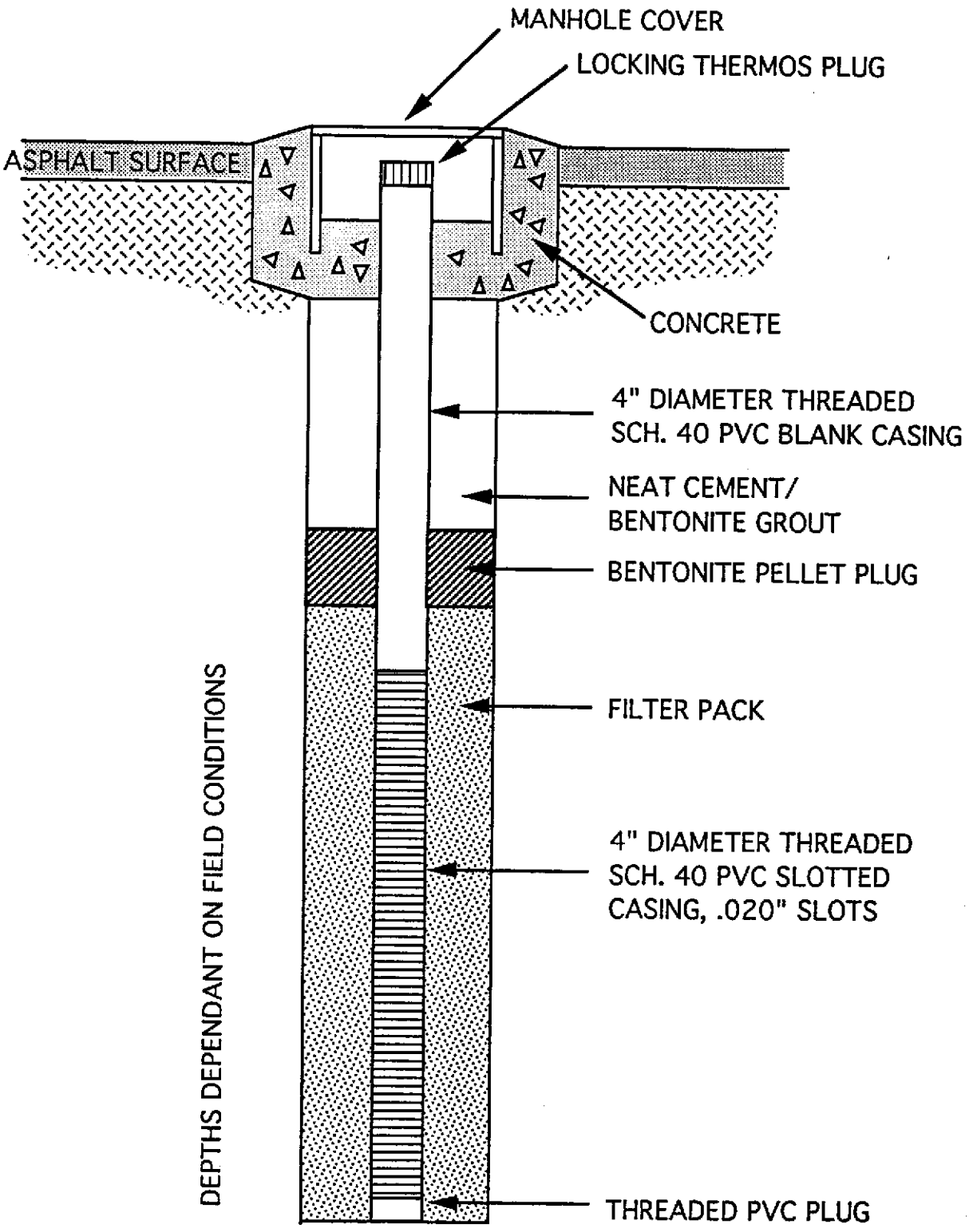
Bottom of boring 45 feet BGS. Completed 4/15/93.

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Ground water level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
4. Elevations referenced to the City of Oakland Datum.

HARTCROWSER

J-6077 *5/93*

Figure A-9



TYPICAL GROUNDWATER MONITORING WELL SCHEMATIC

NOT TO SCALE

HARTCROWSER

J-6077 5/93
Figure A-10

APPENDIX B
Certified Analytical Reports

Superior Precision Analytical, Inc.
825 Arnold Drive, Suite 114 • Martinez, California 94553 • (510) 229-1512 / fax (510) 229-1526

CERTIFICATE OF ANALYSIS

LABORATORY NO.: 88364
CLIENT: HARTCROWSER Inc.
CLIENT JOB NO.: 6077

DATE RECEIVED: 04/19/93
DATE REPORTED: 04/26/93
DATE SAMPLED: 04/14,15,16/93

ANALYSIS FOR CADMIUM, CHROMIUM, LEAD, NICKEL & ZINC
by EPA SW-846 Method 6010

LAB #	Sample Identification	Concentration (mg/kg) Cadmium	Chromium	Lead	Nickel	Zinc
7	MW-2 10.5'	ND	28	5	61	39
8	MW-2 35'	ND	31	ND	47	49
9	MW-3 35.5'	ND	29	ND	42	47
10	MW-4 36'	ND	35	ND	59	34
11	B-8 11'	ND	58	9	150	61
12	B-8 16'	ND	29	ND	53	45
13	B-8 21'	ND	29	ND	43	37
14	B-8 25'	ND	28	6	41	48
15	B-9 10'	ND	27	6	72	40

mg/kg - parts per million (ppm)
Method Detection Limit for Cadmium in Soil: 1 mg/kg
Method Detection Limit for Chromium in Soil: 5 mg/kg
Method Detection Limit for Lead in Soil: 5 mg/kg
Method Detection Limit for Nickel in Soil: 10mg/kg
Method Detection Limit for Nickel in Soil: 20 mg/kg

QAQC Summary: Spike Recovery Range: 90%-98%
Duplicate RPD : <1%

Richard Srna, Ph.D.

Sajid Syed for
Laboratory Manager

Superior Precision Analytical, Inc.
825 Arnold Drive, Suite 114 ▪ Martinez, California 94553 ▪ (510) 229-1512 / fax (510) 229-1526

HARTCROWSER Inc.
Attn: Eric Schniewind

Project 6077
Reported 04/26/93

TOTAL PETROLEUM HYDROCARBONS

Lab #	Sample Identification	Sampled	Analyzed	Matrix
88364- 7	MW-2 10.5'	04/15/93	04/23/93	Soil
88364- 8	MW-2 35'	04/15/93	04/23/93	Soil
88364- 9	MW-3 35.5'	04/15/93	04/24/93	Soil
88364-10	MW-4 36'	04/14/93	04/23/93	Soil
88364-11	B-8 11'	04/16/93	04/23/93	Soil
88364-12	B-8 16'	04/16/93	04/23/93	Soil
88364-13	B-8 21'	04/16/93	04/24/93	Soil
88364-14	B-8 25'	04/16/93	04/24/93	Soil
88364-15	B-9 10'	04/16/93	04/24/93	Soil

RESULTS OF ANALYSIS

Laboratory Number:	88364- 7	88364- 8	88364- 9	88364-10	88364-11
Gasoline:	ND<1	ND<1	ND<1	ND<1	ND<1
Benzene:	ND<.003	ND<.003	ND<.003	ND<.003	ND<.003
Toluene:	ND<.003	ND<.003	ND<.003	ND<.003	ND<.003
Ethyl Benzene:	ND<.003	ND<.003	ND<.003	ND<.003	ND<.003
Xylenes:	ND<.009	ND<.009	ND<.009	ND<.009	ND<.009
Oil and Grease:	NA	NA	NA	NA	NA
Diesel:	ND<10	ND<10	ND<10	ND<10	ND<10
Concentration:	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg

Laboratory Number:	88364-12	88364-13	88364-14	88364-15
Gasoline:	ND<1	ND<1	ND<1	ND<1
Benzene:	ND<.003	ND<.003	ND<.003	ND<.003
Toluene:	ND<.003	ND<.003	ND<.003	ND<.003
Ethyl Benzene:	ND<.003	ND<.003	ND<.003	ND<.003
Xylenes:	ND<.009	ND<.009	ND<.009	ND<.009
Oil and Grease:	NA	NA	NA	NA
Diesel:	ND<10	ND<10	ND<10	ND<10
Concentration:	mg/kg	mg/kg	mg/kg	mg/kg

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C E R T I F I C A T E O F A N A L Y S I S

ANALYSIS FOR TOTAL PETROLEUM HYDROCARBONS

QA/QC INFORMATION
SET: 88364

NA = ANALYSIS NOT REQUESTED
ND = ANALYSIS NOT DETECTED ABOVE QUANTITATION LIMIT
mg/kg = parts per million (ppm)

OIL AND GREASE ANALYSIS By Standard Methods Method 5520F:
Minimum Detection Limit in Soil: 50mg/kg

Modified EPA SW-846 Method 8015 for Extractable Hydrocarbons:
Minimum Quantitation Limit for Diesel in Soil: 10mg/kg

EPA SW-846 Method 8015/5030 Total Purgable Petroleum Hydrocarbons:
Minimum Quantitation Limit for Gasoline in Soil: 1mg/kg

EPA SW-846 Method 8020/BTXE
Minimum Quantitation Limit in Soil: 0.003g/kg

ANALYTE	MS/MSD RECOVERY	RPD	CONTROL LIMIT
Gasoline:	106/100	6%	70-130
Benzene:	108/113	5%	70-130
Toluene:	93/97	4%	70-130
Ethyl Benzene:	100/106	6%	70-130
Xylenes:	102/109	7%	70-130
Oil and Grease:	63/72	14%	56-106
Diesel:	104/104	0%	75-125

Richard Srna, Ph.D.
Laboratory Director

Superior Precision Analytical, Inc.
825 Arnold Drive, Suite 114 • Martinez, California 94553 • (510) 229-1512 / fax (510) 229-1526

HARTCROWSER Inc.
Attn: Eric Schniewind

Project 6077
Reported 26-April-1993

HALGONATED VOLATILE ORGANICS

Sample preparation by Purge and Trap (EPA SW-846 Method 5030) and Chromatographic analysis using an electrolytic conductivity detector (EPA SW-846 Method 8010).

Chronology

Laboratory Number 88364

Identification	Sampled	Received	Extracted	Analyzed	Run #	Lab #
MW-2 10.5'	04/15/93	04/19/93	/ /	04/21/93		7
MW-2 35'	04/15/93	04/19/93	/ /	04/21/93		8
MW-3 35.5'	04/15/93	04/19/93	/ /	04/21/93		9
MW-4 36'	04/14/93	04/19/93	/ /	04/23/93		10
B-8 11'	04/16/93	04/19/93	/ /	04/23/93		11
B-8 16'	04/16/93	04/19/93	/ /	04/23/93		12
B-8 21'	04/16/93	04/19/93	/ /	04/23/93		13
B-8 25'	04/16/93	04/19/93	/ /	04/23/93		14
B-9 10'	04/16/93	04/19/93	/ /	04/23/93		15

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HARTCROWSER Inc.
Attn: Eric Schniewind

Project 6077
Reported 26-April-1993

HALGONATED VOLATILE ORGANICS

Laboratory Number	Sample Identification	Matrix
88364- 7	MW-2 10.5'	Soil
88364- 8	MW-2 35'	Soil
88364- 9	MW-3 35.5'	Soil
88364-10	MW-4 36'	Soil
88364-11	B-8 11'	Soil

RESULTS OF ANALYSIS

Laboratory Number:	88364- 7	88364- 8	88364- 9	88364-10	88364-11
Chloromethane/Vinyl Ch:	ND<10	ND<10	ND<10	ND<10	ND<10
Bromomethane:	ND<5	ND<5	ND<5	ND<5	ND<5
Chloroethane:	ND<5	ND<5	ND<5	ND<5	ND<5
Trichlorofluoromethane:	ND<5	ND<5	ND<5	ND<5	ND<5
1,1-Dichloroethene:	ND<5	ND<5	ND<5	ND<5	ND<5
Dichloromethane:	ND<5	ND<5	ND<5	ND<5	ND<5
t-1,2-Dichloroethene:	ND<5	ND<5	ND<5	ND<5	ND<5
1,1-Dichloroethane:	ND<5	ND<5	ND<5	ND<5	ND<5
c-1,2-Dichloroethene:	ND<5	ND<5	ND<5	ND<5	ND<5
Chloroform:	ND<5	ND<5	ND<5	ND<5	ND<5
1,1,1-Trichloroethane:	ND<5	ND<5	ND<5	ND<5	ND<5
Carbon tetrachloride:	ND<5	ND<5	ND<5	ND<5	ND<5
1,2-Dichloroethane:	ND<5	ND<5	ND<5	ND<5	ND<5
Trichloroethene:	ND<5	ND<5	ND<5	ND<5	ND<5
c-1,3-Dichloropropene:	ND<5	ND<5	ND<5	ND<5	ND<5
1,2-Dichloropropane:	ND<5	ND<5	ND<5	ND<5	ND<5
t-1,3-Dichloropropene:	ND<5	ND<5	ND<5	ND<5	ND<5
Bromodichloromethane:	ND<5	ND<5	ND<5	ND<5	ND<5
1,1,2-Trichloroethane:	ND<5	ND<5	ND<5	ND<5	ND<5
Tetrachloroethene:	ND<5	ND<5	9	12	5
Dibromochloromethane:	ND<5	ND<5	ND<5	ND<5	ND<5
Chlorobenzene:	ND<5	ND<5	ND<5	ND<5	ND<5
Bromoform:	ND<5	ND<5	ND<5	ND<5	ND<5
1,1,2,2-Tetrachloroeth:	ND<5	ND<5	ND<5	ND<5	ND<5
1,3-Dichlorobenzene:	ND<5	ND<5	ND<5	ND<5	ND<5
1,2-Dichlorobenzene:	ND<5	ND<5	ND<5	ND<5	ND<5
1,4-Dichlorobenzene:	ND<5	ND<5	ND<5	ND<5	ND<5
Concentration:	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg

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HARTCROWSER Inc.
Attn: Eric Schniewind

Project 6077
Reported 26-April-1993

HALGONATED VOLATILE ORGANICS

Laboratory Number	Sample Identification	Matrix
88364-12	B-8 16'	Soil
88364-13	B-8 21'	Soil
88364-14	B-8 25'	Soil
88364-15	B-9 10'	Soil

RESULTS OF ANALYSIS

Laboratory Number:	88364-12	88364-13	88364-14	88364-15
Chloromethane/Vinyl Ch:	ND<10	ND<10	ND<10	ND<10
Bromomethane:	ND<5	ND<5	ND<5	ND<5
Chloroethane:	ND<5	ND<5	ND<5	ND<5
Trichlorofluoromethane:	ND<5	ND<5	ND<5	ND<5
1,1-Dichloroethene:	ND<5	ND<5	ND<5	ND<5
Dichloromethane:	ND<5	ND<5	ND<5	ND<5
t-1,2-Dichloroethene:	ND<5	ND<5	ND<5	ND<5
1,1-Dichloroethane:	ND<5	ND<5	ND<5	ND<5
c-1,2-Dichloroethene:	ND<5	ND<5	ND<5	ND<5
Chloroform:	ND<5	ND<5	ND<5	ND<5
1,1,1-Trichloroethane:	ND<5	ND<5	ND<5	ND<5
Carbon tetrachloride:	ND<5	ND<5	ND<5	ND<5
1,2-Dichloroethane:	ND<5	ND<5	ND<5	ND<5
Trichloroethene:	ND<5	ND<5	ND<5	ND<5
c-1,3-Dichloropropene:	ND<5	ND<5	ND<5	ND<5
1,2-Dichloropropane:	ND<5	ND<5	ND<5	ND<5
t-1,3-Dichloropropene:	ND<5	ND<5	ND<5	ND<5
Bromodichloromethane:	ND<5	ND<5	ND<5	ND<5
1,1,2-Trichloroethane:	ND<5	ND<5	ND<5	ND<5
Tetrachloroethene:	ND<5	ND<5	30	ND<5
Dibromochloromethane:	ND<5	ND<5	ND<5	ND<5
Chlorobenzene:	ND<5	ND<5	ND<5	ND<5
Bromoform:	ND<5	ND<5	ND<5	ND<5
1,1,2,2-Tetrachloroeth:	ND<5	ND<5	ND<5	ND<5
1,3-Dichlorobenzene:	ND<5	ND<5	ND<5	ND<5
1,2-Dichlorobenzene:	ND<5	ND<5	ND<5	ND<5
1,4-Dichlorobenzene:	ND<5	ND<5	ND<5	ND<5
Concentration:	ug/Kg	ug/Kg	ug/Kg	ug/Kg

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Superior Precision Analytical, Inc.
825 Arnold Drive, Suite 114 • Martinez, California 94553 • (510) 229-1512 / fax (510) 229-1526

HALGONATED VOLATILE ORGANICS
Quality Assurance and Control Data - Soil

Laboratory Number 88364

Compound	Method Blank (ug/Kg)	PQL (ug/Kg)	Average Spike Recovery (%)	Limits (%)	RPD (%)
Chloromethane/Vinyl Ch:	ND<10	10			
Bromomethane:	ND<5	5			
Chloroethane:	ND<5	5			
Trichlorofluoromethane:	ND<5	5			
1,1-Dichloroethene:	ND<5	5	100%	75-125	10%
Dichloromethane:	ND<5	5			
t-1,2-Dichloroethene:	ND<5	5			
1,1-Dichloroethane:	ND<5	5			
c-1,2-Dichloroethene:	ND<5	5			
Chloroform:	ND<5	5			
1,1,1-Trichloroethane:	ND<5	5			
Carbon tetrachloride:	ND<5	5			
1,2-Dichloroethane:	ND<5	5			
Trichloroethene:	ND<5	5	103%	75-125	8%
c-1,3-Dichloropropene:	ND<5	5			
1,2-Dichloropropane:	ND<5	5			
t-1,3-Dichloropropene:	ND<5	5			
Bromodichloromethane:	ND<5	5			
1,1,2-Trichloroethane:	ND<5	5			
Tetrachloroethene:	ND<5	5			
Dibromochloromethane:	ND<5	5			
Chlorobenzene:	ND<5	5	114%	75-125	6%
Bromoform:	ND<5	5			
1,1,2,2-Tetrachloroeth:	ND<5	5			
1,3-Dichlorobenzene:	ND<5	5			
1,2-Dichlorobenzene:	ND<5	5			
1,4-Dichlorobenzene:	ND<5	5			

Definitions:

ND = Not Detected
PQL = Practical Quantitation Limit

RPD = Relative Percent Difference

QC File No. 88364

Sajid Syed
Senior Analyst

RECEIVED APR 2_ 1993

88565

Sample Custody Record

DATE 4/19/93 PAGE 1 OF 2

HART CROWSER
Hart Crowser, Inc.
353 Sacramento Street, Suite 1140
San Francisco, California 94111

JOB NUMBER 6077 LAB NUMBER

PROJECT MANAGER Eric Schniewind

PROJECT NAME Paccar Oakland

SAMPLED BY: P. Hudson

TESTING

LAB NO.	SAMPLE	TIME	STATION	MATRIX	OIL GREASE 5520 F	TOTAL LEAD	TPH DIESEL	TPH GAS/BTEX	VOC - 8010	METALS Cd, Cr, Pb, Ni, Zn *	NO. OF CONTAINERS
	HC-1:	4/14/93		SOIL							
	11'	↓		↓	X	X					1
	16'				X	X					1
	20'				X	X					1
	26'				X	X					1
	31'				X	X					1
	36'				X	X					1
	MW-2:	4/15/93									
	10.5'	↓					X	X	X	X	1
	35'	↓					X	X	X	X	1
	MW-3:	4/15/93									
	35.5'	↓		↓			X	X	X	X	1

OBSERVATIONS/COMMENTS/ COMPOSITING INSTRUCTIONS

* METALS:
Cd = Cadmium
Cr = Chromium
Pb = Lead
Ni = Nickel
Zn = Zinc

RELINQUISHED BY	DATE	RECEIVED BY	DATE
SIGNATURE: [signature]	4/19/93	SIGNATURE: Wilson Woo Aero	4/19/93
PRINTED NAME: Peter Hudson	TIME 12:35	PRINTED NAME: Wilson Woo	TIME 12:35
COMPANY: Hart Crowser Inc		COMPANY: Aero Del.	

RELINQUISHED BY	DATE	RECEIVED BY	DATE
SIGNATURE: Wilson Woo	4/19/93	SIGNATURE: [signature]	4/19/93
PRINTED NAME: Wilson Woo	TIME 1:00 pm	PRINTED NAME: Rene B.	TIME 100
COMPANY: Aero Del		COMPANY: SPA, SF	

TOTAL NUMBER OF CONTAINERS 9

METHOD OF SHIPMENT: Superior Courier

SPECIAL SHIPMENT/HANDLING OR STORAGE REQUIREMENTS

...red in ice. ...priate containers ...ples preserved ...without headspace ...mments: KC SOC

DISTRIBUTION:
1. PROVIDE WHITE AND YELLOW COPIES TO LABORATORY
2. RETURN PINK COPY TO PROJECT MANAGER
3. LABORATORY TO FILL IN SAMPLE NUMBER AND SIGN FOR RECEIPT
4. LABORATORY TO RETURN WHITE COPY TO HART CROWSER

Relinquished Cor. Car. Torrance 1:05 pm 4/19/93 R. Carlyon 4/20/93 [illegible] 30 am

Sample Custody Record

DATE 4/19/93 PAGE 2 OF 2

HARTCROWSER

Hart Crowser, Inc.
353 Sacramento Street, Suite 1140
San Francisco, California 94111

JOB NUMBER 6077 LAB NUMBER

PROJECT MANAGER ERIC SCHNEEWIND

PROJECT NAME PACCAR - OAKLAND

SAMPLED BY: P. HUDSON

LAB NO.	SAMPLE	TIME	STATION	MATRIX	TESTING * TPH Diesel	TPH Gas / BTEX	VOC - 8010	Metals Cd, Cr, Pb, Ni, Zn						NO. OF CONTAINERS	OBSERVATIONS / COMMENTS / COMPOSITING INSTRUCTIONS
	MW-4:	4/19/93		SOIL											* METALS
	36'	↓			X	X	X	X						1	Cd = CADMIUM
															Cr = CHROMIUM
	B-8:	4/16/93													Pb = LEAD
	11'				X	X	X	X						1	Ni = NICKEL
	16'				X	X	X	X						1	Zn = ZINC
	21'				X	X	X	X						1	
	25'				X	X	X	X						1	
	B-9:	↓		↓											
	10'				X	X	X	X						1	

RELINQUISHED BY	DATE	RECEIVED BY	DATE
SIGNATURE	4/19/93	SIGNATURE	4/19/93
PRINTED NAME: PIETER B. HUDSON	TIME	PRINTED NAME: WILSON WOO	TIME
COMPANY: HART CROWSER	12:30	COMPANY: AERO DEL.	1236
RELINQUISHED BY	DATE	RECEIVED BY	DATE
SIGNATURE: WILSON WOO	4/19/93	SIGNATURE: RENE D.	4/19/93
PRINTED NAME: AERO	TIME 1259	PRINTED NAME: STA, SF	TIME 100
COMPANY		COMPANY	

TOTAL NUMBER OF CONTAINERS: 6

METHOD OF SHIPMENT: SUPERIOR COURIER

SPECIAL SHIPMENT / HANDLING OR STORAGE REQUIREMENTS

Initials
Samples Stored in ice.
Appropriate containers
Samples preserved
Headspace

DISTRIBUTION:

1. PROVIDE WHITE AND YELLOW COPIES TO LABORATORY
2. RETURN PINK COPY TO PROJECT MANAGER
3. LABORATORY TO FILL IN SAMPLE NUMBER AND SIGN FOR RECEIPT
4. LABORATORY TO RETURN WHITE COPY TO HART CROWSER

Relinquished 1:05 pm Received by:
P.B.H. Jr. 4/19/93 [illegible] 4/16/93 3:30 PM

Superior Precision Analytical, Inc.
825 Arnold Drive, Suite 114 • Martinez, California 94553 • (510) 229-1512 / fax (510) 229-1526

HARTCROWSER Inc.
Attn: Eric Schniewind

Project 6077
Reported 05/04/93

TOTAL PETROLEUM HYDROCARBONS

Lab #	Sample Identification	Sampled	Analyzed	Matrix
88430- 1	MW-1	04/26/93	04/28/93	Water
88430- 2	MW-2	04/26/93	04/29/93	Water
88430- 3	MW-3	04/26/93	04/28/93	Water
88430- 4	MW-4	04/26/93	04/29/93	Water
88430- 5	HC-1	04/26/93	04/29/93	Water
88430- 6	MW-1A	04/26/93	04/29/93	Water
88430- 7	TRIP BLANK	04/26/93	04/29/93	Water

RESULTS OF ANALYSIS

Laboratory Number:	88430- 1	88430- 2	88430- 3	88430- 4	88430- 5
Gasoline:	57*	70	ND<50	ND<50	ND<50
Benzene:	ND<0.3	0.8	ND<0.3	ND<0.3	ND<0.3
Toluene:	ND<0.3	1.1	ND<0.3	ND<0.3	ND<0.3
Ethyl Benzene:	ND<0.3	ND<0.3	ND<0.3	ND<0.3	ND<0.3
Xylenes:	ND<0.9	1.0	ND<0.9	ND<0.9	ND<0.9
Oil and Grease:	NA	ND<5000	NA	NA	ND<5000
Concentration:	ug/L	ug/L	ug/L	ug/L	ug/L

Laboratory Number:	88430- 6	88430- 7
Gasoline:	74*	ND<50
Benzene:	ND<0.3	ND<0.3
Toluene:	ND<0.3	ND<0.3
Ethyl Benzene:	ND<0.3	ND<0.3
Xylenes:	ND<0.9	ND<0.9
Oil and Grease:	NA	NA
Concentration:	ug/L	ug/L

* Gasoline range concentration reported. The chromatogram shows only single peak in the gasoline range.

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C E R T I F I C A T E O F A N A L Y S I S

ANALYSIS FOR TOTAL PETROLEUM HYDROCARBONS

QA/QC INFORMATION
SET: 88430

NA = ANALYSIS NOT REQUESTED
ND = ANALYSIS NOT DETECTED ABOVE QUANTITATION LIMIT
ug/L = parts per billion (ppb)

OIL AND GREASE ANALYSIS By Standard Methods Method 5520F:
Minimum Detection Limit in Water: 5000ug/L

Modified EPA SW-846 Method 8015 for Extractable Hydrocarbons:
Minimum Quantitation Limit for Diesel in Water: 50ug/L

EPA SW-846 Method 8015/5030 Total Purgable Petroleum Hydrocarbons:
Minimum Quantitation Limit for Gasoline in Water: 50ug/L

EPA SW-846 Method 8020/BTXE
Minimum Quantitation Limit in Water: 0.3ug/L

ANALYTE	MS/MSD RECOVERY	RPD	CONTROL LIMIT
Gasoline:	77/73	5%	70-130
Benzene:	109/107	2%	70-130
Toluene:	91/91	0%	70-130
Ethyl Benzene:	99/100	1%	70-130
Xylenes:	99/100	1%	70-130
Oil and Grease:	92/93	1%	56-106

Richard Srna, Ph.D.
Laboratory Director

Superior Precision Analytical, Inc.
825 Arnold Drive, Suite 114 • Martinez, California 94553 • (510) 229-1512 / fax (510) 229-1526

HARTCROWSER Inc.
Attn: Eric Schniewind

Project 6077
Reported 04-May-1993

HALGONATED VOLATILE ORGANICS

Sample preparation by Purge and Trap (EPA SW-846 Method 5030) and Chromatographic analysis using an electrolytic conductivity detector (EPA SW-846 Method 8010).

Chronology

Laboratory Number 88430

Identification	Sampled	Received	Extracted	Analyzed	Run #	Lab #
MW-1	04/26/93	04/27/93	/ /	04/28/93		1
MW-2	04/26/93	04/27/93	/ /	04/28/93		2
MW-3	04/26/93	04/27/93	/ /	04/28/93		3
MW-4	04/26/93	04/27/93	/ /	04/28/93		4
HC-1	04/26/93	04/27/93	/ /	04/28/93		5
MW-1A	04/26/93	04/27/93	/ /	04/28/93		6

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HARTCROWSER Inc.
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Project 6077
Reported 04-May-1993

HALGONATED VOLATILE ORGANICS

Laboratory Number	Sample Identification	Matrix
88430- 1	MW-1	Water
88430- 2	MW-2	Water
88430- 3	MW-3	Water
88430- 4	MW-4	Water
88430- 5	HC-1	Water

RESULTS OF ANALYSIS

Laboratory Number:	88430- 1	88430- 2	88430- 3	88430- 4	88430- 5
Freon 1,2 :	37	31	35	28	47
Chloromethane/Vinyl Ch:	ND<1	ND<1	ND<1	ND<1	ND<1
Bromomethane:	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5
Chloroethane:	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5
Trichlorofluoromethane:	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5
1,1-Dichloroethene:	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5
Dichloromethane:	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5
t-1,2-Dichloroethene:	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5
1,1-Dichloroethane:	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5
c-1,2-Dichloroethene:	8.7	8.5	9.7	3.9	13
Chloroform:	1.0	0.9	ND<0.5	0.6	ND<0.5
1,1,1-Trichloroethane:	ND<0.5	0.6	0.8	ND<0.5	ND<0.5
Carbon tetrachloride:	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5
1,2-Dichloroethane:	ND<0.5	0.6	ND<0.5	ND<0.5	ND<0.5
Trichloroethene:	22	32	21	17	22
c-1,3-Dichloropropene:	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5
1,2-Dichloropropane:	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5
t-1,3-Dichloropropene:	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5
Bromodichloromethane:	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5
1,1,2-Trichloroethane:	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5
Tetrachloroethene:	300	7.5	79	98	46
Dibromochloromethane:	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5
Chlorobenzene:	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5
Bromoform:	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5
1,1,2,2-Tetrachloroeth:	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5
1,3-Dichlorobenzene:	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5
1,2-Dichlorobenzene:	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5
1,4-Dichlorobenzene:	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5
Concentration:	ug/L	ug/L	ug/L	ug/L	ug/L

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HARTCROWSER Inc.
Attn: Eric Schniewind

Project 6077
Reported 04-May-1993

HALGONATED VOLATILE ORGANICS

Laboratory Number	Sample Identification	Matrix
88430- 6	MW-1A	Water

RESULTS OF ANALYSIS

Laboratory Number: 88430- 6

Freon 1,2 :	110
Chloromethane/Vinyl Ch:	ND<1
Bromomethane:	ND<0.5
Chloroethane:	ND<0.5
Trichlorofluoromethane:	ND<0.5
1,1-Dichloroethene:	ND<0.5
Dichloromethane:	ND<0.5
t-1,2-Dichloroethene:	ND<0.5
1,1-Dichloroethane:	ND<0.5
c-1,2-Dichloroethene:	9.6
Chloroform:	1.1
1,1,1-Trichloroethane:	0.6
Carbon tetrachloride:	ND<0.5
1,2-Dichloroethane:	ND<0.5
Trichloroethene:	25
c-1,3-Dichloropropene:	ND<0.5
1,2-Dichloropropane:	ND<0.5
t-1,3-Dichloropropene:	ND<0.5
Bromodichloromethane:	ND<0.5
1,1,2-Trichloroethane:	ND<0.5
Tetrachloroethene:	290
Dibromochloromethane:	ND<0.5
Chlorobenzene:	ND<0.5
Bromoform:	ND<0.5
1,1,2,2-Tetrachloroeth:	ND<0.5
1,3-Dichlorobenzene:	ND<0.5
1,2-Dichlorobenzene:	ND<0.5
1,4-Dichlorobenzene:	ND<0.5
Concentration:	ug/L

RECEIVED

Superior Precision Analytical, Inc.
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HALGONATED VOLATILE ORGANICS
Quality Assurance and Control Data - Water

Laboratory Number 88430

Compound	Method Blank (ug/L)	PQL (ug/L)	Average Spike Recovery (%)	Limits (%)	RPD (%)
Chloromethane/Vinyl Ch:	ND<1	1			
Bromomethane:	ND<0.5	0.5			
Chloroethane:	ND<0.5	0.5			
Trichlorofluoromethane:	ND<0.5	0.5			
1,1-Dichloroethene:	ND<0.5	0.5	89%	75-125	0%
Dichloromethane:	ND<0.5	0.5			
t-1,2-Dichloroethene:	ND<0.5	0.5			
1,1-Dichloroethane:	ND<0.5	0.5			
c-1,2-Dichloroethene:	ND<0.5	0.5			
Chloroform:	ND<0.5	0.5			
1,1,1-Trichloroethane:	ND<0.5	0.5			
Carbon tetrachloride:	ND<0.5	0.5			
1,2-Dichloroethane:	ND<0.5	0.5			
Trichloroethene:	ND<0.5	0.5	100%	75-125	2%
c-1,3-Dichloropropene:	ND<0.5	0.5			
1,2-Dichloropropane:	ND<0.5	0.5			
t-1,3-Dichloropropene:	ND<0.5	0.5			
Bromodichloromethane:	ND<0.5	0.5			
1,1,2-Trichloroethane:	ND<0.5	0.5			
Tetrachloroethene:	ND<0.5	0.5			
Dibromochloromethane:	ND<0.5	0.5			
Chlorobenzene:	ND<0.5	0.5	106%	75-125	3%
Bromoform:	ND<0.5	0.5			
1,1,2,2-Tetrachloroeth:	ND<0.5	0.5			
1,3-Dichlorobenzene:	ND<0.5	0.5			
1,2-Dichlorobenzene:	ND<0.5	0.5			
1,4-Dichlorobenzene:	ND<0.5	0.5			

Definitions:

ND = Not Detected
PQL = Practical Quantitation Limit

RPD = Relative Percent Difference

QC File No. 88430

Sajid Syed
Senior Analyst

Superior Precision Analytical, Inc.
825 Arnold Drive, Suite 114 • Martinez, California 94553 • (510) 229-1512 / fax (510) 229-1526

C E R T I F I C A T E O F A N A L Y S I S

LABORATORY NO.: 88430
CLIENT: HARTCROWSER Inc.
CLIENT JOB NO.: 6077

DATE RECEIVED: 04/27/93
DATE REPORTED: 05/04/93
DATE SAMPLED: 04/26/93

ANALYSIS FOR CADMIUM, CHROMIUM, LEAD, ZINC & NICKEL
by EPA SW-846 Method 6010

LAB #	Sample Identification	Concentration (mg/L) Cadmium	Chromium	Lead	Zinc	Nickel
1	MW-1	ND	ND	ND	ND	ND
2	MW-2	ND	ND	ND	ND	ND
3	MW-3	ND	0.17	ND	0.21	0.2
4	MW-4	ND	0.06	ND	0.08	ND
5	HC-1	ND	ND	ND	ND	ND

mg/L - parts per million (ppm)
Method Detection Limit for Cadmium in Water : 0.05 mg/L
Method Detection Limit for Chromium in Water : 0.05 mg/L
Method Detection Limit for Lead in Water : 0.1 mg/L
Method Detection Limit for Zinc in Water : 0.05 mg/kg
Method Detection Limit for Nickel in Water : 0.1 mg/kg

QAQC Summary: MS/MSD Recovery Range : 100%-101%
Duplicate RPD : < 4%

Richard Srna, Ph.D.
For Sajjil S Syed
Laboratory Manager

8430

Sample Custody Record

DATE 4-27-93 PAGE 1 OF 1

HARTCROWSER

Hart Crowser, Inc.
353 Sacramento Street, Suite 1140
San Francisco, California 94111

JOB NUMBER 6077 LAB NUMBER

PROJECT MANAGER ERIC SCHNIEWIND

PROJECT NAME PACCAR OAKLAND J 6077

SAMPLED BY: BJORKLUND / SCHNIEWIND

LAB NO.	SAMPLE	TIME	STATION	MATRIX	TPH6/BTEX	8010	O+G	CAM Pb Ni Zn	NO. OF CONTAINERS	OBSERVATIONS/COMMENTS/ COMPOSITING INSTRUCTIONS
1	MW-1	4-26-93		WATER	✓	✓		✓	5	
2	MW-2	↓		↓	✓	✓	✓	✓	6	
3	MW-3				✓	✓		✓	5	
4	MW-4				✓	✓		✓	5	
5	HC-1				✓	✓	✓	✓	6	
6	MW-1A	↓		↓	✓	✓		HOLD	5	
7	TRIP BLANK	4-26-93		WATER	✓					

Please Initial: KAS
Samples Stored in ice. ✓ 4°C
Appropriate containers ✓
Samples preserved ✓
VOA's without headspace ✓
Comments:

TOTAL NUMBER OF CONTAINERS 33

METHOD OF SHIPMENT SELF

SPECIAL SHIPMENT/HANDLING OR STORAGE REQUIREMENTS

5 DAY TAT

RELINQUISHED BY	DATE	RECEIVED BY	DATE
SIGNATURE Brian Bjorklund	4/27/93	SIGNATURE	
PRINTED NAME BRIAN BJORKLUND	TIME	PRINTED NAME	TIME
COMPANY HART CROWSER	8:35	COMPANY	
RELINQUISHED BY	DATE	RECEIVED BY	DATE
SIGNATURE		SIGNATURE Afsaneh Salimpour	
PRINTED NAME	TIME	PRINTED NAME Afsaneh Salimpour	TIME
COMPANY		COMPANY Superior	4/27/93 8:35

DISTRIBUTION:

1. PROVIDE WHITE AND YELLOW COPIES TO LABORATORY
2. RETURN PINK COPY TO PROJECT MANAGER
3. LABORATORY TO FILL IN SAMPLE NUMBER AND SIGN FOR RECEIPT
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