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Weiss Associates

REMEDIAL ACTION PLAN

for the

01/27/95

New Century Beverage Company Facility
1150 Park Avenue, Emeryville, California

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for the

New Century Beverage Company Facility
1150 Park Avenue, Emeryville, California

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WA Job #14-0307-08

January 27, 1995

SUMMARY

Weiss Associates (WA) prepared this Remedial Action Plan (RAP) to address fuel hydrocarbons in the subsurface near two former underground storage tanks at the New Century Beverage Co. facility, 1150 Park Avenue, Emeryville, California. The hydrocarbons were detected in soil and ground water during a subsurface investigation at the site in March 1994. One tank, located near the northwest corner of the site's main building (Tank No. 1), stored gasoline until 1987, and diesel fuel between 1987 and 1993. This tank was removed in July 1994. The other tank, located near the southeast corner of the main building (Tank No. 2), was used to store diesel fuel until it was removed in 1987.

Prior to preparing the RAP, WA conducted an additional investigation in October 1994 to supplement subsurface data collected in March 1994. Data collected in October 1994 were generally consistent with earlier data. A total of 48 soil borings were drilled and 12 monitoring wells were installed for the two investigations.

The ground water flow direction at this site is consistently toward the southwest according to ground water elevation data. Based on slug tests completed in five of the wells, hydraulic conductivity of the screened sediments ranges from about 2x10-5 ft/min to about 0.01 ft/min. These conductivities are for relatively conductive layers within generally low-conductivity shallow sediments. Well yields are estimated to be generally less than 0.5 gallons per minute in the site wells based on well development data.

In the vicinity of Tank No. 1, gasoline-range hydrocarbons in unsaturated soil have been detected in an area at the south end of the tank, where associated underground fuel piping was formerly located. Well MW-5, installed directly downgradient of the former tank, has consistently contained gasoline-range hydrocarbons as high as 30 ppm. Benzene has been detected in this well in concentrations as high as 0.49 ppm, which exceeds the California Department of Toxic Substances Control's Maximum Contaminant Level (MCL) for drinking water of 0.001 ppm. Well MW-12, located directly downgradient of the former Tank No. 1 fuel piping, also contained benzene above the MCL, at 0.0076 ppm. However, no hydrocarbons were detected in ground water from well MW-8 or MW-11, which are both located about 250 ft downgradient of Tank No. 1. Therefore, the downgradient extent of gasoline-range hydrocarbons is some distance upgradient of these wells. Analytic results of several soil borings drilled in the tank vicinity and downgradient further constrain the lateral and downgradient extent of gasoline hydrocarbons. Well MW-7, directly upgradient of the former tank, has no detectable hydrocarbons, indicating it is unlikely that the gasoline compounds in the Tank No. 1 area migrated from an upgradient source.

Well MW-6 was installed about 40 ft west of Tank No. 2 and has consistently contained detectable concentrations of diesel-range hydrocarbons. During the most recent sampling, ethylbenzene and xylenes were also detected near detection limits. Well MW-10, installed in October 1994 about 70-ft directly downgradient of Tank #2, contains no detectable hydrocarbons. Analytical results from soil and open-borehole water samples in borings B-19 and B-23 further to

the west constrain the occurrence of diesel-range hydrocarbons to a relatively small region south and west of the former tank location.

Based on the results of the subsurface investigations, WA evaluated alternative remedial actions to protect public health, environmental health and ground water resources for the hydrocarbons near the former onsite tanks. Two other occurrences of fuel hydrocarbons detected at the eastern property boundary were not considered because previous investigation concluded that they originate from offsite upgradient fuel leak sites. Negotiations are continuing to ensure that the responsible parties address those occurrences.

Four alternative remedial actions were evaluated for the New Century site:

1) no action,

2) soil excavation and ground water monitoring;

3) ground water extraction and treatment in addition to Alternative No. 2; and

4) soil vapor extraction (SVE) and ground water monitoring.

These alternatives were evaluated against criteria that generally follow those recommended in US EPA guidance documents for feasibility studies.

Alternative No. 2 was determined to be the most feasible option. Soil excavation reduces environmental risks cost-effectively in the short-term. In the long term, MCL remediation goals will be met by natural hydrocarbon attenuation. Alternative No. 2 is likely to achieve regulatory approval since the site satisfies the criteria for a Category I Non-Attainment Area (NAA) as presented by the NAA policy of the California Regional Water Quality Control Board - San Francisco Bay Region's Draft Basin Plan of August 1994. This policy acknowledges that for Category I sites, active remedial strategies may not cost-effectively improve environmental risks, and may not achieve remediation goals significantly more quickly than natural processes.

The no action alternative would not gain regulatory approval. Alternative No. 3 does not achieve regulatory requirements significantly more quickly than natural attenuation, even though both capital and operation and maintenance costs are significantly greater. Alternative 4 is probably not technically implementable in the low-permeability site soil at Tank No. 1 or for the diesel hydrocarbons at Tank No. 2. If SVE were implementable, it would still be more costly than Alternative No. 2, without providing significant short-term risk mitigation.

1. INTRODUCTION

This Remedial Action Plan (RAP) was prepared by Weiss Associates (WA) for the New Century Beverage Co. Facility at 1150 Park Avenue in Emeryville, California (Figure 1). The objectives of this RAP are to protect public health, environmental health, and ground water resources from the occurrence of fuel hydrocarbons in soil and ground water near two former underground diesel and gasoline storage tanks.

Prior to preparing the RAP, WA conducted additional subsurface investigation to supplement site data reported in WA's Subsurface Investigation Report (1994a). The objectives of this investigation were to further define the extent of fuel hydrocarbons in shallow soil and ground water in the vicinity of the two former tanks, and characterize general hydrogeological parameters affecting transport of fuel hydrocarbons in the subsurface. These data were then used to evaluate the feasibility of alternative remedial actions.

Background information on the subject facility and surrounding sites is summarized in Section 2. Section 3 summarizes the results of earlier investigations, and presents the additional subsurface investigation results and conclusions. Section 4 discusses several potential alternative remedial actions, and presents a remedial action plan using the most appropriate alternative to protect public health, environmental health and ground water resources.

2. BACKGROUND

2.1 Site History and Current Use

Soft drink production began at 1150 Park Avenue in 1958 in a newly constructed bottling plant on a 2.9-acre site. The plant was constructed on the site of the Oakland Ball Park, a semi-professional baseball facility. Based on aerial photograph and fire insurance map review, the site was undeveloped except for a residence prior to its use as a ball park beginning in about 1913.

The main building on the 2.9-acre site houses the administrative offices, a quality control laboratory, a production area which includes soft drink canning, a packaging area, and product storage (Figure 2). The warehouse north of the main building is used to store products packaged for distribution, and also contains the vehicle maintenance shop. Operations at the plant include treatment of incoming municipal water, formulation and canning of soft drinks, packaging and warehousing of canned products for distribution, and vehicle and other equipment maintenance.

Since November 1992, the company has also leased the adjacent 2.1-acre unpaved parcel west of the property from Del Monte Foods (Figure 2). This area is used for delivery truck and employee parking, as it was used by Del Monte prior to the lease arrangement. Based on aerial photograph review, this leased parcel has never been paved and was undeveloped prior to the Oakland Ball Park construction.

2.2 Surrounding Land Use History

The City of Emeryville was incorporated in 1896. At that time, the area around the site was primarily agricultural; however, some industrialization of the area had already begun. Presently, the area is dominated by commercial, light industrial, and residential uses. Adjacent properties to the northwest are residential. To the north is a Standard Brands Paint store, and to the east are the former Emeryville Fire Department (EFD) Station #1, a restaurant, meeting hall, cafe, and a fast-food store. South of Park Avenue from the site is the Oaks Club card room, Fantasy Junction vintage car dealers, and New Logic Designs, a filtration systems designer. Immediately to the west is the unpaved parcel which is leased from the Del Monte Corporation for fleet and employee parking. Further west is the vacant Del Monte Plant 35, which operated from 1918 until 1989 (Figure 2).

2.3 Potential Offsite Contaminant Releases

WA identified a number of locations in the site vicinity where contaminant releases that could have impacted the site may have occurred. The four sites identified as most likely to have impacted the site (Figure 2) are:

1) Standard Brands

This paint retail store, located immediately north of the site (Figure 2), was formerly a gas station and later an Oliver Rubber & Tire Company manufacturing facility. Underground storage tanks (USTs) are shown at this site on 1950 and 1967 fire insurance maps. In addition, organic compounds may have been used and stored at the site during Oliver Rubber Co. operations. In an August 1994 subsurface investigation, several organic chemicals, including gasoline, diesel fuel, solvents, paint thinner and heavy oils were detected in soil, ground water and/or soil gas samples beneath the Standard Brands site (Enviropro, 1994).

2) Former Emeryville Fire Department (EFD) Station

A gasoline/diesel UST located immediately east of the site was removed from the EFD property in July 1994 (Figure 2). Although the present building and former UST location are on the southern portion of the EFD lot, aerial photographs show an earlier EFD building occupying the northern portion of the lot. According to EFD officials, at least one UST was associated with this earlier facility location; however, the location of the older tank is not known, and the EFD has no documentation indicating that the tank has been removed (ERDA, 1994).

3) The Corner Site

Although no significant hazardous materials use is suspected by the present fast-food operation located at the northwest corner of Park Avenue and San Pablo Avenue, this adjacent property was formerly a gas station, and USTs are shown on 1950 and 1967 fire insurance maps. We have found no evidence that the tanks were removed from the property when the gas station was razed.

4) Emeryville Redevelopment Agency - U.S. Post Office (ERDA-USPS)

This site is located about 220 ft east of the subject property on the east side of San Pablo Avenue. A gasoline and diesel release is known to have impacted ground water near former USTs at this site, and these compounds have migrated to the west-southwest or northwest (Subsurface Consultants, 1993a).

2.4 Regional Setting

The site is located about 40 ft above mean sea level (MSL), on an alluvial plain that gently slopes toward San Francisco Bay, which is located about one-half mile to the west (Figure 1). The north-northwest trending Berkeley Hills are about two miles to the east. The topography at the site slopes gently southwest, while north of the site the land slopes locally northwest toward west-flowing Temescal Creek, which is about 1,500 ft north of the site. Surface water drainage on the concrete-covered property is controlled by storm drains connected to the municipal storm sewers; however, the parking area leased from Del Monte is unpaved.

The site is about two miles west of the active, northwest-trending right-lateral Hayward Fault Zone of the San Andreas Fault System. Helley et al. (1972) indicate that the uppermost sediments beneath the site are 15 ft or less of Quaternary fluvial deposits consisting primarily of fine sand, silt and silty clay. Underlying the fluvial deposits are interfluvial basin deposits consisting of plastic silty clay and clay, with interfingering fluvial and alluvial fan deposits.

Two different shallow ground water flow directions have been reported in the site vicinity. At the neighboring Del Monte site, southwestward ground water flow was reported (CH2M Hill, 1992), while the ground water elevations at the ERDA-USPS site indicate a generally west-southwestward to northwestward flow direction (Subsurface Consultants, 1993a,b). These reported flow directions are generally consistent with the topographic slope in the area. Additionally, ground water flow at the ERDA-USPS site was apparently northwestward during the 1990 and 1991 drought years, while more recent 1993 data indicate a generally westward flow.

3. SUBSURFACE INVESTIGATIONS

Between March and June 1994, WA conducted a subsurface investigation at the New Century site to evaluate whether soil or ground water beneath the site has been impacted by possible onsite or offsite hazardous materials releases. In July 1994, WA reported the findings of that investigation (WA, 1994a) to the Alameda County Health Care Services Agency (ACHA), the lead regulatory agency responsible for overseeing fuel leak investigations in Emeryville. In July 1994, a 10,000-gal fuel tank, the sole existing UST at the site, was removed. WA collected soil samples as required by state regulations, and reported the tank removal findings to the ACHA in October 1994 (WA, 1994b).

Results of subsurface sampling from the investigation and tank removal identified four areas where fuel compounds occur in ground water beneath the site. Two of these areas appear to have offsite, upgradient sources, while the other two are in the vicinity of former USTs removed from the New Century site. Based on these findings, WA completed an additional investigation in October 1994 to better define the extent of fuel compounds in the vicinity of the two former onsite USTs. The following sections summarize the results of earlier subsurface sampling, and present the results of the October 1994 investigation.

3.1 Initial Subsurface Investigation

Based on the history of the site and surrounding properties, WA collected soil samples from 39 soil borings drilled throughout the property and adjacent leased parking area between March 14 and June 1, 1994. Open-borehole water samples were also collected from each soil boring and analyzed along with 67 soil samples for total volatile hydrocarbons as gasoline (TVH-G) and mineral spirits; total extractable hydrocarbons (TEH) as kerosene, diesel (TEH-D), hydraulic fluid and motor oil; benzene, toluene, ethylbenzene, xylenes (BTEX) and halogenated volatile organic compounds (HVOCs). Nine ground water monitoring wells were installed at the site to collect ground water samples for chemical analysis and determine the shallow ground water flow direction (Figure 3). The soil and open-borehole water sample results are presented in Table 1. Ground water analytic results are shown in Table 2.

Ground water elevation data indicate that shallow ground water beneath the site flows southwestward (Figure 4). This is consistent with the topographic slope and with the ground water flow direction reported at the Del Monte property west of the site (CH2M Hill, 1993). Historical water level measurements are recorded in Table 3. MW-4 had an anomalously high ground water elevation, suggesting an infiltration source such as a leaking water line was near this well, since the ground water elevation in MW-3 was closely consistent with elevations in other site wells.

Analytic results of the soil, open-borehole water samples and ground water samples identified four areas where fuel hydrocarbons occur in ground water beneath the site (Figure 5):

1) Gasoline compounds up to 22 ppm (boring B-5) were detected in open-borehole water samples collected downgradient of former Tank No. 1.

2) Diesel and motor oil-range compounds were detected in the backfill of former Tank No. 2 (boring B-6), and in borings up to 60-ft to the southwest.

Fuel compounds detected at the upgradient property boundary indicate that two hydrocarbon occurrences originate offsite:

3) A sheen was noted on the ground water in well MW-2 adjacent to the EFD property, and diesel at 220 ppm was detected in an open-borehole water sample. Although no diesel compounds were detected in surrounding borings, gasoline was detected at concentrations as high as 20 ppm in open-borehole water samples from borings near the EFD site. This portion of the site is also downgradient of the ERDA-USPS fuel leak site and the Standard Brands UST site.

4) The open-borehole water samples from borings B-3, B-4 and B-21, all drilled adjacent to the Corner Site, contained detectable gasoline compounds. Since none of the unsaturated soil samples from these borings contained any hydrocarbons, this indicates the hydrocarbons in this area also originate offsite.

HVOCs in relatively low concentrations were detected in unsaturated samples beneath the vehicle maintenance area located in the warehouse and beneath the hazardous materials storage area at the southeast corner of the site. However, no HVOCs were detected in ground water samples from the monitoring wells in these areas.

Analytic results of the ground water samples from the wells were generally consistent with those from the open-boreholes. Well MW-5 (B-5), directly downgradient of Tank No. 1, had TVH-G up to 2.3 ppm and benzene up to 0.49 ppm in ground water samples, but MW-8 (B-34), which is 250-ft downgradient of the tank had no detectable hydrocarbons. Upgradient well MW-7 also had no detectable hydrocarbons. At Tank No. 2, ground water samples from MW-6 had up to 5 ppm TEH-D, and no detectable BTEX.

3.2 Gasoline/Diesel Underground Storage Tank Removal

On July 19, 1994, Tank No. 1 was removed from the site. Although Tank No. 1 was most recently used for diesel storage, it was also used for gasoline storage prior to 1987. No holes or other signs of tank failure were observed during inspection of the tank; however, soil with hydrocarbon odors and staining was present in the surrounding excavation. Since ground water

was standing in the excavation, four soil samples were collected from the sidewalls of the tank excavation for hydrocarbon analysis, as required by state fuel UST closure regulations. Soil samples were also collected beneath the two associated fuel dispensers and connected underground piping, as well as two sets of abandoned underground piping found south of the tank.

Soil sample locations at the tank excavation are shown on Figure 6, and the analytic results are presented in Table 4. Samples T-1, T-2 and T-3, collected from the northerly end of the tank excavation at the water table, all contained less than 20 ppm total hydrocarbons, while all but one of the more southerly samples had more than 100 ppm of detectable hydrocarbons. This suggests that a fuel leak may have occurred from one of the sets of abandoned piping.

Soil sample P-2 was collected beneath the sandy backfill of an abandoned sprinkler pipe running southward from the tank area. The sandy backfill was stained gray-green and had a hydrocarbon odor, suggesting that the fuel compounds may have migrated southward within the relatively high-permeability backfill around the underground sprinkler pipe.

3.3 Additional Subsurface Investigation

Based on the findings of our initial investigation and the tank removal sampling, WA conducted an additional field investigation between October 10 and 22, 1994. The purpose of this additional work was to better constrain the limits of hydrocarbon-impacted soil and dissolved hydrocarbons in ground water surrounding the UST locations, and to better characterize hydrogeologic conditions beneath the site. To accomplish these goals, WA collected soil and/or open-borehole water samples from nine soil borings and installed three additional ground water monitoring wells at the site. We collected ground water samples from the three new wells and four existing wells for hydrocarbon analysis, and measured ground water levels to determine the ground water gradient. In addition, we conducted slug tests on five of the wells to estimate the hydraulic conductivity of saturated sediments beneath the site.

Prior to beginning the field work, WA obtained ACHA approval of an October 7, 1994 work plan (WA, 1994c). We prepared a site safety plan that addressed all potential hazards related to the field activities, and outlined preventive measures and procedures to protect site workers. Borings and wells on the leased portion of the site were completed with the permission of the Del Monte Corporation. The Alameda County Flood Control and Water Conservation District - Zone 7 issued Permit No. 94653 for the soil borings and monitoring wells. We also obtained an encroachment permit for the well and three borings drilled in the sidewalk and street of Park Avenue from the City of Emeryville Public Works Department.

3.3.1 Soil Borings

WA collected shallow soil samples from four borings (B-40 through B-43) along the abandoned sprinkler pipe running southward from the Tank No. 1 site (Figure 7), to determine whether fuel compounds have migrated southward within the high-permeability backfill. Three soil borings (B-44, B-45 and B-46) were drilled in Park Avenue southwest of well MW-6, to determine the extent of diesel compounds in ground water downgradient of the Tank No. 2 site. Two borings, B-48 and B-49, were drilled southwest of the Tank No. 1 site to better constrain the downgradient occurrence of dissolved gasoline compounds.

All borings were sampled and logged continuously by driving a split spoon sampler within an outer steel casing using a soil sampling rig, recovering the sample and driving another sample within the same hole. Soil samples for possible chemical analysis were collected in 2-in. diameter stainless steel tubes at least every 5 ft above the saturated zone. The steel casing was steam-cleaned prior to use in each boring and sampling equipment was washed with Alconox detergent and rinsed between samples to prevent cross-contamination. Samples were immediately sealed with Teflon tape and plastic caps, and labeled and refrigerated for delivery under chain-of-custody to the analytical laboratory.

Borings B-40 through B-43 were drilled to 10-ft depth. All other borings were drilled until ground water was encountered to collect open-borehole water samples. Since existing wells indicated static ground water levels were about 10-ft below ground surface, the field geologists allowed time for ground water to collect in the borings between soil sampling locations below 10-ft. When ground water was encountered a 1-in. diameter PVC screen was placed in the borehole, the steel outer casing was pulled back above the estimated ground water depth and water was allowed to collect in the borehole. A water sample was then collected through the PVC screen using steam-cleaned stainless steel bailers. Each sample was decanted into appropriate containers and immediately refrigerated for delivery under chain-of-custody to the analytical laboratory. Bailer blanks were collected to test for any possible equipment contamination of the samples during collection, and travel blanks accompanied each shipment from sample collection until analysis at the laboratory.

The soil and open-borehole water samples were shipped to Curtis & Tompkins, Ltd. of Berkeley, California (C&T), a State-certified analytical laboratory. After sampling, all borings were backfilled using grout consisting of Portland cement with 3-5 percent bentonite powder by weight. Boring logs are presented in Appendix A. Copies of the chain-of-custody documents are included with the certified analytic reports in Appendix B.

3.3.2 *Hydrogeologic Conditions*

The sediments encountered in the new soil borings were generally similar to those seen in earlier borings. Sediments varied from low permeability silty clay, clayey silt and sandy silt to moderate permeability silty sand and gravel. Although some relatively high-permeability deposits were encountered, they are relatively thin, moderate permeability layers that may not be continuous across the site. A low-permeability unit was encountered at the water table in all the new soil borings. Consequently, ground water did not collect in the borings until drilling to about 15- to 25-ft depth, then subsequently rose in the borings. A relatively high-permeability silty gravel was encountered at about 23-ft depth in borings B-44, B-45, B-46 and B-48. A clayey to silty sand was also noted in both borings B-48 and B-49 between 13 and 19-ft depth.

3.3.3 *Analytic Results for Soil and Open-Borehole Water Samples*

Soil samples were surveyed in the field with a photoionization detector (PID) to qualitatively evaluate whether volatile hydrocarbons were present. The field PID is used for qualitative assessment only, because the correlation between the volume-based measurement of the PID and mass-based measurement of a laboratory analysis is not well defined, and because field measurement procedures are less precise than laboratory procedures. Field PID readings are shown on the boring logs in Appendix A.

The field geologists also evaluated the sediment samples for odor and staining that would indicate the presence of organic compounds. A gray-green color was noted for the sediments in borings B-40 through B-43 at about 8 to 10-ft depth, and an associated weak hydrocarbon odor was noted in borings B-40, B-41 and B-42. PID readings indicated the presence of volatile hydrocarbons at this interval, showing a consistently decreasing trend from B-40 to B-43. A hydrocarbon odor was also noted in sediments from about 6-ft depth in boring B-48. However, no odors or hydrocarbon discoloration was noted in borings B-44, B-45, B-46 or B-49.

Twelve soil samples were selected for chemical analysis based on the field observations and field PID measurements. Six soil samples were analyzed to profile contaminant concentrations in the unsaturated zone near the abandoned sprinkler pipe, and the other six were analyzed to determine soil concentrations near the water table in borings downgradient of the potential sources. Based on the compounds detected in the previous investigations, all soil samples were analyzed for:

- TVH-G by the California Department of Health Services (DHS) method using gas chromatography (GC) and flame ionization detection (FID),
- TEH by the DHS method using solvent extraction and GC/FID, with the detected hydrocarbons compared to typical kerosene and diesel chromatograms, and

- BTEX by EPA Method 8020, GC/PID.

Analytic results of the October 1994 soil and open-borehole ground water samples are included in Table 1 along with previous results. Copies of the certified analytic reports are included in Appendix B, along with a letter from C&T clarifying the interpretation of TVH and TEH results. Due to the nature of the various hydrocarbon/fuel products, precise identification of TEH and TVH compounds detected by the DHS method is not always feasible. For example, the TEH analysis reports kerosene-range compounds in several samples. However, the laboratory has indicated that this class of hydrocarbons is more likely a portion of the gasoline which was also detected in the samples using the TVH extraction method.

An anomaly was noted in the chromatograms of the TEH analyses for the open-borehole water samples. Although TEH was detected in all samples, the detections resulted largely from a single peak. C&T identified this peak as benzoic acid, a common preservative used in food processing, and also in analytical chemistry. Sodium benzoate, another common food preservative and laboratory chemical, dissolves to form benzoic acid. As additional quality control on these samples, laboratory split samples from borings B-45 and B-48 were sent to Superior Precision Analytical Laboratory, Inc. (SPAL) of Martinez, CA. SPAL reported no detectable TEH in the sample from boring B-48 and 0.065 ppm TEH in boring B-45. SPAL attributed the TEH in B-45 largely to a single peak on the chromatogram at the same range of benzoic acid (SPAL, 1994). Since no soil or ground water samples from the wells had detectable benzoic acid, it is possible the reported TEH resulted from contamination of the sample.

A discussion of the analytic results of soil and open-borehole ground water samples for each UST area follows. Analytic results of the soil and open-borehole water samples generally confirmed the hydrocarbon distribution pattern seen in the previous investigation, further constraining the occurrence of gasoline compounds southeast of Tank No. 1, and diesel compounds southeast of Tank No. 2.

Tank No. 1

Although the 5-ft depth soil samples from borings B-40 through B-43 were all analyzed for hydrocarbons, only the sample from B-40 contained detectable concentrations. These samples were all collected about 2-ft beneath the relatively high-permeability backfill of the abandoned sprinkler pipe, indicating that fuel constituents probably did not travel in the unsaturated zone as far south as boring B-41. The 10-ft sample from B-41, beneath the inferred water table, did contain fuel compounds (in concentrations near analytic detection limits) (Table 1). Other observations during drilling, including consistently declining PID readings, odors and discoloration at the 10-ft depth interval from B-40 to B-43, suggest that the limit of detectable hydrocarbons in soil south of the tank is somewhere between B-42 and B-43.

Fuel compounds were detected in the soil and water samples from boring B-48, which is at about the same distance from the former UST area as boring B-24. Although the soil concentrations were relatively high in boring B-48, the water sample concentrations were lower than in B-24. Since hydrocarbons were detected in B-48, B-49 was drilled further downgradient (Figure 7). Although the water sample from B-49 contained benzene (0.0007 ppm) and xylenes

(0.0016 ppm), concentrations were near the 0.0005 ppm detection limit, indicating B-49 is near the downgradient extent of hydrocarbons. The detections in the B-49 open-borehole water sample may have resulted from excessive sediment in the sample. Similar concentrations were noted in the boring from well MW-8 (B-34), even though no fuel compounds were detected in water samples from well MW-8.

Tank No. 2

No fuel components were detected in either soil sample from boring B-44, southwest of well MW-6. Assuming that benzoic acid in open-borehole water samples was from laboratory contamination, TEH in water was detected only in boring B-45, at 0.1 ppm. However, SPAL reported no detectable TEH in the laboratory split open-borehole water sample from B-45. No TVH or BTEX was detected in any of the samples collected from these borings.

3.3.4 Ground Water Monitoring Wells

Based on the soil and open-borehole analytic results from borings B-44 through B-49, WA installed three additional ground water monitoring wells at the site on October 14, 1994. Well MW-10 was installed near B-44, to better define the downgradient extent of hydrocarbons near Tank No. 2. Similarly, Well MW-11 was installed slightly downgradient of boring B-49 to better define the extent of fuel hydrocarbons downgradient of Tank No. 1. Well MW-12 was installed near boring B-18 to characterize hydrocarbons in ground water directly downgradient of the area at Tank No. 1 where unsaturated soil TVH concentrations were greatest.

Well Construction and Development

Each new well was completed in the first water-bearing zone identified during drilling, and the screen was extended about 3-ft above the estimated static ground water level. The new monitoring wells were constructed in 10-in. diameter boreholes drilled with a hollow-stem auger drill rig, using 4-inch diameter, 0.01-inch factory slotted, flush-threaded PVC well screen and blank casing. Number 2/16 Monterey sand was placed between the casing and borehole wall from the bottom of the well to 2 ft above the well screen. One ft of bentonite pellets separate the sand pack from the annular surface seal, which was constructed of Portland cement with 3-5 percent bentonite powder by weight in each well. All wells were completed at grade with traffic-rated watertight vaults and locking, watertight well caps. Well construction details are shown on the well logs in Appendix A.

On October 18, 1994, WA environmental technicians developed each well using surge agitation and reverse airlift. The air was filtered prior to injection to remove any entrained oil from the air compressor. Ten well volumes of water were bailed from wells MW-10 and MW-11, and yield was about 0.5 gallons per minute (gpm). Since well MW-12 had very low yield (less than 0.1 gpm), only 5 well-volumes could be evacuated. The ground water pH, temperature and electrical conductivity were monitored during development. In wells with sufficient yield,

development continued until all three measured parameters stabilized and the technician noted that the amount of suspended solids removed during bailing stabilized as well.

Surveying and Ground Water Elevations

On October 21, PLS Surveys of Alameda, California, surveyed the wellhead and ground surface elevations of wells MW-10 through MW-12, and rechecked wellhead elevations for MW-5 and MW-6. The elevations were reported relative to MSL using the United States Coast and Geodetic Survey benchmark on the north face of the old Emeryville Town Hall building at Park Avenue and Hollis Street (Elevation 24.514 ft above MSL). PLS noted that the MW-5 casing elevation was lower by 0.02 ft compared to the March 1994 survey. However, it was noted that the March report had a calculation error and the actual elevation matched the resurvey. Table 2 has been revised to reflect correct well and ground water elevations. The 0.02-ft error is too small to affect past ground water flow direction determinations. The ground surface elevations are shown on the well logs in Appendix A.

Water levels were measured in wells MW-5, MW-6, MW-7, MW-8 and the three new wells on October 20, 1994. These measurements and the calculated ground water elevations are shown on Table 2. The ground water elevation contours for October 20, 1994, shown on Figure 8, indicate a southwestward flow direction beneath the subject site, consistent with past measurements (Figure 5). The water level from well MW-11 was anomalous, so it was not used in contouring. This well probably had not yet recovered from development since it has very low yield.

3.3.5 Ground Water Sampling

WA technicians collected ground water samples from wells MW-5, MW-6, MW-7, MW-8 and the three new wells on October 20. Each well was purged of standing water using a steam-cleaned PVC bailer, and the ground water pH, temperature and electrical conductivity were monitored. To ensure the samples were representative of in-situ ground water, samples were collected after the three measured parameters stabilized and a minimum of three well volumes of ground water was purged from each well.

The ground water samples were collected using a separate steam-cleaned Teflon bailer for each well to prevent cross-contamination. Samples were decanted into appropriate containers and immediately refrigerated for transport to the laboratory for analysis. Travel blanks accompanied each sample shipment from collection until analysis at the laboratory to ensure that the samples were not contaminated during handling. A bailer blank was also collected to test for any possible equipment contamination of the samples during collection. In addition, laboratory split duplicates from wells MW-11 and MW-12 were sent to WEST Laboratory of Sacramento, CA as a further quality control measure. Due to the detection of benzoic acid in TEH analyses from open-borehole water samples, we also sent split duplicates for TEH analysis from all wells except MW-7 to either WEST Laboratory or SPAL as an additional quality control check.

3.3.6 Analytic Results of Ground Water Samples

Each ground water sample was analyzed at C&T for TVH-G and TEH by the DHS method, and for BTEX by EPA Method 8020. The split samples from MW-11 and MW-12 were analyzed for the same compounds at WEST, while other splits were analyzed at either WEST or SPAL for TEH only.

The October 1994 analytic results are shown on Table 2, along with historical results. Detected compounds in water samples from the October 20, 1994 sampling are plotted on Figure 9, and the analytic reports and chain-of-custody documents are included in Appendix C.

Analytic results of the October 1994 ground water samples were generally consistent with the October 1994 open-borehole water sample results and with past ground water results (Tables 1 and 2). No fuel compounds were detected in samples from MW-7, upgradient of the former tank locations, or from MW-8, MW-10 or MW-11, downgradient of the former tanks. Gasoline and BTEX concentrations detected in well MW-5 were generally lower than in the two earlier sampling episodes; however, they were higher than in well MW-12 to the south. TEH detected in MW-5 was reported as kerosene range compounds, but qualified by the laboratory as an artifact of gasoline range hydrocarbons. TEH-D was detected only in the MW-6 sample sent to WEST, at 0.27 ppm. C&T reported no detectable TEH in MW-6. However, they did report gasoline-range hydrocarbons near detection limits. Benzene was above the 0.001-ppm maximum contaminant level (MCL) for drinking water established by the California Department of Toxic Substances Control in MW-5 (0.23 ppm) and MW-12 (0.0073 ppm), both located directly downgradient of Tank No. 1.

3.3.7 Hydraulic Testing

On October 25, 1994, WA conducted slug tests on MW-5, MW-6, MW-10, MW-11 and MW-12 to estimate the hydraulic conductivity of the sediments screened in these wells. This information was collected for use in evaluating the feasibility of potential ground water extraction systems as alternatives for the RAP.

The slug tests were completed by first introducing a tethered, concrete-filled PVC pipe into each well, and monitoring water level recovery to the static level using a pressure transducer and data logger. Once the well recovered, another slug test was completed by instantaneously withdrawing the slug and again monitoring recovery. The recovery data were then analyzed using the method of Cooper et al (1967), an analytical solution.

The recovery data, assumptions, input parameters and resulting transmissivity and storativity estimates are included in Appendix D. Table 5 summarizes the transmissivity estimates and includes a range of estimated hydraulic conductivity values calculated from the assumed

minimum and maximum effective thickness of the producing zone near each well. The estimated hydraulic conductivity varied from about 2x10-5 ft/min in MW-12 to about 1x10-4 ft/min in MW-10 and MW-11, and 0.01 ft/min in MW-5 and MW-6. The shallow sediments at these wells are generally low-permeability silts and clays, with relatively thin and possibly discontinuous sandy layers. Therefore, the higher conductivity estimates are only valuable in characterizing the most conductive sediments in each well, which generally comprise a small portion of sediments at the well screens.

3.4 Conclusions

The results of this additional investigation generally support the conclusions of the previous WA investigation regarding the occurrence of fuel compounds near the locations of the two former tanks. The ground water gradient has been consistently to the southwest since the initial wells were installed and monitored at the site in March 1994, and the distribution of hydrocarbons in ground water suggest fuel compounds have migrated to the southwest from the former tank locations. The hydrocarbon distribution at each former tank location is discussed below.

3.4.1 Former Tank No. 1

Although gasoline and diesel were both stored in this tank historically, only gasoline-range hydrocarbons have been consistently detected in ground water nearby and downgradient. Gasoline concentrations in unsaturated soil are highest in the area of former underground piping south of the tank location, and seem to be limited to an area between B-16 to the north and B-41 to the south (Figure 9). However, concentrations are higher in MW-5, directly downgradient of the tank than in MW-12, located directly downgradient of the piping. This may result from the much lower permeability of the sediments at MW-12, as shown by the slug test results.

Ground water analytic results of the October 1994 ground water samples are consistent with the May 1994 results. Benzene exceeded the 0.001 ppm MCL only in samples from wells MW-5 (0.23 ppm) and MW-12 (0.0073 ppm) collected on October 20. No other analytes exceeded MCLs in any of the wells. TVH-G at moderate concentrations was detected in open-borehole water samples from borings B-24 and B-48, located about 150 ft downgradient of the former Tank No. 1 location; however, no hydrocarbons were detected in MW-8 or MW-11, located about 250 ft downgradient of the tanks. In addition, the lateral extent of gasoline hydrocarbons is defined by the absence of hydrocarbons in soil and open-borehole water samples collected from borings B-23 and B-25 in March 1994. Since no hydrocarbons have been detected in MW-7, directly upgradient of the former tank location, it is unlikely that an upgradient hydrocarbon source is contributing to the detected hydrocarbons.

3.4.2 Former Tank No. 2

Although soil samples collected beneath Tank No. 2 during its removal in 1987 contained no detectable hydrocarbons (Robert J. Miller, 1987), soil samples collected from the backfill of the tank excavation and in downgradient boring B-19 contained diesel-range hydrocarbons. Analytic results of soil and open-borehole water samples from borings B-23 and B-44, and ground water samples from MW-10 constrain this occurrence to a relatively small area around the tank location (Figure 9). Hydrocarbons have been detected in ground water from MW-6, which is closer to the tank location than MW-10. However, the results have not been consistent. TEH-D was reported at up to 5 ppm during the March 1994 sampling, but only 0.27 ppm was reported in the October sampling. No benzene was reported in any of the soil samples, open-borehole water samples or ground water samples from MW-6, and ethylbenzene and xylenes were reported near detection limits in MW-6 only in the most recent sampling.

4. REMEDIAL ACTION PLAN

This RAP addresses the occurrence of fuel compounds detected near the locations of the two former USTs which the New Century Beverage Co. used for storing diesel and gasoline at the site. Although two other areas on the eastern side of the New Century site have fuel compounds in ground water, both were shown to have originated from upgradient UST sites (Section 3.1). New Century is presently negotiating with other property owners to ensure that the responsible parties conduct additional remedial investigations and plan any necessary remedies to protect public health, environmental health and ground water resources in those areas.

Following is a discussion of the regulatory framework requiring remedial action for the subsurface hydrocarbons, and a summary of the site conditions relevant to the remedial planning. Several alternative remedial actions are evaluated, and a plan is presented for implementing the most feasible alternative.

4.1 Regulatory Framework

Title 23 of the California Code of Regulations, which established the California Water Resources Control Board (WRCB), requires that the WRCB through the several Regional Water Quality Control Boards protect all potential state water resources, including ground water. Title 23 specifically addresses fuel leaks from underground tanks and establishes procedures for reporting, investigating and remediating fuel releases to protect water resources as well as public health and environmental health. Although the California Regional Water Quality Control Board - San Francisco Bay Region (RWQCB) is responsible for overseeing fuel leak cases in the area of the subject site, this oversight has been delegated to the ACHA through administrative agreements. Therefore, this RAP has been prepared with consideration of the RWQCB's Draft Basin Plan and ACHA policy.

4.1.1 Drinking Water Standards

The RWQCB generally requires that state MCLs be used as cleanup goals for remediating ground water impacted by fuel leaks. Therefore, we have evaluated the remedial alternatives considering their ability to ultimately reduce hydrocarbon concentrations in ground water below MCLs.

4.1.2 Preliminary Remediation Goals

Potential public and environmental health impacts related to direct exposure to contaminants are generally very dependent on site conditions. Therefore, no general legal standards have been established for cleaning up soil contaminated with hydrocarbons. Health protective concentrations for soil have been determined by risk assessments on a site-by-site basis considering potential exposures from skin contact, ingestion, inhalation of vapors or dusts, etc. However, the US EPA - Region IX has recently published a set of Preliminary Remediation Goals (PRGs) for various chemicals to help streamline the risk assessment process by making conservative assumptions of site factors and the predominant human potential exposure pathways (US EPA Region IX, 1994). Therefore, these PRGs are convenient remediation goals for soil at sites such as the New Century site, especially when site factors tend to reduce the likelihood of public exposure. For example, the generally low permeability soils beneath the site and site security tend to decrease the likelihood of exposure. Therefore, applying PRGs as remediation goals at this site would likely protect public health from fuel hydrocarbon exposures. Considering this, we have evaluated the remedial alternatives considering their ability to ultimately reduce hydrocarbon concentrations in soil below US EPA Region IX PRGs.

4.1.3 Non-Attainment Areas

The August 17, 1994 Draft Ground Water Basin Plan approved by the RWQCB included a provision for categorizing certain sites with fuel hydrocarbons or other chemical compounds in ground water as "Non-Attainment Areas" (RWQCB, 1994). This provision acknowledges that current remediation technologies in many cases cannot significantly reduce health risks or improve ground water quality in a reasonable time frame, despite large monetary costs. Under this policy, the RWQCB allows for monitoring natural attenuation of fuel hydrocarbons or other compounds rather than conducting more intensive, ineffective remedial measures, if the site meets the criteria of one of two site categories. "Category I" sites, which have hydrocarbon occurrences in soil or ground water that pose limited water quality, environmental and human health risks, meet all of the following criteria:

- The responsible party has demonstrated and will verify that no significant migration will occur due to chemical characteristics or hydrogeologic conditions;
- Adequate source removal or isolation is undertaken to limit future migration to ground water;

- Active remediation of the dissolved phase is not cost-effective due to limited water quality, environmental and human health risks, and separate-phases have been or are actively being removed; and

- An acceptable plan is submitted and implemented for containing and managing any remaining human health, environmental health and water quality risks due to the presence of residual concentrations in soil and ground water.

The NAA requirement states that an acceptable risk management plan should include human and environmental health risk assessments, site management measures, contingency options, and a commitment to other mitigations such as participating in a regional ground water monitoring or protection program.

Based on our evaluation of site conditions, WA believes that with additional monitoring to confirm present findings, this site will fulfill the requirements for establishing a Category I NAA. Therefore, we have evaluated alternative remedial actions with respect to establishing an NAA at the site, which should significantly reduce the overall cost of remediation.

4.2 Summary of Site Conditions

The following summarizes relevant site conditions for evaluating the feasibility of alternative remedial actions.

4.2.1 Chemicals of Concern

This plan addresses the hydrocarbons in soil and ground water in the vicinity of the two former fuel USTs. Therefore, gasoline, diesel and BTEX are the chemicals of concern.

Drinking water MCLs for BTEX are shown on Table 2. No primary MCLs have been established for gasoline or diesel. However, the RWQCB has indicated that secondary standards for odor apply. In practice, attaining the very low 0.001 ppm MCL for benzene virtually ensures that all other fuel hydrocarbon standards are met.

PRGs for soil are shown at the end of Table 1 for BTEX. No PRG has been established for gasoline or diesel fuel, which are mixtures of hydrocarbon constituents. Therefore, we will use an additional soil cleanup standard of 100 ppm total petroleum hydrocarbons (TPH) in addition to the BTEX PRGs, to ensure remaining soil is protective of public health and ground water resources.

4.2.2 Site Land Use

Both the New Century property and the adjacent leased lot are used for commercial and light industrial purposes, including soft drink processing, warehousing and parking. This usage or other similar commercial/industrial use will likely continue in the future. The property is presently within a Redevelopment Zone. In May 1994, New Century entered into an agreement with the ERDA and Kaiser Foundation Hospitals, Inc. to transfer the property to Kaiser, who plans to develop a medical facility within the redevelopment zone. The agreement specified that the New Century lot as well as the leased Del Monte lot also to be purchased by Kaiser will be developed as a single project, and that if the property does transfer, Kaiser will provide access for New Century to conduct all reasonable remedial actions related to hazardous materials. In the case that the Kaiser project is not developed, the ERDA would most likely incorporate the subject site into a similar large commercial/light industrial development. Therefore, remedial alternatives were evaluated assuming the present or a similar land use will continue at the site in the foreseeable future. The purchase agreement between Kaiser and New Century was finalized on January 11, 1995, ensuring that New Century will have full access to the New Century lot as well as the Del Monte lot to conduct all necessary remedial action.

4.2.3 Public Health Issues

The most likely sources of the fuel compounds in soil and ground water, the former USTs, have been removed precluding any future releases from these sources. In addition, impacted soil is all below grade and would only present exposure risks to construction workers during site excavations. The generally low permeability soil seen in the uppermost 10-ft of sediments underlying the site suggests vapors from gasoline compounds cannot migrate to the surface in concentrations that would cause concern. In addition, the predominantly low permeability soil logged in the impacted ground water zone does not allow a significant rate of migration away from the sources. The downgradient extent of both plumes has been established. Therefore, potential human exposures are very unlikely except in the case of construction personnel working in excavations impacted by the hydrocarbons. Completion of the New Century-Kaiser agreement further ensures that public health risks are minimized because land use is restricted to non-sensitive uses, and provides for access to conduct necessary remedial actions.

4.2.4 Potential Ground Water Resources

Since the impacted ground water is in the shallowest water-bearing zone near the water table, it is much more subject to seasonal variation in water levels, dewatering and surface impacts from urban runoff. In addition, low apparent well yield indicates this zone does not provide

significant production. Therefore, this ground water is unlikely to be used as a municipal drinking water source. Since the site and downgradient properties are not in a residential area, no shallow ground water is likely to be extracted for domestic use. In addition, local municipal supply is readily available and comes from distant surface water sources. Therefore, the affected ground water has very low potential for beneficial use. Nevertheless, the remedial alternatives evaluated in this RAP have been evaluated for their ability to prevent further degradation of the shallow ground water quality from residual hydrocarbons.

4.3 Evaluation of Remedial Alternatives

Four alternative remedial actions for the New Century site have been evaluated to mitigate potential risk to human health, environmental health, and beneficial uses of water resources ("environmental risks") from hydrocarbons detected in the subsurface near Tanks No. 1 and No. 2. US EPA criteria (US EPA, 1988a,b) were generally used to evaluate the feasibility of each alternative. These criteria include:

- Protection of Human Health and the Environment:

  Short-Term Effectiveness: Each alternative was evaluated regarding its ability to protect human health, environmental health, and ground water resources during the construction and implementation phase.

  Long-Term Effectiveness: Each alternative was evaluated regarding its ability to protect human health, environmental heath, and ground water resources after implementation.

- Reduction of Contaminant Mobility, Toxicity and Volume: Each alternative was evaluated regarding its ability to permanently and significantly reduce toxicity, mobility and/or volume of hazardous substances.

- Compliance with Appropriate Regulations: Each alternative was evaluated regarding its ability to achieve MCLs in ground water, and PRGs and the 100 ppm TPH level in soil. We also considered each alternative's ability to satisfy RWQCB criteria for Category I NAA sites.

- Regulatory and Community Acceptance: Each alternative remedial action was evaluated on technical and administrative issues and concerns that the regulatory agencies may have.

- Implementability: Each alternative was evaluated on the technical and administrative feasibility of implementation considering the availability of materials and services needed.

- Cost: capital costs and operation and maintenance (O&M) costs are evaluated for each alternative.

The four remedial alternatives evaluated in this RAP are:

1) No further action;

2) Soil excavation and ground water monitoring;

3) Soil excavation, ground water extraction and treatment, and ground water monitoring; and

4) Soil vapor extraction (SVE) and ground water monitoring.

The "no further action" alternative provides a baseline to compare against the other three alternatives, which are widely accepted and applied techniques for remediating subsurface hydrocarbons. Each alternative is described below followed by an evaluation of its ability to mitigate potential environmental risks from impacted soil and ground water based on the above criteria. Each alternative except "no further action" includes a remedial design phase and a ground water monitoring program. Site monitoring and reporting continue after implementation of each alternative to demonstrate compliance with appropriate regulations.

4.3.1 Alternative No. 1 -- No Further Action

Under this alternative, no further actions would be taken to mitigate potential environmental risks. This alternative does not affect short-term human health, environmental health, or beneficial uses of ground water resources because there is no remedial action requiring implementation.. In the long-term, natural hydrocarbon attenuation processes would reduce the risks.

This alternative eventually meets the appropriate regulations for soil and ground water through natural processes, though the time required to achieve a significant reduction in toxicity or volume is uncertain. Since there is no monitoring plan, it is impossible to demonstrate effectiveness of natural hydrocarbon attenuation. Therefore, this alternative will not likely be accepted by the regulatory agencies or the public. This alternative requires no capital or O&M costs.

4.3.2 Alternative No. 2 -- Soil Excavation and Ground Water Monitoring

Soil excavation removes impacted soil from the subsurface and consequently eliminates the source of ground water impacts and other environmental risks. If this alternative were implemented, soil would be excavated from areas with the highest hydrocarbon concentrations and potential environmental risks. In areas with very shallow ground water (less than about 10-15-ft depth), soil is typically excavated until no detectable hydrocarbons are present, or to the water table, whichever is shallower.

When field data indicate the excavation may be complete, confirmation samples are taken from the excavation walls to determine if the residual concentrations are below PRGs and the 100 ppm TPH level. If wall samples contain acceptable residual concentrations, the excavation is complete; otherwise, additional excavation is conducted until confirmation samples indicate acceptable concentrations. Once excavated, soil is typically treated (on- or offsite), or disposed of at a sanitary landfill. Treated soil can be used as excavation backfill or sent to a sanitary landfill for disposal. If excavated soil is not used as backfill, clean soil is imported for backfill. A ground water monitoring program would then be implemented to confirm natural attenuation of the hydrocarbons and demonstrate compliance with appropriate regulations.

This alternative actively reduces potential environmental risks in the short term by either treating the soil to much lower concentrations, or providing safer management of the hydrocarbon-bearing soil at a properly designed waste facility. Any increased short-term risks to site workers from dust and vapor exposure are minimized by implementing an appropriate health and safety plan. Soil treatment reduces the toxicity and volume of contamination, and disposing of soil at an appropriate facility reduces the mobility of the hydrocarbons. Source removal eliminates further ground water impacts, and natural attenuation processes will reduce the toxicity and volume of hydrocarbons in ground water and landfilled soil in the long term.

Alternative No. 2 meets applicable regulatory requirements and satisfies the criteria for a Category I NAA site. At a minimum, soil will meet PRGs and the 100 ppm TPH level at the end of the excavation. After excavation, natural hydrocarbon attenuation processes will continue to reduce residual soil concentrations. An NAA monitoring program will ensure concentrations in ground water are maintained below MCLs outside the NAA, and natural hydrocarbon degradation processes will continue to reduce concentrations within the NAA. A ground water monitoring program will track and confirm the attenuation of the hydrocarbons and demonstrate compliance with applicable regulations. If site conditions change, a contingency plan would be used to evaluate whether additional monitoring, characterization or remedial action is appropriate.

This alternative can be implemented cost effectively based on the relatively small expected soil volume, shallow excavation depth and likely acceptance of excavated soil at a Class III disposal facility based on known hydrocarbon concentrations in soil. The capital costs associated with excavation and backfilling include excavation and related sampling costs, soil disposal and/or treatment costs, costs of materials to backfill the excavation, and well abandonment at closure. O&M costs include ground water monitoring, probably for at least three years after the excavation,

and site closure activities such as ground water modeling, additional investigations or risk assessment which may be needed for approval to establish an NAA closure plan.

4.3.3 Alternative No. 3 -- Soil Excavation, Ground Water Extraction and Treatment, and Ground Water Monitoring

Ground water extraction and treatment systems remove hydrocarbons from the ground water and hydraulically control hydrocarbon migration. Hydrocarbon-bearing soil considered to be a source of future ground water contamination is typically excavated, as described in Alternative No. 2. Therefore, this alternative involves implementing the soil excavation plan described in Alternative No. 2 and conducting ground water extraction and treatment as described below.

Once the soil is excavated, ground water extraction wells would be installed to achieve the greatest hydrocarbon mass removal and/or to achieve hydraulic control of the impacted ground water. A treatment system would be constructed onsite to treat the extracted ground water. Ground water extraction systems operate until they reach asymptotic removal rates or monitoring data indicate compliance with applicable regulations.

Extracted ground water containing hydrocarbons is commonly treated by a granular activated carbon (GAC) filtration system consisting of three carbon beds in series. As the hydrocarbon adsorption efficiency of the carbon beds diminishes, the spent carbon is replaced. The effluent is generally sampled at the inlet, between beds and at the outlet to evaluate adsorption efficiency and verify that discharge requirements are met. Spent carbon is recycled by the manufacturer using a process the destroys the adsorbed hydrocarbons. Systems are typically permitted to discharge treated effluent to the sanitary sewer.

A ground water extraction and treatment system will eventually reduce hydrocarbon toxicity and volume through removal and destruction, and will reduce mobility in the subsurface through hydraulic control. However, reduction rates are dependent on site conditions. At the New Century site, well yields are typically less than 0.5 gpm according to well development estimates. The sediments near the water table are generally low permeability clay or clayey silt, with only relatively thin zones of higher permeability sediments. In addition, hydrocarbon concentrations in ground water are relatively low, so total mass removal rates will be low even with sustained pumping. Wells about 250 ft downgradient of Tank #1 and 70 ft downgradient of Tank #2 contain no detectable hydrocarbons, suggesting the rate of migration is relatively slow, especially near Tank #2. Considering these factors, ground water extraction may not significantly improve hydrocarbon reduction rates even in the long term compared to natural hydrocarbon attenuation processes.

Ground water extraction is a widely accepted remediation method and would likely be accepted by the ACHA. However, the RWQCB NAA policy discourages installation of costly remediation systems in cases where environmental risks are limited and it can be demonstrated that the system would not significantly reduce environmental risks.

Ground water extraction could be implemented without major impact to the site's present or future use. If the Kaiser development is successful, building plans would need to include access for operating equipment and system maintenance, which would increase capital costs somewhat. In addition to the costs associated with Alternative #2, capital costs include building permits, installation of pumps in existing or new extraction wells, and the treatment system. Additional O&M costs include effluent sampling, system maintenance, waste GAC recycling, discharge fees and reporting costs.

4.3.4 Alternative No. 4 -- Soil Vapor Extraction and Ground Water Monitoring

Soil vapor extraction is generally applied to remove volatile hydrocarbons from the unsaturated zone and floating hydrocarbons from the water table. As vapor is extracted through vadose zone wells, air is drawn from the atmosphere through the subsurface, creating an airflow cell and vapor gradient. This promotes diffusion of adsorbed hydrocarbons from soil and evaporation of separate-phase liquids from the water table into the vapor stream. These hydrocarbons are then extracted in the vapor phase. Hydrocarbons also diffuse to a lesser degree from the dissolved phase in shallow ground water. The increased airflow also improves the subsurface environment for hydrocarbon-consuming microbes, enhancing the natural bioattenuation process in the subsurface.

The extracted vapor is typically treated using a GAC treatment system similar to that described for Alternative No. 3. Operation of an SVE system typically requires a permit from the local air quality control board for discharge of the treated vapor.

At the New Century site, this would be applied instead of soil excavation to remove residual hydrocarbons in unsaturated soil south of former Tank No. 1. The less volatile diesel compounds would not desorb or evaporate as easily as gasoline, and therefore SVE would not significantly mitigate environmental risks around former Tank No. 2.

SVE decreases long-term environmental risks and reduces volatile hydrocarbon toxicity, mobility and volume, and under ideal conditions may decrease short-term risks if removal and destruction rates are high. However, due to the low soil permeability and shallow water table at the New Century site, a successful system will likely require a very dense array of vapor wells, increasing capital costs significantly. Even with a dense array of vapor extraction wells, this alternative would probably not reduce hydrocarbon concentrations at a significantly greater rate than natural processes, due to the low soil permeability.

Soil PRGs and the 100 ppm TPH level may eventually be met through enhanced bioremediation. However, establishment of an NAA may not be approved until significant source removal is demonstrated. In addition, residual hydrocarbons in soil could continue to impact ground water quality in the short term. This may delay closure of the site by years and therefore increase monitoring costs considerably.

4.4 Recommended Remedial Alternative

Alternative No. 2, soil excavation and monitoring, is the most feasible alternative. Soil excavation reduces environmental risks in the short-term, and satisfies RWQCB requirements of adequate source area removal for establishing a Category I NAA. Once an NAA is established, MCL goals will be met outside the NAA during the monitoring phase. In the long term, MCL remediation goals will be met by natural hydrocarbon attenuation in the NAA.

Soil would either be treated to reduce the volume of hydrocarbons, or landfilled at an appropriate facility where it would be less mobile, and would eventually undergo destruction through bioattenuation. This alternative is easily implementable due to the shallow ground water table, and is significantly less costly than Alternative No. 3 or 4.

Alternative No. 1, no action, would not gain regulatory approval. Alternative No. 3 is not likely to achieve regulatory requirements significantly more quickly than natural attenuation, although it has a significantly greater capital and O&M cost than Alternative No.2. Alternative No. 4 may not be technically implementable in the low-permeability site soil, since even a dense array of vapor extraction wells may not produce significant short-term reductions in environmental risks. SVE is also more costly and would not be implementable for removing less volatile diesel compounds at Tank No. 2.

A remedial action program using Alternative No. 2 at the New Century site would include the following objectives:

- Remove source area soil near Tanks #1 and #2 that may impact ground water quality, and in addition, remove all hydrocarbon-bearing soil with BTEX concentrations above PRGs and the 100 ppm TPH level;
- Implement a ground water monitoring program to demonstrate natural attenuation of hydrocarbons in ground water;
- Demonstrate compliance with NAA criteria, and petition the ACHA for establishment of an NAA at the site; and
- Obtain full or conditional site closure once environmental risks are minimized.

Based on our present understanding of site conditions, this program may require excavating up to 1,600 cubic yards of soil from the Tank No. 1 area, and up to 800 cubic yards of soil from the Tank No. 2 area. The initial excavations will be confined to the areas of impacted unsaturated soil estimated on Figure 9. When the limits of each excavation are reached, samples will be collected at the side walls every 20 feet around the perimeter of the excavation at a depth of 8 to 10 feet, and at approximately 20 ft separation in the bottom of the excavation. Samples will be sent under chain-of-custody to an independent California-certified laboratory for analysis.

The excavation contractor will over-excavate areas where confirmation samples are reported by the laboratory to have concentrations greater than PRGs for BTEX or the 100 ppm TPH level. If the excavation is conducted with the present site building in place, any remaining soils above cleanup levels will be excavated after the building is razed. The excavated soil will be stockpiled on site and stockpile samples will be analyzed as required for characterization. Hydrocarbon-bearing soil will be transported to an appropriate disposal or treatment facility unless onsite treatment is feasible and will be more cost effective. The excavation will be backfilled and compacted with clean imported soil, or with excavated soil treated to non-detectable concentrations.

A ground water sampling and reporting program will be designed and implemented to monitor natural hydrocarbon attenuation in ground water. The program will initially include quarterly monitoring and reporting, with reduced monitoring and reporting frequencies as site data allows. Based on present site data, the monitoring program will involve collecting ground water samples from the following monitoring wells near Tank #1:

- Upgradient well MW-7,
- Source area wells MW-5 and MW-12,
- Downgradient wells MW-8 and MW-11, and
- An additional midpoint well to be installed near boring B-24.

The following monitoring wells near Tank #2 will be sampled:

- Intermediate well MW-6, and
- Downgradient well MW-10.

An independent California-certified laboratory will analyze the ground water samples for TVH-G and/or TEH using the DHS method and for BTEX using EPA method 8020. Each quarterly report will include historical ground water sampling and water level data, and present and discuss the most recent results.

Based on our present understanding of the site conditions, compliance with NAA criteria may be achieved after one year of monitoring following soil excavation. Compliance with NAA requirements may be demonstrated using the proposed monitoring program, and possibly ground water modeling, and/or risk assessment, depending on monitoring results. Additional monitoring and/or modeling results will likely demonstrate that no significant additional hydrocarbon migration will occur due to the hydrogeologic conditions at the site, and that dissolved phase cleanup is not cost-effective due to limited environmental risks. The soil excavation will demonstrate adequate source removal has been undertaken to limit future migration of hydrocarbons to ground water. If an NAA can be established for the site, we will implement a Ground Water Management Plan for containing and managing the remaining environmental risks, if any, posed by residual hydrocarbons in soil or ground water. Additional ground water

monitoring for up to three years or more may be necessary to obtain a full or conditional closure for the site.

Our Ground Water Management/NAA Closure Plan will include contingency planning, which will outline procedures to address changing site conditions such as increasing hydrocarbon concentrations or changing land use. These contingencies will ensure environmental protection at the site until it is demonstrated that there are no remaining environmental risks from the hydrocarbons.

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WA, 1994b, Underground Storage Tank Removal at New Century Beverage Company, 1150 Park Avenue, Emeryville, California, consultant's report prepared for the New Century Beverage Co., October 19, 1994, 6 p., 3 fig, 1 tbl, 5 app.

WA, 1994c, consultant's letter addressed to the Alameda County Health Care Services Agency outlining a subsurface investigation work plan at 1150 Park Avenue, Emeryville, California, October 7, 1994.

FIGURES

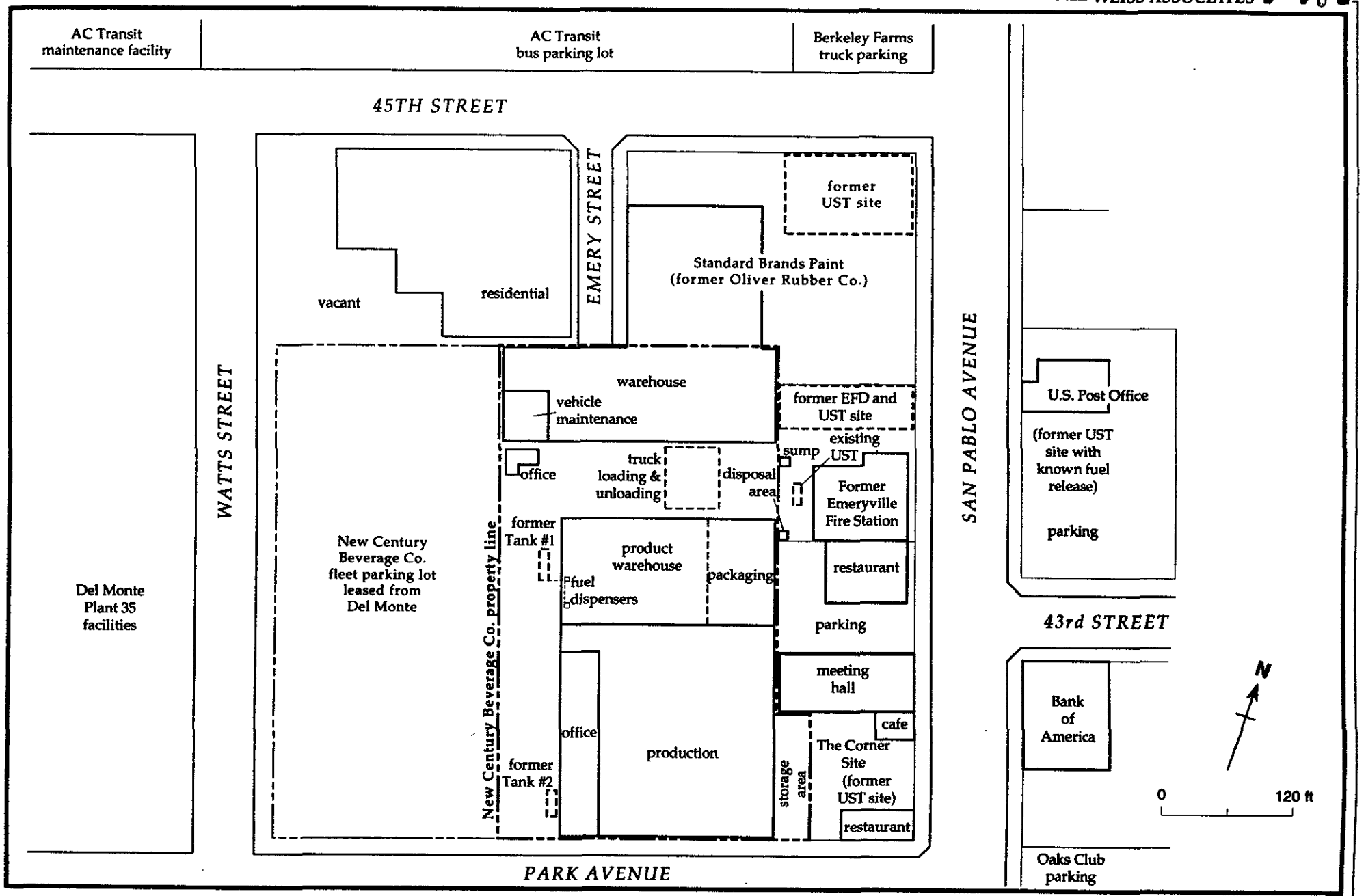


Figure 2. Facility and Surrounding Properties - New Century Beverage Company, 1150 Park Avenue, Emeryville, California

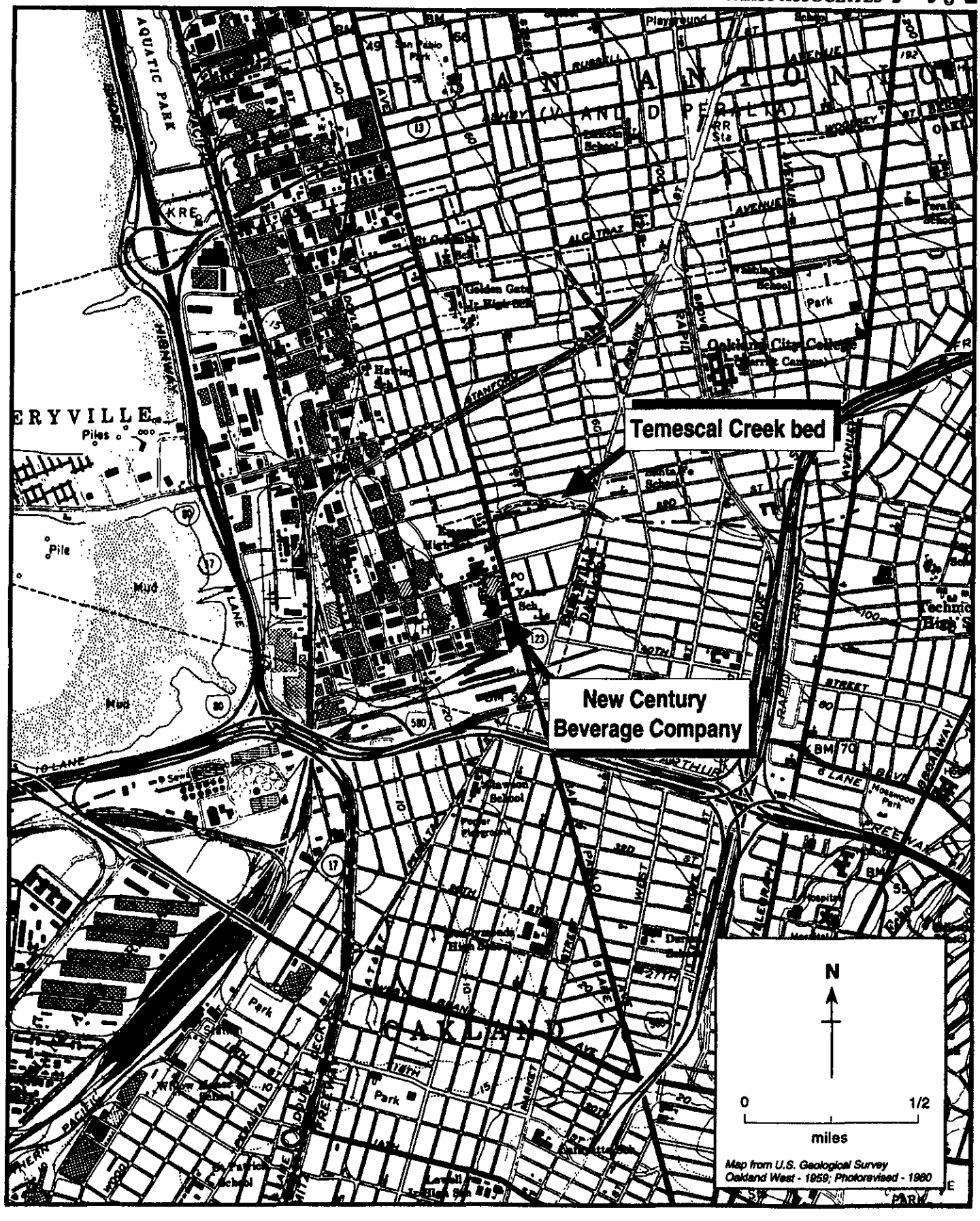


Figure 1. Site Vicinity Map - New Century Beverage Company, 1150 Park Avenue, Emeryville, California

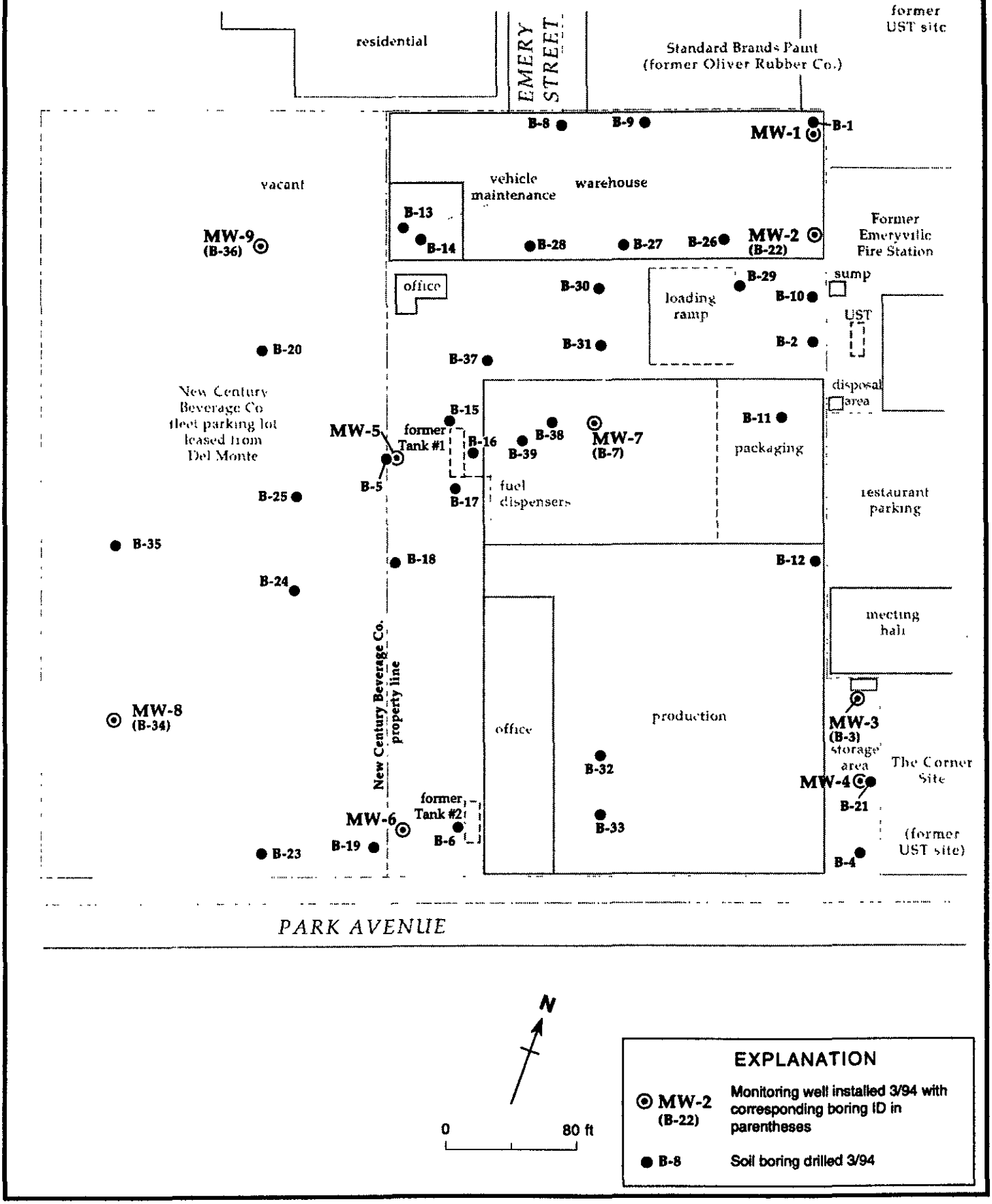


Figure 3. Soil Boring and Monitoring Well Locations - March 1994 - New Century Beverage Company, 1150 Park Avenue, Emeryville, California

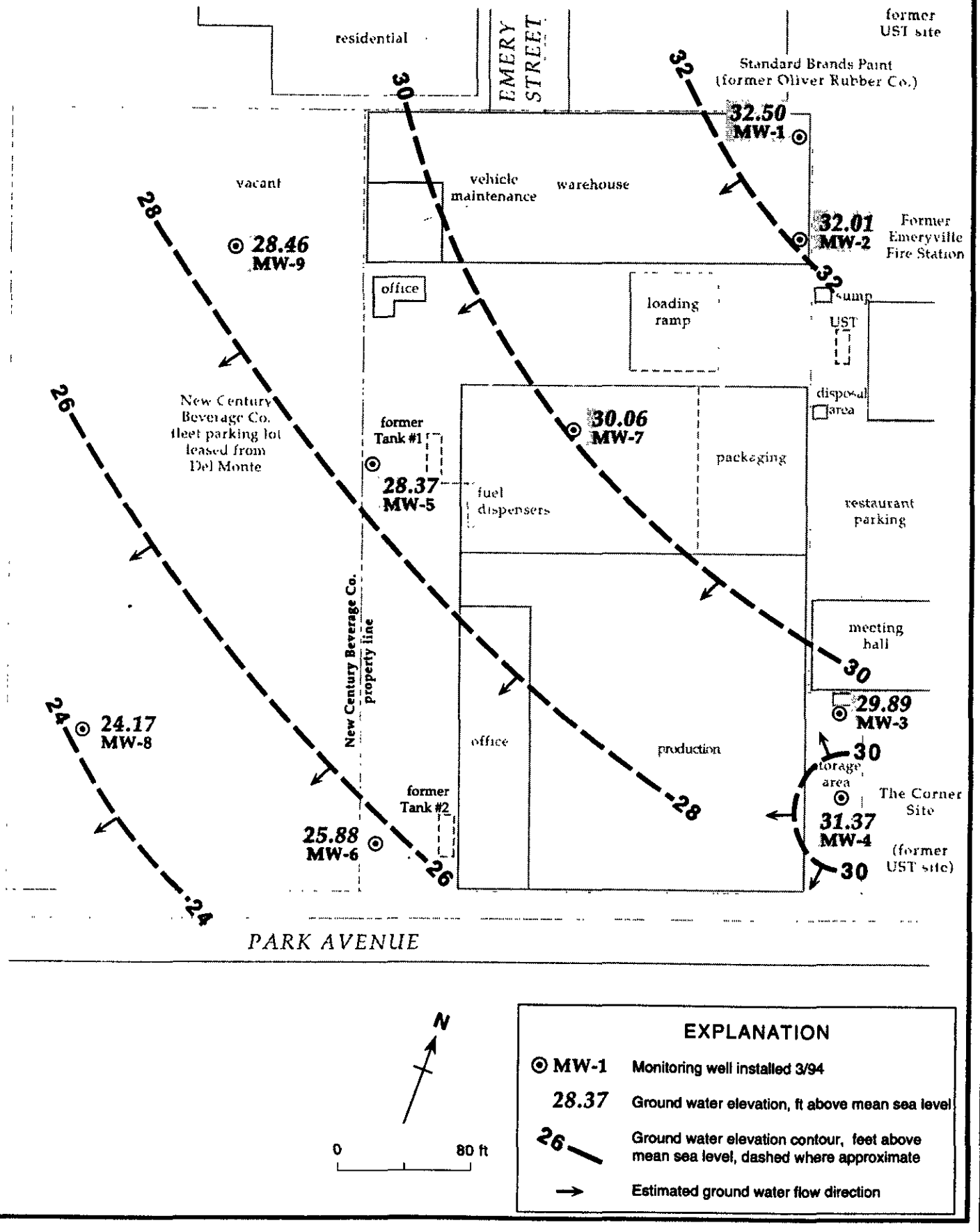
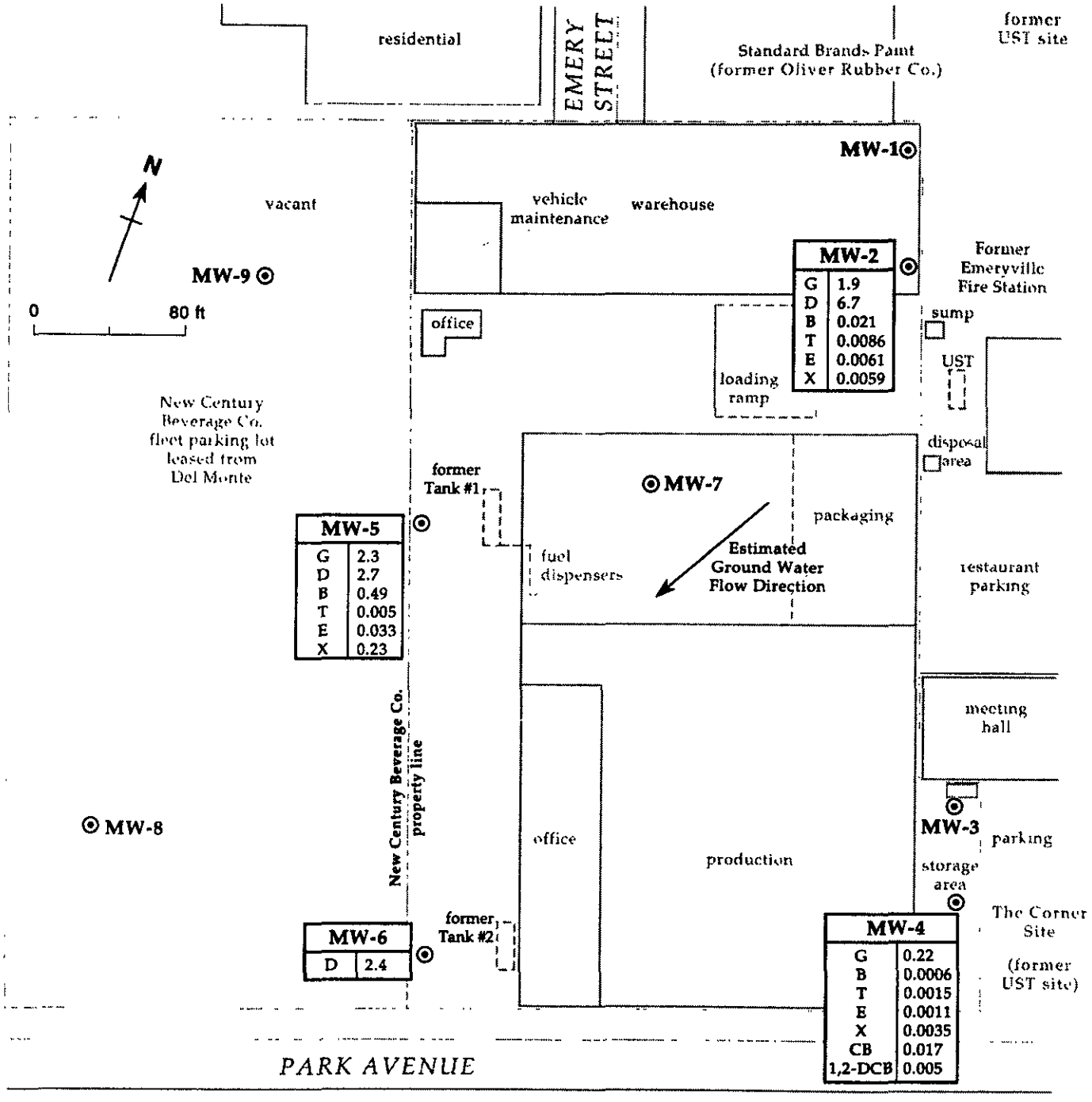


Figure 4. Ground Water Elevation Contours and Estimated Flow Direction - April 15, 1994 - New Century Beverage Company, 1150 Park Avenue, Emeryville, California



Well ID	
G	Total Volatile Hydrocarbons as Gasoline
D	Total Extractable Hydrocarbons as Diesel
B	Benzene
T	Toluene
E	Ethylbenzene
X	Xylenes
CB	Chlorobenzene
1,2-DCB	1,2-Dichlorobenzene

EXPLANATION

⊙ MW-1	Monitoring well installed 3/94
ND	Not Detected

All values in parts per million (ppm).
Where no value is shown, compound was not detected.
Refer to Table 3 for all analytic results

Figure 5. Fuel Compound Concentrations in Ground Water - May 20, 1994 - New Century Beverage Company, 1150 Park Avenue, Emeryville, California

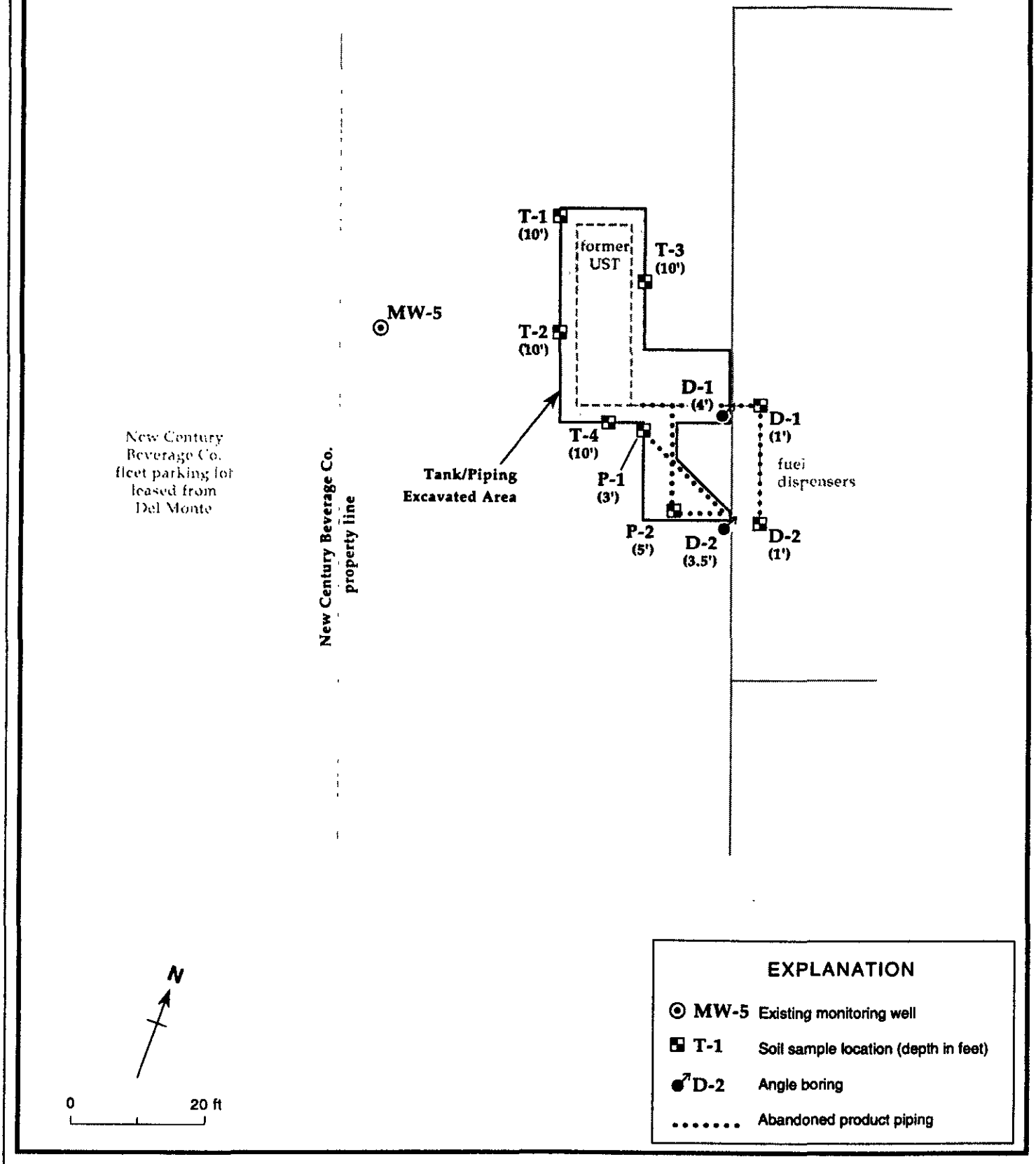


Figure 6. Underground Storage Tank #1 and Piping Sample Locations - New Century Beverage Company, 1150 Park Avenue, Emeryville, California

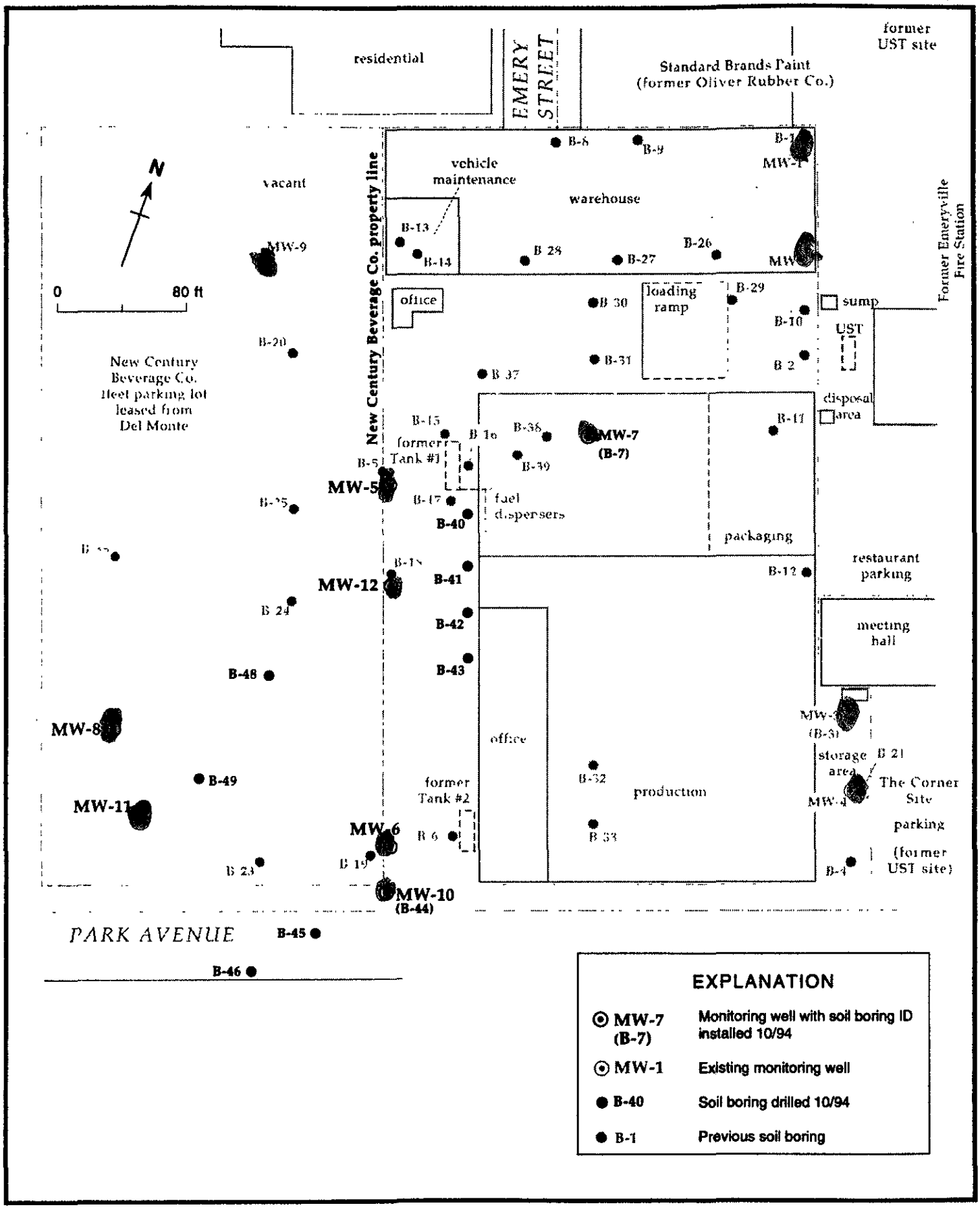


Figure 7. Monitoring Well and Soil Boring Locations - October 1994 - New Century Beverage Company, 1150 Park Avenue, Emeryville, California

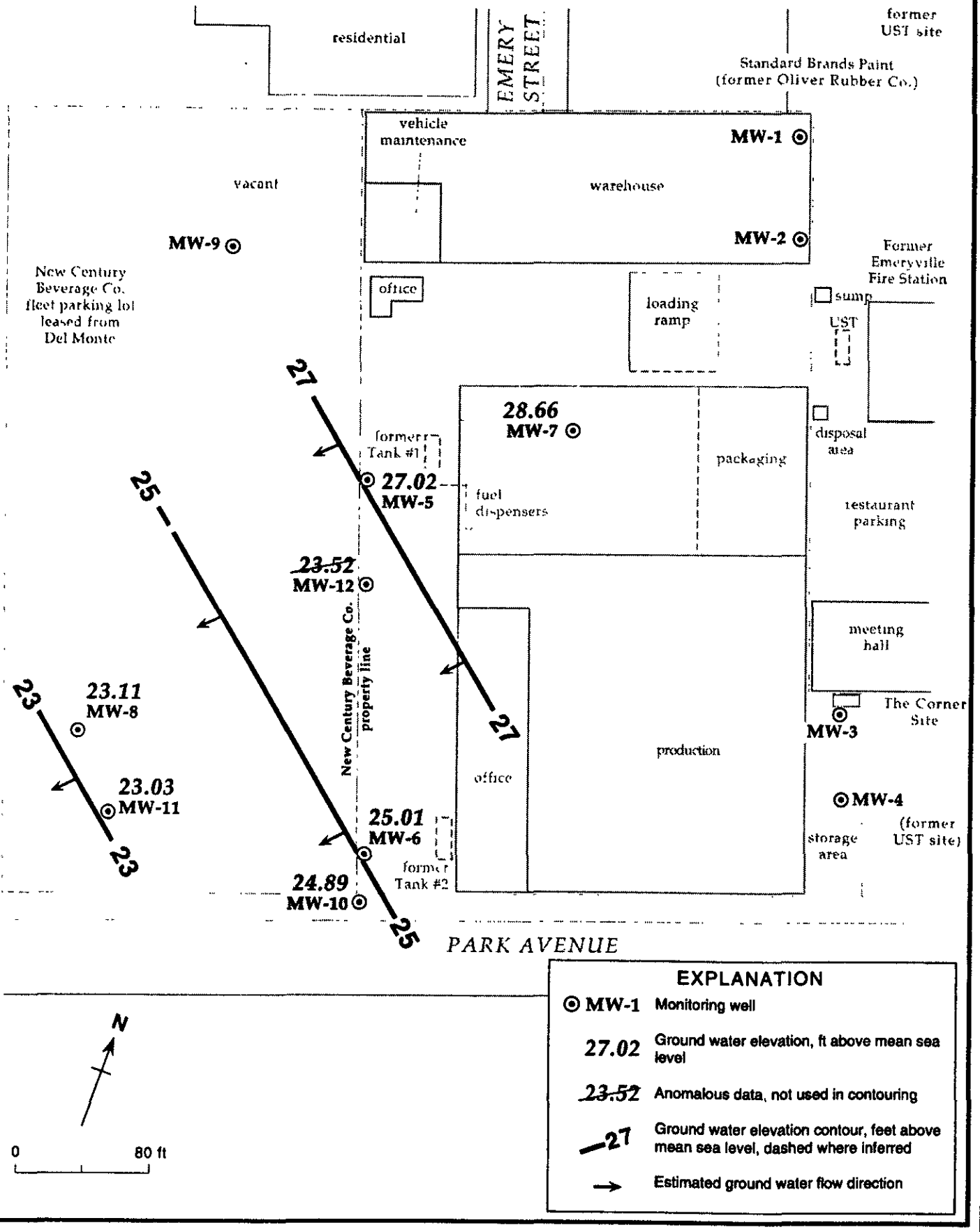


Figure 8. Ground Water Elevation Contours and Estimated Flow Direction - October 20, 1994 - New Century Beverage Company, 1150 Park Avenue, Emeryville, California

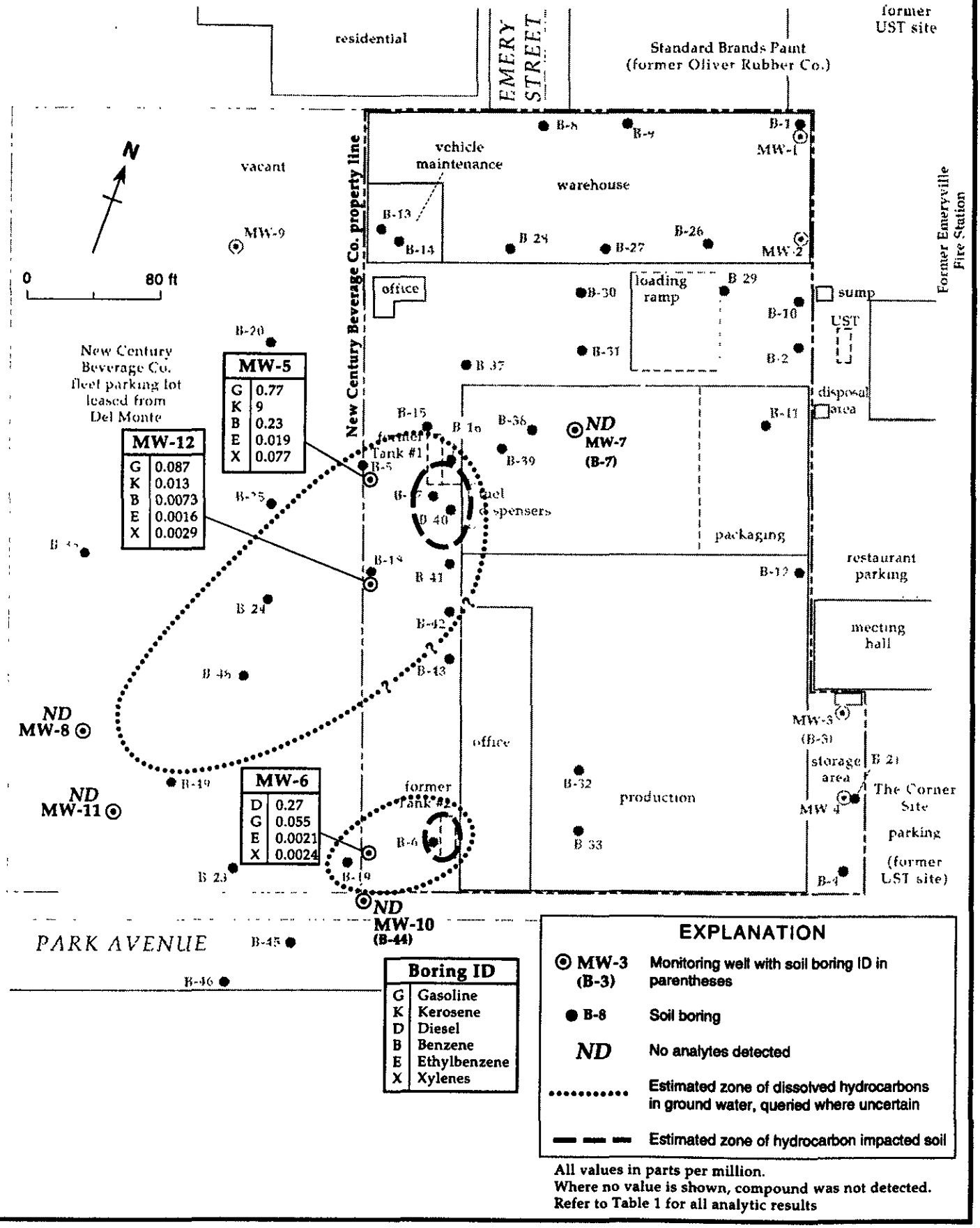


Figure 9. TVH-G, TEH, and BTEX in Ground Water - October 20, 1994 - New Century Beverage Company, 1150 Park Avenue, Emeryville, California

TABLES

Table 1. Analytic Results for Soil and Open-borehole Water Samples - New Century Beverage Co., 1150 Park Avenue, Emeryville, California

Boring ID	Depth	Date Sampled	Sat/ Unsat	TVH-G	TEH	Benzene	Toluene	Ethyl-benzene	Xylenes	1,2-DCA	PCE	Other HVOCs
				<----------Parts per million---------->								
B-1	6.4	3/15/94	Sat	ND	ND	ND	ND	ND	ND	ND	ND	ND
	8.9	3/15/94	Sat	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Water	*3/15/94*		*0.2*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*
B-2	6.0	3/16/94	Unsat	ND	ND	ND	ND	ND	ND	ND	ND	ND
	8.5	3/16/94	Sat	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Water	*3/16/94*		*ND*	*ND*	*ND*	*0.0005*	*0.0005*	*ND*	*ND*	*ND*	*ND*
B-3	2.5	3/15/94	Unsat	ND	ND	ND	ND	ND	ND	ND(0.03)	0.28	ND(0.03-0.1)
	7.5	3/15/94	Unsat	ND	ND	ND	ND	ND	ND	ND	ND	ND
	10.0	3/15/94	Unsat	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Water	*3/15/94*		*0.52*	*ND*	*0.001*	*0.019*	*0.0084*	*0.046*	*ND*	*ND*	*ND*
B-4	5.0	3/15/94	Unsat	ND	ND	ND	ND	ND	ND	ND	ND	ND
	10.0	3/15/94	Sat	ND	49 (K)	ND	ND	ND	ND	ND	ND	ND
	Water	*3/15/94*		*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*
B-5	5.0	3/14/94	Unsat	ND	50 (D) 2,200 (MO)	ND	ND	ND	ND	ND	ND	ND
	7.5	3/14/94	Unsat	ND	ND	ND	ND	ND	ND	ND	ND	ND
	12.5	3/14/94	Sat	ND	ND	0.015	ND	ND	0.012	ND	ND	ND
	Water	*3/14/94*		*0.95*	*15 (K)*	*0.18*	*ND(1)*	*ND(1)*	*0.088*	*ND*	*ND*	*ND*
B-6	5.0	3/14/94	Unsat	ND	4 (D) 37 (MO)	ND	ND	ND	ND	ND	ND	ND
	7.5	3/14/94	Unsat	10	230 (D) 1,200 (MO)	ND(0.03)	ND(0.03)	0.017	ND(0.03)	ND(0.03)	ND(0.03)	ND(0.03-0.1)
	Water	*3/14/94*		*4.0*	*79 (D)* *730 (MO)*	*<5*	*<5*	*7*	*<5*	*ND*	*ND*	*0.001 c1,2-DCE*
B-7	8.5	3/16/94	Sat	ND	ND	ND	ND	ND	ND	ND	ND	ND
	13.5	3/16/94	Sat	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Water	*3/16/94*		*0.06*	*ND*	*ND*	*0.002*	*ND*	*ND*	*ND*	*ND*	*ND*

-- Table 1 continues next page --

Table 1. Analytic Results for Soil and Open-borehole Water Samples - New Century Beverage Co., 1150 Park Avenue, Emeryville, California (continued)

Boring ID	Depth	Date Sampled	Sat/ Unsat	TVH-G	TEH	Benzene	Toluene	Ethyl-benzene	Xylenes	1,2-DCA	PCE	Other HVOCs
				< Parts per million >								
B-8	5.0	3/16/94	Unsat	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Water	*3/16/94*		*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*
B-9	5.0	3/17/94	Unsat	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Water	*3/17/94*		*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*
B-10	5.9	3/14/94	Unsat	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Water	*3/14/94*		*15*	*3 (K)*	*0.34*	*0.031*	*0.64*	*1.9*	*ND(0.01)*	*ND(0.01)*	*ND(0.01-0.2)*
B-11	2.5	3/16/94	Unsat	ND	ND	ND	ND	ND	ND	ND	ND	ND
	7.5	3/16/94	Unsat?	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Water	*3/16/94*		*0.06*	*ND*	*ND*	*0.0008*	*ND*	*ND*	*ND*	*ND*	*ND*
B-12	7.5	3/17/94	Unsat	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Water	*3/17/94*		*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*
B-13	2.5	3/16/94	Unsat	ND	2 (D)	ND	ND	ND	0.008	ND	0.005	0.05 MC 0.009 1,1-DCA 0.05 TCE
	7.5	3/16/94	Unsat	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Water	*3/16/94*		*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*
B-14	2.5	3/16/94	Unsat	ND	ND	ND	ND	ND	ND	ND	ND	ND
	7.5	3/16/94	Unsat	ND	ND	ND	ND	ND	0.007	ND	ND	ND
	Water	*3/16/94*		*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*
B-15	2.5	3/17/94	Unsat	ND	ND	ND	ND	ND	ND	ND	ND	ND
	7.5	3/17/94	Unsat	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Water	*3/17/94*		*0.07*	*1 (K)*	*0.0097*	*ND*	*0.0011*	*0.0076*	*ND*	*ND*	*ND*
B-16	5.0	3/18/94	Unsat	ND	ND	ND	ND	ND	ND	ND	ND	ND
	7.5	3/18/94	Unsat	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Water	*3/18/94*		*38*	*15 (K)*	*0.57*	*0.28*	*1.5*	*5.4*	*ND*	*ND*	*ND*

-- Table 1 continues next page --

Table 1. Analytic Results for Soil and Open-borehole Water Samples - New Century Beverage Co., 1150 Park Avenue, Emeryville, California (continued)

Boring ID	Depth	Date Sampled	Sat/ Unsat	TVH-G	TEH	Benzene	Toluene	Ethyl-benzene	Xylenes	1,2-DCA	PCE	Other HVOCs
				<----------Parts per million---------->								
B-17	2.5	3/17/94	Unsat	1	2 (D) 50 (MO)	ND	ND	0.005	0.055	ND	ND	ND
	7.5	3/17/94	Unsat	130	190 (K)	ND(0.08)	0.19	1.2	1.4	ND(0.03)	ND(0.03)	ND(0.03-0.1)
	Water	*3/17/94*		*32*	*6 (K)*	*1.8*	*0.78*	*1.1*	*2.4*	*ND*	*ND*	*0.001 CB*
B-18	8.4	3/14/94	Unsat	1	ND	ND	ND	ND	ND	ND	ND	ND
	13.4	3/14/94	Sat	1	ND	ND	ND	ND	ND	ND	ND	ND
	Water	*3/14/94*		*0.65*	*ND*	*0.032*	*0.0006*	*0.0048*	*0.0038*	*0.003*	*ND*	*ND*
B-19	7.5	3/14/94	Unsat	23[a]	150 (D)	ND(0.01)	ND(0.01)	0.061	0.019	ND(0.1)	ND(0.1)	ND(0.1-0.5)
	12.5	3/14/94	Sat	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Water	*3/14/94*		*ND*	*110 (D)*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*
B-20	7.5	3/14/94	Unsat	ND	ND	ND	ND	ND	ND	ND	ND	ND
	12.5	3/14/94	Sat	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Water	*3/14/94*		*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*
B-21	5.0	3/15/94	Unsat	ND	ND	ND	ND	ND	ND	ND	ND	ND
	10.0	3/15/94	Sat	11	ND	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND	ND	ND
	Water	*3/15/94*		*0.14*	*ND*	*ND*	*ND*	*ND*	*0.0006*	*ND*	*ND*	*0.018 CB* *0.004 1,2-DCB*
B-22	5.0	3/18/94	Unsat	ND	ND	ND	ND	ND	ND	ND	ND	ND
	7.5	3/18/94	Sat	130	340 (D)	0.07	0.98	0.07	0.25	ND(0.03)	ND(0.03)	ND(0.03-0.1)
	Water	*3/18/94*		*6.0*	*220 (D)*	*0.06*	*0.02*	*0.03*	*0.06*	*ND*	*ND*	*ND*
B-23	10.0	3/30/94	Unsat	ND	ND	ND	ND	ND	ND	ND	ND	ND
	12.5	3/30/94	Sat?	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Water	*3/30/94*		*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*TCE 0.004* *c-1,2-DCE 0.006* *VC 0.004*
B-24	9.0	3/18/94	Sat?	4	20 (K)	0.13	ND	0.045	0.19	ND(0.03)	ND(0.03)	ND(0.03-0.1)
	Water	*3/18/94*		*22*	*2 (K)*	*1.8*	*0.03*	*0.52*	*1.9*	*0.004*	*ND*	*ND*

-- Table 1 continues next page --

Table 1. Analytic Results for Soil and Open-borehole Water Samples - New Century Beverage Co., 1150 Park Avenue, Emeryville, California (continued)

Boring ID	Depth	Date Sampled	Sat/ Unsat	TVH-G	TEH	Benzene	Toluene	Ethyl-benzene	Xylenes	1,2-DCA	PCE	Other HVOCs
				<-------- Parts per million -------->								
B-25	10.0	3/18/94	Sat?	ND	ND	ND	ND	ND	ND	ND	ND	ND
	12.5	3/18/94	Sat	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Water	*3/18/94*		*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*
B-26	6.0	3/27/94	Unsat	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Water	*3/27/94*		*0.18*	*ND*	*0.0012*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*
B-27	*Water*	*3/26/94*		*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*
B-28	8.5	3/26/94	Sat?	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Water	*3/26/94*		*0.06*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*
B-29	6.0	3/27/94	Unsat	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Water	*3/27/94*		*20*	*2 (K)*	*0.13*	*0.041*	*0.77*	*0.36*	*ND*	*ND*	*ND*
B-30	6.0	3/27/94	Unsat	ND	ND	ND	ND	ND	ND	ND	ND	ND
	8.5	3/27/94	Sat?	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Water	*3/27/94*		*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*
B-31	6.0	3/27/94	Unsat	ND	ND	ND	ND	ND	ND	ND	ND	ND
	8.5	3/27/94	Sat?	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Water	*3/27/94*		*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*
B-32	8.5	3/26/94	Unsat?	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Water	*3/26/94*		*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*0.001 c1,2-DCE*
B-33	8.5	3/26/94	Unsat?	ND	ND	ND	ND	ND	ND	ND	ND	ND
	11.5	3/26/94	Sat	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Water	*3/26/94*		*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*0.003*	*0.005 TCE* *0.004 c1,2-DCE*
B-34	10.0	3/30/94	Sat?	ND	ND	ND	ND	ND	ND	ND	ND	ND
	12.5	3/30/94	Sat	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Water	*3/30/94*		*0.15*	*ND*	*0.001*	*0.01*	*0.003*	*0.019*	*ND*	*ND*	*ND*

-- Table 1 continues next page --

Table 1. Analytic Results for Soil and Open-borehole Water Samples - New Century Beverage Co., 1150 Park Avenue, Emeryville, California (continued)

Boring ID	Depth	Date Sampled	Sat/ Unsat	TVH-G	TEH	Benzene	Toluene	Ethyl-benzene	Xylenes	1,2-DCA	PCE	Other HVOCs
				<----------Parts per million---------->								
B-35	10.0	3/30/94	Sat?	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Water	*3/30/94*		*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*TCE 0.002*
B-36	7.5	3/30/94	Unsat	ND	ND	ND	ND	ND	0.007	ND	ND	ND
	10.0	3/30/94	Sat	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Water	*3/30/94*		*ND*	*ND*	*ND*	*ND*	*ND*	*0.0005*	*ND*	*ND*	*ND*
B-37	8.5	3/27/94	Unsat?	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Water	*3/27/94*		*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*0.002 1,1-DCE*
B-38	5.0	3/31/94	Unsat	ND	ND	ND	ND	ND	ND	ND	ND	ND
	7.5	3/31/94	Unsat	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Water	*3/31/94*		*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*
	Water[b]	*3/31/94*		*ND(0.01)*	*ND(0.01)*	*ND(0.0003)*	*ND(0.0003)*	*ND(0.0003)*	*ND*	*ND*	*ND*	*ND*
B-39	7.5	3/31/94	Unsat	ND	ND	ND	ND	ND	ND	ND	ND	ND
	10.0	3/31/94	Sat?	ND	ND	ND	ND	ND	0.01	ND	ND	ND
	Water	*3/31/94*		*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*
	Water[b]	*3/31/94*		*ND(0.01)*	*ND(0.01)*	*ND(0.0003)*	*ND(0.0003)*	*ND(0.0003)*	*ND*	*ND*	*ND*	*ND*
B-40	5.0	10/10/94	Unsat	64	35(K)	0.098	0.28	0.74	1.2	—	—	—
	10.0	10/10/94	Sat?	390	100(K)	1.7	2.8	13	49	—	—	—
B-41	5.0	10/10/94	Unsat	ND	ND	ND	ND	ND	ND	—	—	—
	10.0	10/10/94	Sat?	5	4(K)	0.011	0.012	0.013	ND	—	—	—
B-42	5.0	10/10/94	Unsat	ND	ND	ND	ND	ND	ND	—	—	—
B-43	5.0	10/10/94	Unsat	ND	ND	ND	ND	ND	ND	—	—	—
B-44	5.0	10/10/94	Unsat	ND	ND	ND	ND	ND	ND	—	—	—
	9.0	10/10/94	Unsat?	ND	ND	ND	ND	ND	ND	—	—	—
	Water	*10/10/94*		*ND*	*ND(0.05)*[d]	*ND*	*ND*	*ND*	*ND*	—	—	—
B-45	*Water*	*10/10/94*		*ND*	*0.1(K)*[d]	*ND*	*ND*	*ND*	*ND*	—	—	—
	Water[b]	*10/10/94*		—	*ND(0.05)*[e]	—	—	—	—	—	—	—
B-46	*Water*	*10/10/94*		*ND*	*ND(0.05)*[d]	*ND*	*ND*	*ND*	*ND*	—	—	—

-- Table 1 continues next page --

Table 1. Analytic Results for Soil and Open-borehole Water Samples - New Century Beverage Co., 1150 Park Avenue, Emeryville, California (continued)

Boring ID	Depth	Date Sampled	Sat/ Unsat	TVH-G	TEH	Benzene	Toluene	Ethyl-benzene	Xylenes	1,2-DCA	PCE	Other HVOCs
				<----------Parts per million---------->								
B-48	5.0	10/10/94	Unsat	3	1.8(K)	0.007	ND	ND	0.16	---	---	---
	10.0	10/10/94	Sat	470	52(K)	1.5	0.77	8	42	---	---	---
	Water	*10/10/94*		*0.17*	*0.13(K)*[d]	*0.003*	*ND*	*0.004*	*0.019*	---	---	---
	Water[b]	*10/10/94*		---	*ND(0.05)*	---	---	---	---	---	---	---
B-49	5.0	10/10/94	Unsat	ND	ND	ND	ND	ND	ND	---	---	---
	10.0	10/10/94	Sat	ND	ND	ND	ND	ND	ND	---	---	---
	Water	*10/10/94*		*ND*	*0.069*[d]	*0.0007*	*ND*	*ND*	*0.0016*	---	---	---
Travel Blank	Water	3/27/94		ND	---	ND	ND	ND	ND	ND	ND	ND
	Water	3/31/94		---	---	ND	ND	ND	ND	ND	ND	ND
	Water	3/31/94		---	---	ND	ND	ND	ND	ND	ND	0.002 MC[c]
	Water	10/10/94		ND	---	ND	ND	ND	ND	---	---	---
Standard detection limit	Soil			1	1 (K,D) 30 (MO)	0.005	0.005	0.005	0.005	0.005	0.005	0.005-0.02
	Water			0.05	1 (K,D) 20 (MO)	0.0005	0.0005	0.0005	0.0005	0.001	0.001	0.001-0.02
PRG						1.9	870	3,400	980			
MCL						0.001	0.1[f]	0.68	1.75	0.0005	0.005	0.03 CB 0.005 1,1-DCA 0.13 1,2-DCB[f] 0.006 1,1-DCE 0.006 c1,2-DCE 0.005 MC 0.005 TCE 0.0005 VC

-- Table 1 continues next page --

Table 1. Analytic Results for Soil and Open-borehole Water Samples - New Century Beverage Co., 1150 Park Avenue, Emeryville, California (continued)

Abbreviations:

Sat/Unsat = indicates whether soil sample was saturated with ground water
TVH-G = Total volatile hydrocarbons as gasoline detected by EPA Method 8015, modified per California Department of Health Services (DHS)
note: mineral spirits were also screened with this method, however, all detected TVH were characterized as gasoline
TEH = Total extractable hydrocarbons [kerosene (K), diesel (D), and motor oil (MO) range] detected by EPA Method 8015, modified by DHS
notes: hydraulic oil was also screened with this method, however, no hydraulic oil was reported in any samples
Kerosene-range compounds, where reported, are characterized by the laboratory as a fraction of gasoline hydrocarbons
HVOCs = Halogenated volatile organic compounds detected by EPA Method 8010
ND = Not detected at standard detection limit (indicated on the last row of the table)
ND(n) = Not detected at detection limit of n ppm, due to dilution of sample prior to analysis
— = Not analyzed
PRG = Region IX, US EPA Preliminary Remediation Goal for residential soil
MCL = Maximum Contaminant Level for Drinking Water established by the California Department of Toxic Substances Control

Notes:

Analyses performed by Curtis & Tompkins, Ltd. of Berkeley, CA except as noted (CA DHS certification # 1459)

[a]Reported concentration falls in volatile range but does not match gasoline or mineral spirits fingerprint
[b]Split duplicate analysis:
March 1994 splits performed by GTEL Environmental Laboratories, Inc. of Concord, CA (CA DHS certification # E1075)
October 1994 splits performed by Superior Precision Analytical Laboratories, Inc. of Martinez, CA (CA DHS certification #1542)
[c]Methylene chloride was also reported in the method blank at 0.0007 ppm - no methylene chloride was detected in the site ground water samples (methylene chloride is used during some laboratory procedures and is a common laboratory contaminant)
[d]Benzoic acid was reported as a single peak on the chromatogram. Since this is not a fuel compound, the laboratory calculated the TEH concentrations excluding the benzoic acid contribution, and issued a revised report showing these corrected concentrations. Both the revised and uncorrected analytic reports are included in Appendix C.
[e]A single peak on the chromatogram in the range of benzoic acid reportedly attributed to the detection of TEH above the detection limit. Since SPAL could not positively identify the compound at the peak, the report was not revised. However, the reported concentration may not be representative of field conditions since TEH is not detectable if the benzoic acid peak is discounted.
[f]DTSC Recommended Action Level - no MCL established

Table 2. Analytic Results of Ground Water Samples from Developed Wells - New Century Beverage Co., 1150 Park Avenue, Emeryville, Ca.

Well/ Boring ID	Date Sampled	TVH-G	TEH	Benzene	Toluene	Ethyl-benzene	Xylenes	1,2-DCA	PCE	Other HVOCs
		<----------Parts per million---------->								
MW-1	3/29/94	ND	ND (1)	ND	ND	ND	ND	ND	ND	ND
	5/20/94	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-2	3/29/94	2.4	37 (D)	0.017	ND (0.001)	0.005	0.015	ND	ND	ND
	5/20/94	1.9	6.7	0.021	0.0086	0.0061	0.0059	ND	ND	ND
MW-3	3/29/94	ND	ND (1)	ND	ND	ND	ND	ND	ND	ND
	5/20/94	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-4	3/29/94	0.13	ND (1)	ND	ND	ND	ND	ND	ND	0.017 CB 0.004 1,2-DCB
	5/20/94	0.22	[b]	0.0006	0.0015	0.0011	0.0035	ND	ND	0.017 CB 0.005 1,2-DCB
	6/1/94	—	ND	—	—	—	—	—	—	—
MW-5	3/29/94	2.1	30 (K)	0.39	ND (0.003)	ND (0.003)	0.18	ND	ND	ND
	5/20/94	2.3	2.7 (D)	0.49	0.005	0.033	0.23	ND	ND	ND
	10/20/94	0.77	9(K)	0.23	ND(0.001)	0.019	0.077	—	—	—
split[d]	10/20/94	—	ND	—	—	—	—	—	—	—
MW-6	3/29/94	ND	5 (D)	ND	ND	ND	ND	ND	ND	ND
	5/20/94	ND	2.4 (D)	ND	ND	ND	ND	ND	ND	ND
	10/20/94	0.055	ND	ND	ND	0.0021	0.0024	—	—	—
split[e]	10/20/94	—	0.27(D)	—	—	—	—	—	—	—
MW-7	3/29/94	0.16	ND (1)	ND	ND	ND	ND	ND	ND	ND
dup	3/29/94	ND	ND (1)	ND	ND	ND	ND	ND	ND	ND
	5/20/94	ND	ND	ND	ND	ND	ND	ND	ND	ND
split[a]	5/20/94	ND	ND	ND	ND	ND	ND	ND (0.0005)	ND (0.0005)	ND
dup	5/20/94	ND	[b]	ND	ND	ND	ND	ND	ND	ND
dup	6/1/94	—	ND	—	—	—	—	—	—	—
	10/20/94	ND	ND	ND	ND	ND	ND	—	—	—

-- Table 2 continues next page --

Table 2. Analytic Results of Ground Water Samples from Developed Wells - New Century Beverage Co., 1150 Park Avenue, Emeryville, Ca. (continued)

Well/ Boring ID	Date Sampled	TVH-G	TEH	Benzene	Toluene	Ethyl-benzene	Xylenes	1,2-DCA	PCE	Other HVOCs
		<----------Parts per million---------->								
MW-8	4/5/94	ND	ND (1)	ND	ND	ND	ND	ND	ND	ND
split[a]	4/5/94	ND(0.01)	ND (1)	ND(0.0003)	0.0004	ND(0.0003)	ND(0.0003)	ND	ND	ND
	5/20/94	ND	ND[c]	ND	ND	ND	ND	ND	ND	ND
	10/20/94	ND	ND	ND	ND	ND	ND	—	—	—
split[e]	10/20/94	—	ND	—	—	—	—	—	—	—
MW-9	4/5/94	ND	ND (1)	ND	ND	ND	ND	ND	ND	ND
	5/20/94	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-10	10/20/94	ND	ND	ND	ND	ND	ND	—	—	—
split[e]	10/20/94	—	ND	—	—	—	—	—	—	—
MW-11	10/20/94	ND	ND	ND	ND	ND	ND	—	—	—
split[d]	10/20/94	ND	ND	ND(0.0003)	ND(0.0003)	ND(0.0003)	ND	—	—	—
MW-12	10/20/94	0.087	0.13(K)	0.0063	ND	0.0014	0.0027	—	—	—
split[d]	10/20/94	0.057	ND	0.0073	ND(0.0003)	0.0016	0.0029	—	—	—
Travel Blank	3/29/94	ND	—	ND	ND	ND	ND	ND	ND	ND
	4/5/94	ND	—	ND	ND	ND	ND	ND	ND	ND
	5/20/94	ND	—	ND	ND	ND	ND	ND	ND	ND
	10/20/94	ND	—	ND	ND	ND	ND	—	—	—
split[d]	10/20/94	ND	—	ND(0.0003)	ND(0.0003)	ND(0.0003)	ND			
split[e]	10/20/94	ND	—	ND	ND	ND	ND			
Bailer Blank	3/29/94	ND	ND (1)	ND	ND	ND	ND	ND	ND	ND
	4/5/94	ND	ND (1)	ND	ND	ND	ND	ND	ND	ND
	5/20/94	ND	0.42[b]	ND	ND	ND	ND	ND	ND	ND
Standard detection limit		0.05	0.05 (K,D)	0.0005	0.0005	0.0005	0.0005	0.001	0.001	0.001-0.02
MCL				0.001	0.1[f]	0.68	1.75	0.0005	0.005	0.13 1,2-DCB[f] 0.03 CB

-- Table 2 continues next page --

Table 2. Analytic Results of Ground Water Samples from Developed Wells - New Century Beverage Co., 1150 Park Avenue, Emeryville, Ca. (continued)

Abbreviations:

TVH-G = Total volatile hydrocarbons as gasoline detected by EPA Method 8015, modified by DHS
note: Mineral spirits were also screened with this method, however, all detectable TVH was characterized as gasoline.
TEH = Total extractable hydrocarbons [kerosene (K) and diesel (D)] detected by EPA Method 8015, modified per DHS
notes: Hydraulic oil and motor oil were also screened with this method, however, all detected TEH was characterized as kerosene or diesel
All reported kerosene-range TEH was characterized as a fraction of gasoline compounds by the analytical laboratory
HVOCs = Halogenated volatile organic compounds detected by EPA Method 8010
ND = Not detected at standard detection limit specified on the last row of the table
ND(n) = Not detected at detection limit of n ppm, due to dilution of sample prior to analysis
--- = Not analyzed
MCL = Maximum Contaminant Level for Drinking Water established by the California Department of Toxic Substances Control

Notes:

Benzene, toluene, ethylbenzene and xylenes were analyzed by EPA Method 8020.
Analyses performed by Curtis & Tompkins, Ltd. of Berkeley, CA except as noted (CA DHS certification # 1459)

[a] Split duplicate analysis performed by GTEL Environmental Laboratories, Inc. of Concord, CA (CA DHS certification # E1075)
[b] TEH as diesel was detected at 0.42 ppm in the bailer blank collected on 5/20/94, and similar concentrations were reported in well MW-4 (0.31 ppm) and MW-7 (0.45 ppm) samples. Since no TEH was detected in earlier MW-4 and MW-7 samples, this indicated the samples were contaminated with the sampling equipment. Samples were collected in wells MW-4 and MW-7 again on 6/1/94, and no TEH was detected in either sample, consistent with the 3/94 results.
[c] Although no TEH as diesel, kerosene or motor oil was reported, the laboratory reported a single peak on the gas chromatogram that was identified as pentatriacontane (a nonhazardous alkane or paraffin organic compound $C_{36}H_{74}$) using EPA Method 8270 (Gas chromatography with Mass spectrometry)
[d] Split duplicate analysis performed by WEST Laboratory of Sacramento, CA (CA DHS certification #1346)
[e] Split duplicate analysis performed by Superior Precision Analytical Laboratories, Inc. of Martinez, CA (CA DHS certification #1542)
[f] DTSC Recommended Action Level - no MCL established

Table 3. Historical Ground Water Elevations - New Century Beverage Co., 1150 Park Avenue, Emeryville, Ca

Well ID	Date	Top-of-Casing Elevation (ft above msl)	Depth to Water (ft)	Ground Water Elevation (ft above msl)
MW-1	3/27/94	38.74	5.90	32.84
	3/29/94		5.89	32.85
	4/15/94		6.24	32.50
	5/20/94		5.79	32.95
MW-2	3/27/94	38.87	6.57	32.30
	3/29/94		6.58	32.29
	4/15/94		6.86	32.01
	5/20/94		6.45	32.42
MW-3	3/27/94	40.79	10.75	30.04
	3/29/94		10.69	30.10
	4/15/94		10.90	29.89
	5/20/94		10.81	29.98
MW-4	3/27/94	40.15	8.23	31.92
	3/29/94		8.21	31.94
	4/15/94		8.78	31.37
	5/20/94		8.54	31.61
MW-5	3/27/94	36.49	8.02	28.47
	3/29/94		7.93	28.56
	4/15/94		8.10	28.39
	5/20/94		7.88	28.61
	10/20/94		9.45	27.04

Well ID	Date	Top-of-Casing Elevation (ft above msl)	Depth to Water (ft)	Ground Water Elevation (ft above msl)
MW-6	3/27/94	35.52	9.60	25.92
	3/29/94		9.59	25.93
	4/15/94		9.64	25.88
	5/20/94		9.47	26.05
	10/20/94		10.51	25.01
MW-7	3/27/94	37.53	7.25	30.28
	3/29/94		7.27	30.26
	4/15/94		7.47	30.06
	5/20/94		7.25	30.28
	10/20/94		8.87	28.66
MW-8	4/5/94	33.11	9.03	24.08
	4/15/94		8.94	24.17
	5/20/94		8.70	24.41
	10/20/94		10.00	23.11
MW-9	4/5/94	36.06	7.60	28.46
	4/15/94		7.60	28.46
	5/20/94		7.39	28.67
MW-10	10/20/94	35.03	10.14	24.89
MW-11	10/20/94	32.74	9.71	23.03
MW-12	10/20/94	36.18	12.66	23.52

Table 4. Analytic Results of Soil Samples Collected During Underground Tank Removal, New Century Beverage Company, 1150 Park Avenue, Emeryville, California

Sample ID	Depth (ft)	Date Sampled	Sat/ Unsat	Analyte: EPA Method:	TVH-G 8015	TEH 8015	B 8020	E 8020	T 8020	X 8020	Lead 7420
					<----------parts per million (mg\kg)---------->						
Tank Excavation Samples											
T-1	10.0	07/19/94	Sat		<1	15[a]	0.059	0.009	<0.005	0.019	---
T-2	10.0	07/19/94	Sat		2.0	4.0	<0.005	0.007	<0.005	0.038	---
T-3	10.0	07/19/94	Sat		5.0	9.0	0.14[b]	0.015	0.19	0.87	---
T-4	10.0	07/19/94	Sat		170	74.0	0.14[b]	1.9	0.46	5.9	---
Dispenser Samples											
D-1	1.0	07/19/94	Unsat		180	22,000	<0.04	0.28	0.18	4.1	---
D-1	4.0	08/05/94	Unsat		1.0	<1.0	<0.005	<0.005	0.008	0.007	---
D-2	1.0	07/19/94	Unsat		210	11,000	0.08	0.94	1.1	5.2	---
D-2	3.5	08/05/94	Unsat		1,300	150	0.51	21.0	21.0	100	---
Product Line samples											
P-1	3.0	07/21/94	Unsat		120	110	<0.07[b]	0.39	0.35	1.6	13
P-2	5.0	08/05/94	Unsat		170	6.0	0.23[b]	2.8	0.29	10.0	---
Stockpiled Soil Composites											
SP-1		07/20/94			25	950	<0.005	0.026[b]	<0.005	0.12	<5.0
SP-2		07/20/94			2.0	100	<0.005	<0.005	<0.005	0.010	<5.0
SP-3		07/20/94			17	350	<0.005	0.017	<0.005	0.069	<5.0

Abbreviations:

Sat/Unsat = Saturated or unsaturated in-place soil sample
TVH-G = Total Volatile Hydrocarbons as Gasoline
TEH = Total Extractable Hydrocarbons - reported as diesel unless noted
B = Benzene
E = Ethylbenzene
T = Toluene
X = Xylenes
<n = Not detected at a detection limit of n ppm
--- = Not analyzed

Notes:

All laboratory analyses completed by Curtis & Tompkins, Ltd., of Berkeley, CA, DHS Certification #1459

a = Reported as Kerosene - Diesel range not reported due to overlap of hydrocarbon ranges
b = Presence of this compound confirmed by second column; however, the confirmation concentration differed from the reported result by more than a factor of two.

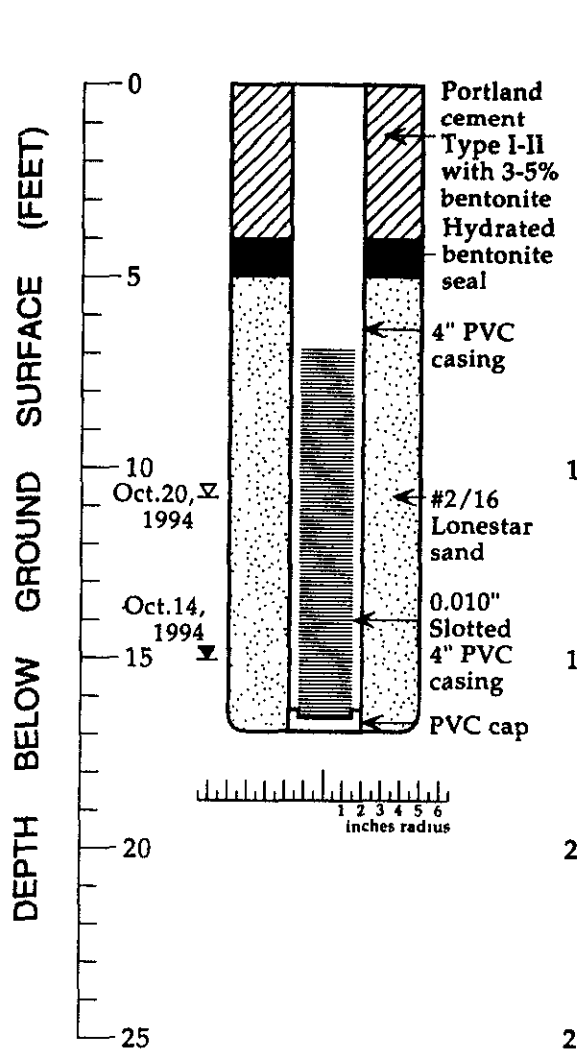
Table 5. Transmissivity and Hydraulic Conductivity Estimates, New Century Beverage Co., 1150 Park Avenue, Emeryville, California.

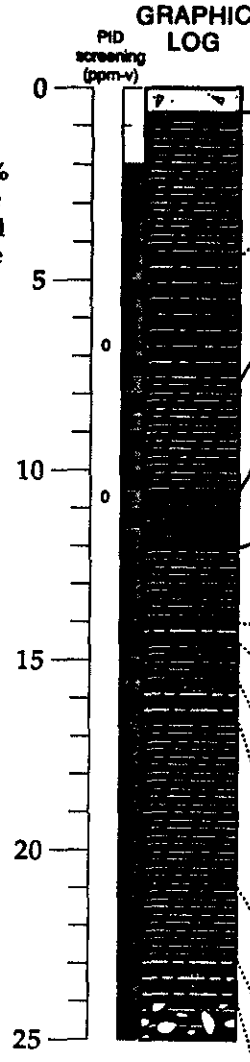
WELL No.	Average Transmissivity	Estimated Effective thickness		Estimated Hydraulic Conductivity	
	T	minimum	maximum	minimum	maximum
	[ft^2/min]	[ft]	[ft]	[ft/min]	[ft/min]
MW-5	$6.9x10^{-3}$	0.5	7.0	$9.9x10^{-4}$	$1.4x10^{-2}$
MW-6	$7.6x10^{-3}$	0.5	5.0	$1.5x10^{-3}$	$1.5x10^{-2}$
MW-10	$4.9x10^{-3}$	2.0	11.0	$4.5x10^{-4}$	$2.5x10^{-3}$
MW-11	$1.0x10^{-3}$	5.5	11.0	$9.1x10^{-5}$	$1.8x10^{-4}$
MW-12	$1.4x10^{-4}$	4.0	11.0	$1.3x10^{-5}$	$3.5x10^{-5}$

APPENDIX A

WELL AND BORING LOGS

WELL MW-10 (B-44)





DESCRIPTION

Concrete

Clayey SILT (ML); black; firm; damp; 30% clay, 50% silt, 20% coarse angular sand; medium plasticity; low K

Silty CLAY (CL); dark gray; firm; damp; 50% clay, 30% silt, 20% coarse angular sand; medium plasticity; low K

Clayey SILT (ML); brown, red-brown iron staining; firm; damp; 30% clay, 50% silt, 20% fine- to medium-grained sand; low plasticity; low K

Sandy CLAY (CL) brown; stiff; moist; 60% clay, 10% silt, 30% angular sand; low plasticity; low K; trace angular gravel to 0.4 inches

Clayey SILT (ML); brown; firm; moist; 30% clay, 60% silt, 10% fine sand; medium plasticity; low K

SILT (ML); brown; firm; wet; 10% clay; 90% silt; low plasticity; low K

Clayey SILT (ML); brown; firm; moist; 30% clay, 70% silt; medium plasticity; low K

Sandy SILT (ML); brown; soft; wet; 5% clay; 65% silt, 30% fine sand; medium plasticity; moderate K

Clayey SILT (ML); brown, dark gray and red-brown mottling; firm; moist; 30% clay, 60% silt, 10% fine sand; medium plasticity; low K

Clayey SILT (ML); brn, dk gray and red-brown mottling; firm; moist; 10% clay, 80% silt, 10% fine sand; med plasticity; low K

Sandy SILT (ML); brown; soft; moist; 10% clay, 60% silt, 30% medium sand; low plasticity; moderate K

Gravelly SILT (ML); brown; firm; moist; 10% clay, 50% silt, 40% angular gravel to 0.5" diameter; low plasticity; moderate K

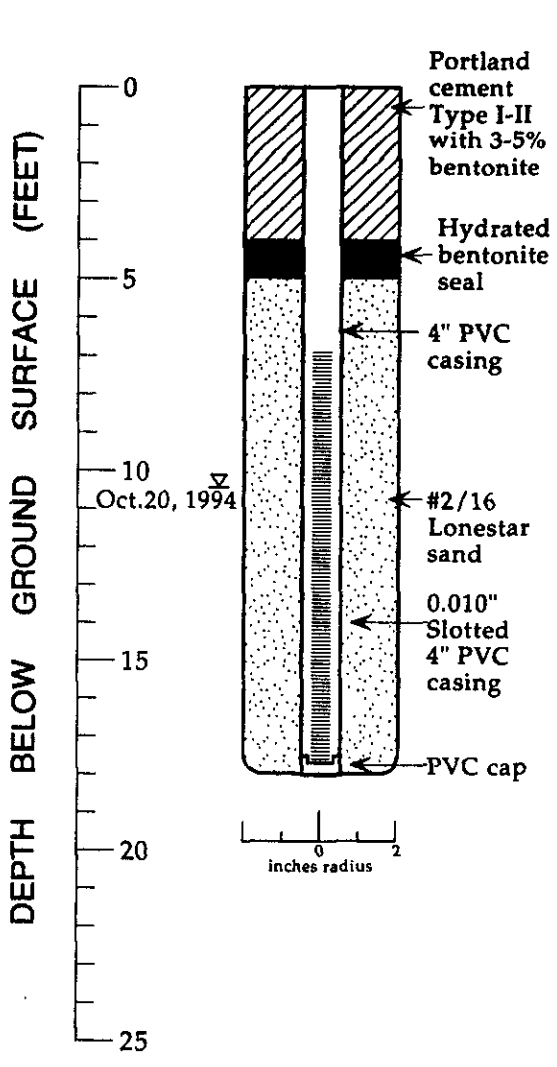
EXPLANATION

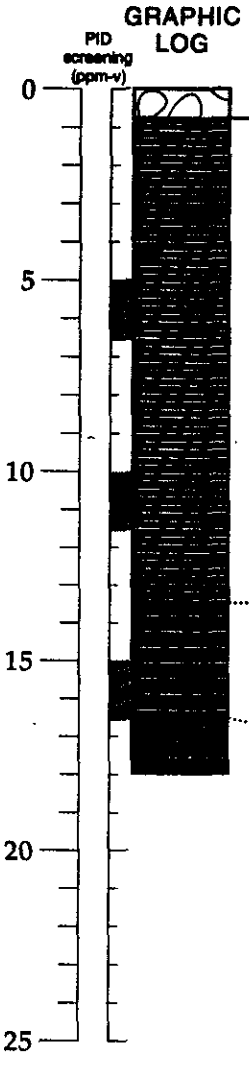
- ▼ Water level during drilling (date)
- ▽ Water level (date)
- ——····—— Contact (dotted where approximate)
- —?—?— Uncertain contact
- ////////. Gradational contact
- Location of recovered drive sample
- Location of drive sample sealed for possible chemical analysis
- Cuttings sample
- K = Estimated hydraulic conductivity
- ND = Not detected

Logged By: Alison Watts
Supervisor: Mary L. Stallard, CEG No. 1704
Drilling Company: Precision Drilling/Gregg Drilling
License Number: C57-636387/C57-485165
Driller: Stuart King/Morris Reed
Drilling Method: Push Sampler, XD1 Rig/Hollow stem auger
Date Drilled: October 10, 1994/October 14, 1994
Type of Sampler: Split barrel (2" ID)
PID: Results of field screening with photoionization detector for VOCs in parts per million by volume
Ground Surface Elevation: 35.73 feet above mean sea level

Boring Log and Well Construction Details - Well MW-10 (B-44) - New Century Beverage Company, 1150 Park Avenue, Emeryville, California

WELL MW-11





DESCRIPTION

Gravel

Clayey SILT (ML); black; firm; damp; 30% clay, 60% silt, 10% fine sand; medium plasticity; low K

Brown; 20% clay, 80% silt; red-brown staining

Brown; 30% clay, 70% silt

Brown, gray and red-brown mottling; firm; 30% clay, 60% silt, 10% angular gravel to 0.25" diameter

Silty CLAY (CL); brown, gray and red-brown mottling; firm; moist; 50% clay; 40% silt, 10% angular gravel to 0.25" diameter; medium plasticity; low K

Sandy CLAY (CL); brown, red-brown and gray mottling; firm; wet; 60% clay, 30% coarse sand, 10% angular gravel to 0.25' diameter; low plasticity; moderate K

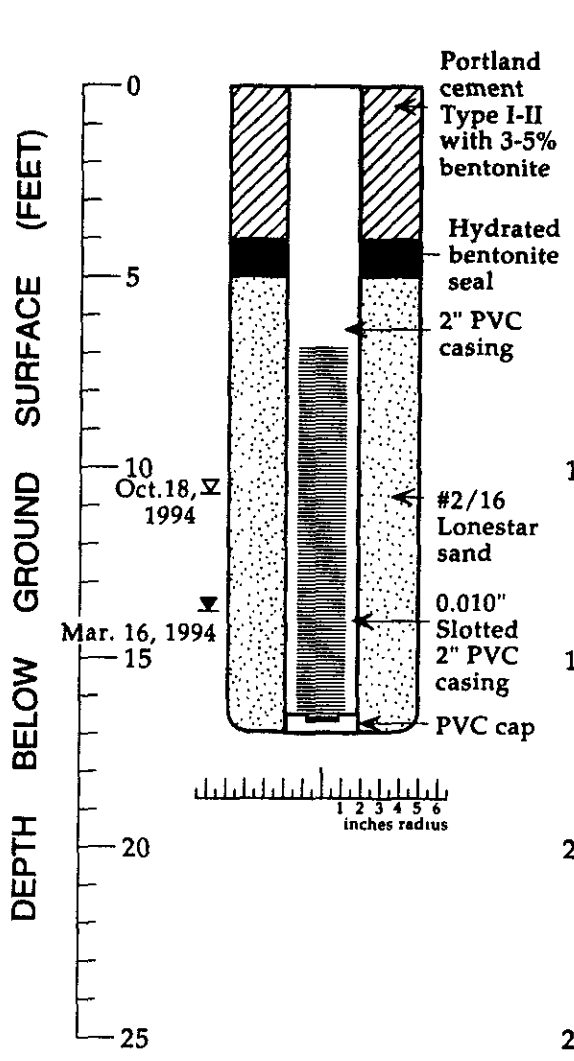
EXPLANATION

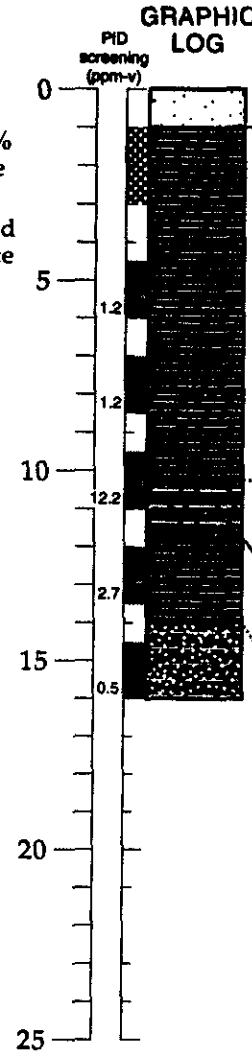
- ▼ Water level during drilling (date)
- ⧖ Water level (date)
- ——····—— Contact (dotted where approximate)
- —?—?— Uncertain contact
- ////////. Gradational contact
- ▬ Location of recovered drive sample
- ▬ Location of drive sample sealed for possible chemical analysis
- ▩ Cuttings sample
- K = Estimated hydraulic conductivity
- ND = Not detected

Logged By: Alison Watts
Supervisor: Mary L. Stallard, CEG No. 1704
Drilling Company: Gregg Drilling, San Rafael, CA
License Number: C57-485165
Driller: Morris Reed
Drilling Method: Hollow stem auger
Date Drilled: October 14 , 1994
Type of Sampler: Split barrel (2" ID)
PID: Results of field screening with photoionization detector for VOCs in parts per million by volume
Ground Surface Elevation: 33.41 feet above mean sea level

Boring Log and Well Construction Details - Well MW-11 - New Century Beverage Company, 1150 Park Avenue, Emeryville, California

WELL MW-12





DESCRIPTION
(from Boring B-18)

Concrete

Clayey SILT (ML); black-gray; very stiff; dry; 10% clay; 90% silt; low plasticity; low K

Sandy SILT (ML); light gray mottled brown; stiff; damp; 5% clay; 85% silt; 10% very fine sand; low plasticity; low K

Clayey SILT (ML); olive-brown mottled gray; stiff; damp; 10% clay; 85% silt; 5% very fine sand; low plasticity; low K

Silty SAND (SM); brown; dense; wet; 20% silt; 80% very fine to medium sand; non-plastic; moderate K

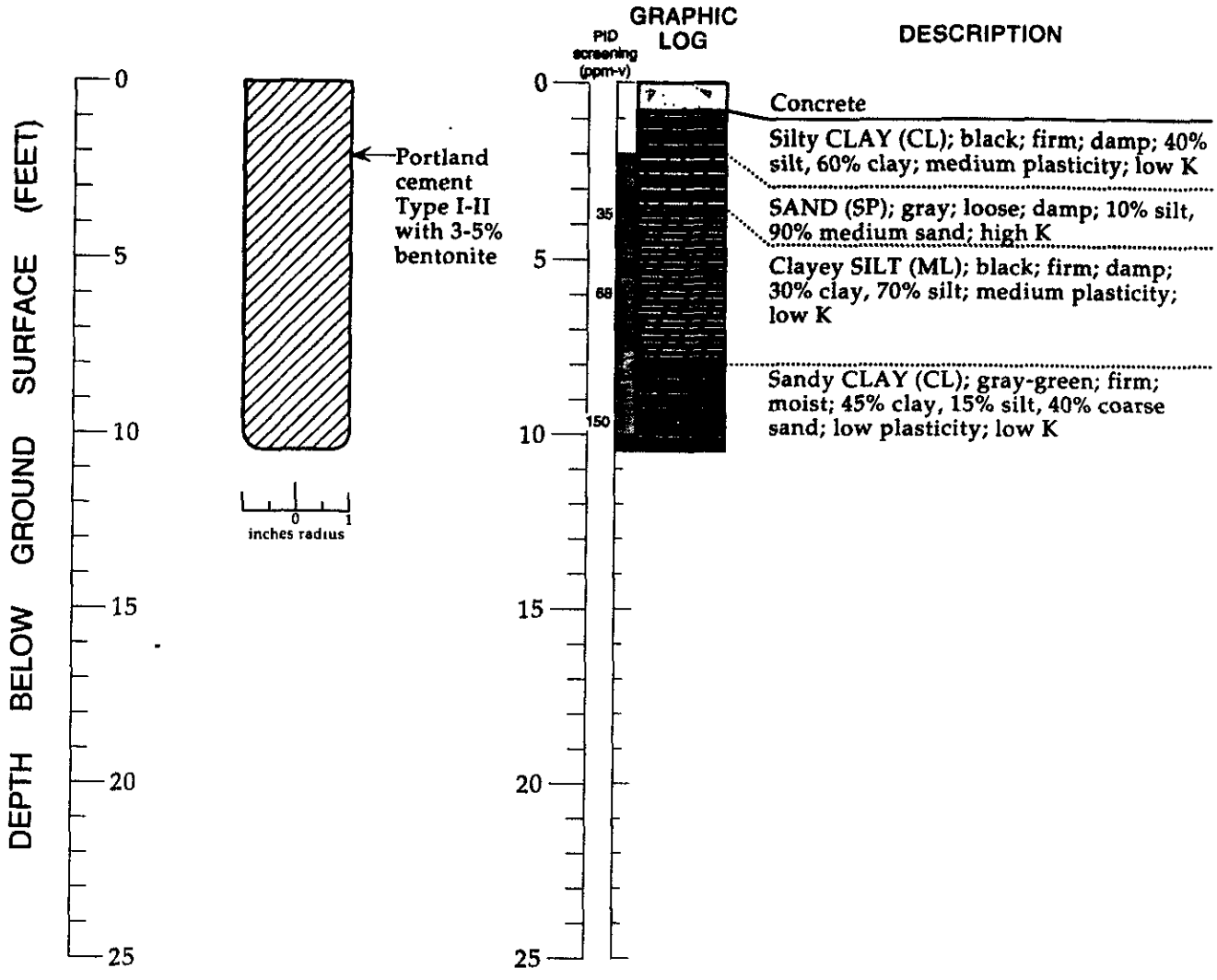
EXPLANATION

- ▼ Water level during drilling (date)
- ▽ Water level (date)
- ——····· Contact (dotted where approximate)
- —?—?— Uncertain contact
- ////////// Gradational contact
- Location of recovered drive sample
- Location of drive sample sealed for possible chemical analysis
- Cuttings sample
- K = Estimated hydraulic conductivity

Logged By: Joyce Adams
Supervisor: Mary Stallard; CEG No. 1704
Drilling Company: Gregg Drilling, San Rafael, CA
License Number: C57-636387
Driller: Morris Reed
Drilling Method: Hollow-stem auger
Date Drilled: October 14, 1994
Type of Sampler: Split barrel (2.0" ID)
PID: Results of field screening with photoionization detector for VOCs in parts per million by volume
Ground Surface Elevation: 36.55 feet above mean sea level

Boring Log and Well Construction Details - Well MW-12 - New Century Beverage Company, 1150 Park Avenue, Emeryville, California

BORING B-40



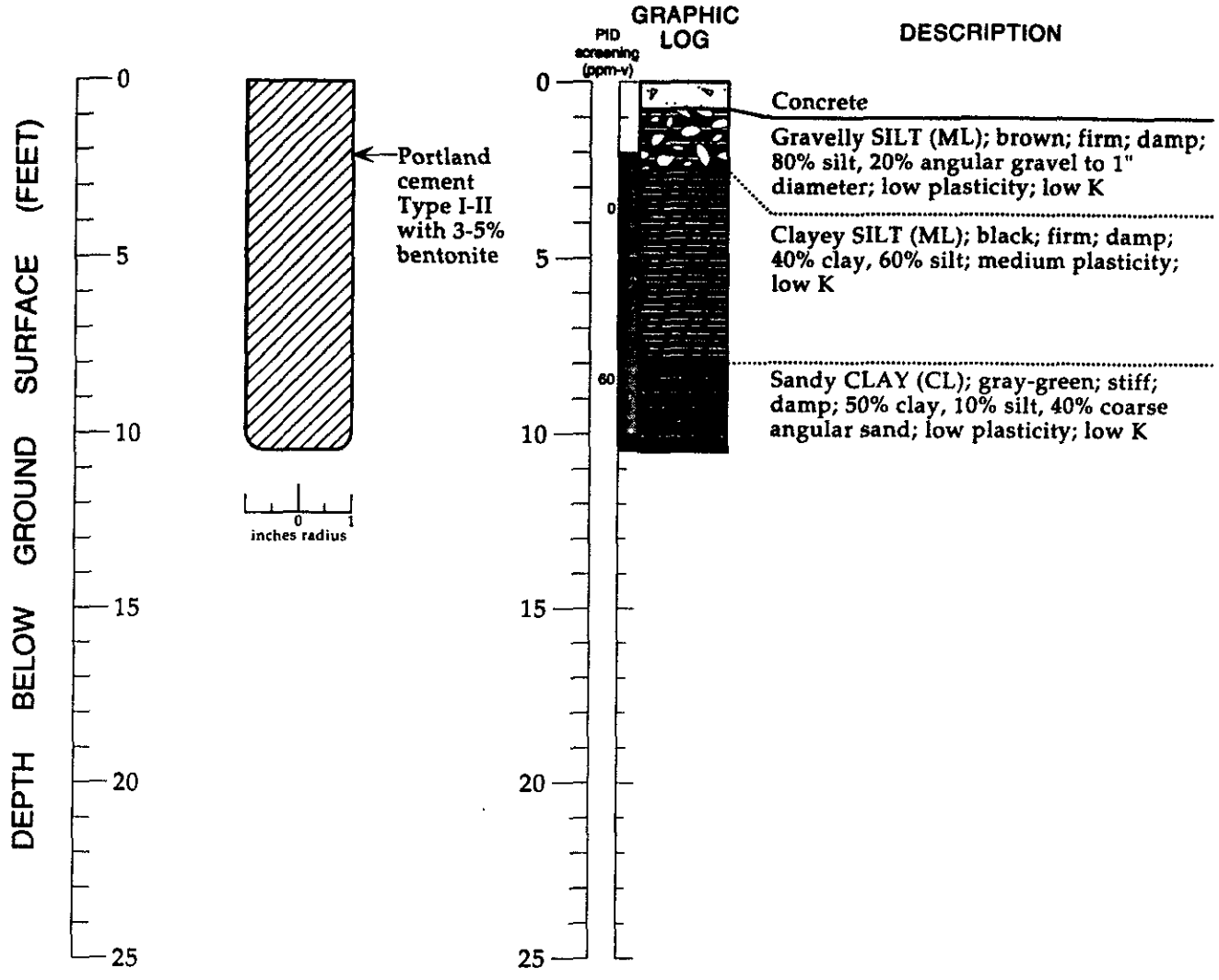
EXPLANATION

- Water level during drilling (date)
- Water level (date)
- Contact (dotted where approximate)
- Uncertain contact
- Gradational contact
- Location of recovered drive sample
- Location of drive sample sealed for possible chemical analysis
- Cuttings sample
- K = Estimated hydraulic conductivity
- ND = Not detected

Logged By: Alison Watts
Supervisor: Mary L. Stallard, CEG No. 1704
Drilling Company: Precision Drilling, San Rafael, CA
License Number: C57-636387
Driller: Mike Day
Drilling Method: Push Sampler Difficult Access Rig
Date Drilled: October 11, 1994
Type of Sampler: Split barrel (2" ID)
PID: Results of field screening with photoionization detector for VOCs in parts per million by volume

Boring Log - Boring B-40 - New Century Beverage Company, 1150 Park Avenue, Emeryville, California

BORING B-41



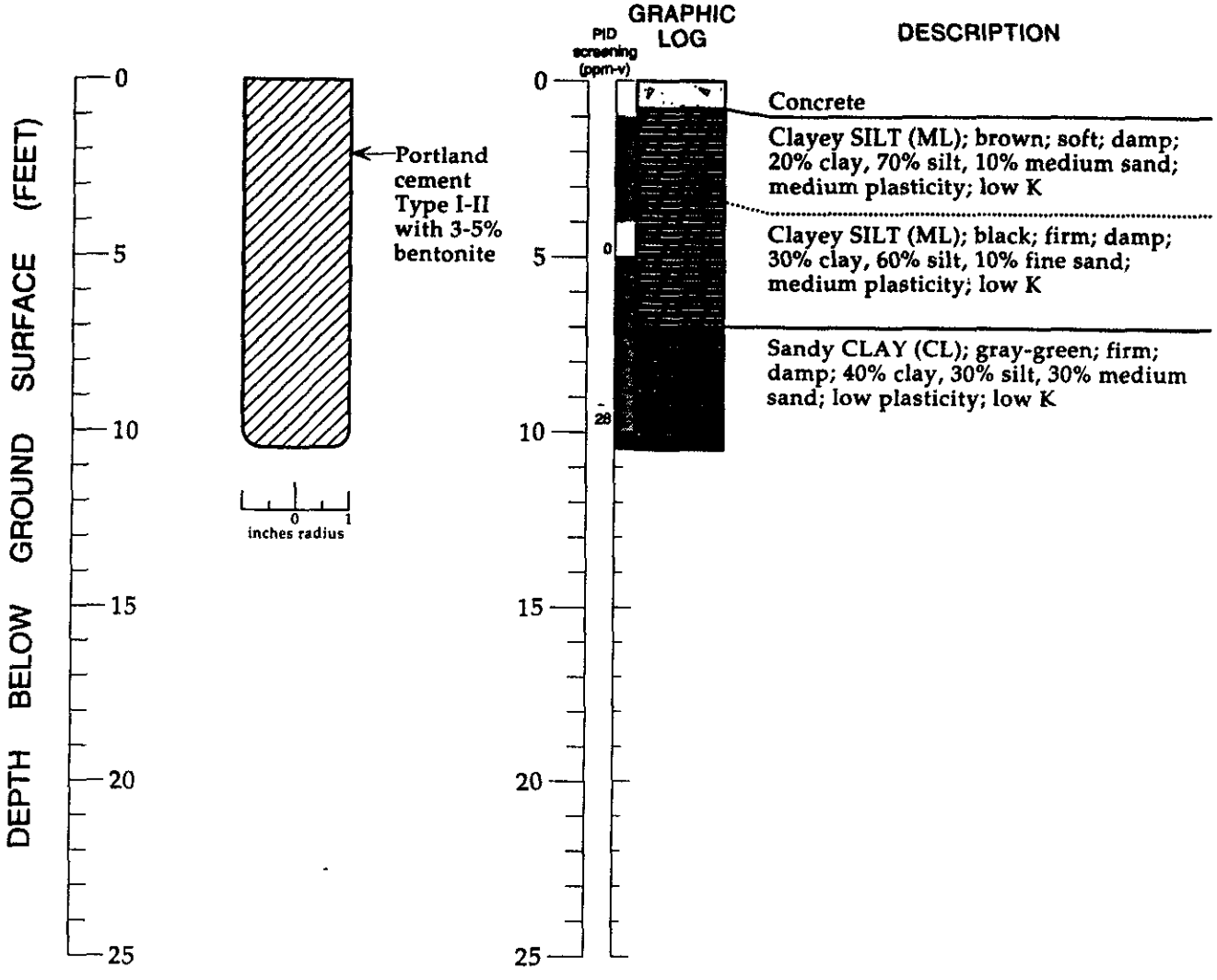
EXPLANATION

- ▼ Water level during drilling (date)
- ▽ Water level (date)
- ——..... Contact (dotted where approximate)
- —?—?— Uncertain contact
- ////////. Gradational contact
- ■ Location of recovered drive sample
- ■ Location of drive sample sealed for possible chemical analysis
- ▩ Cuttings sample
- K = Estimated hydraulic conductivity
- ND = Not detected

Logged By: Alison Watts
Supervisor: Mary L. Stallard, CEG No. 1704
Drilling Company: Precision Drilling, San Rafael, CA
License Number: C57-636387
Driller: Mike Day
Drilling Method: Push Sampler, Difficult Access Rig
Date Drilled: October 11, 1994
Type of Sampler: Split barrel (2" ID)
PID: Results of field screening with photoionization detector for VOCs in parts per million by volume

Boring Log - Boring B-41 - New Century Beverage Company, 1150 Park Avenue, Emeryville, California

BORING B-42



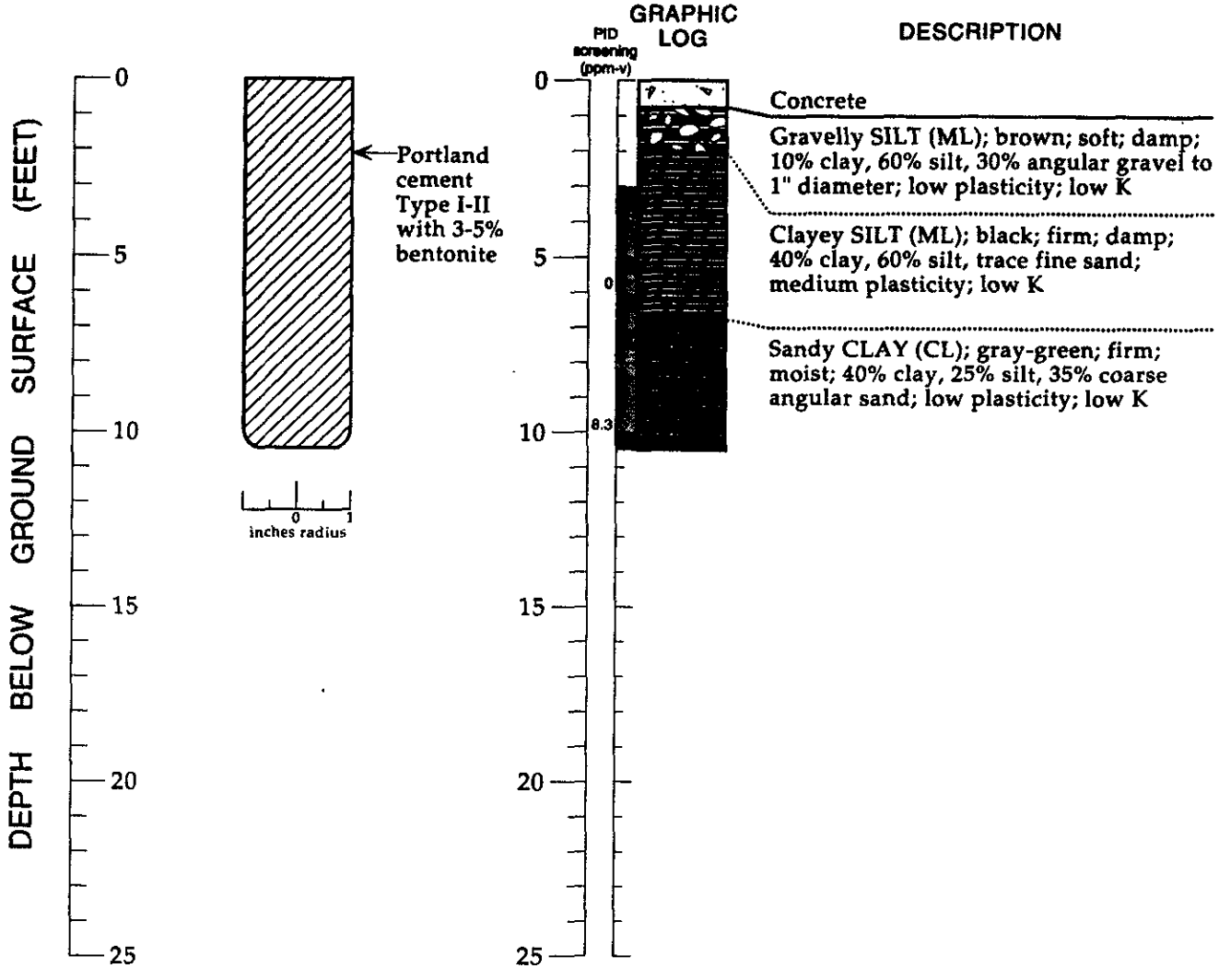
EXPLANATION

- Water level during drilling (date)
- Water level (date)
- Contact (dotted where approximate)
- Uncertain contact
- Gradational contact
- Location of recovered drive sample
- Location of drive sample sealed for possible chemical analysis
- Cuttings sample
- K = Estimated hydraulic conductivity
- ND = Not detected

Logged By: Alison Watts
Supervisor: Mary L. Stallard, CEG No. 1704
Drilling Company: Precision Drilling, San Rafael, CA
License Number: C57-636387
Driller: Mike Day
Drilling Method: Push Sampler, Difficult Access Rig
Date Drilled: October 11, 1994
Type of Sampler: Split barrel (2" ID)
PID: Results of field screening with photoionization detector for VOCs in parts per million by volume

Boring Log - Boring B-42 - New Century Beverage Company, 1150 Park Avenue, Emeryville, California

BORING B-43



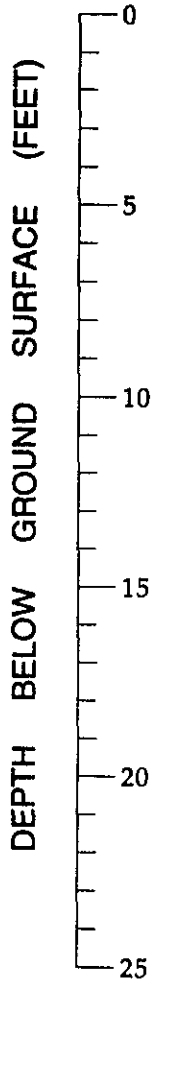
EXPLANATION

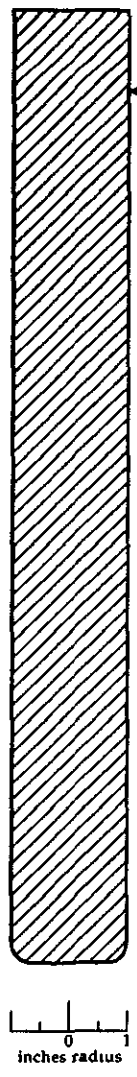
- Water level during drilling (date)
- Water level (date)
- Contact (dotted where approximate)
- Uncertain contact
- Gradational contact
- Location of recovered drive sample
- Location of drive sample sealed for possible chemical analysis
- Cuttings sample
- K = Estimated hydraulic conductivity
- ND = Not detected

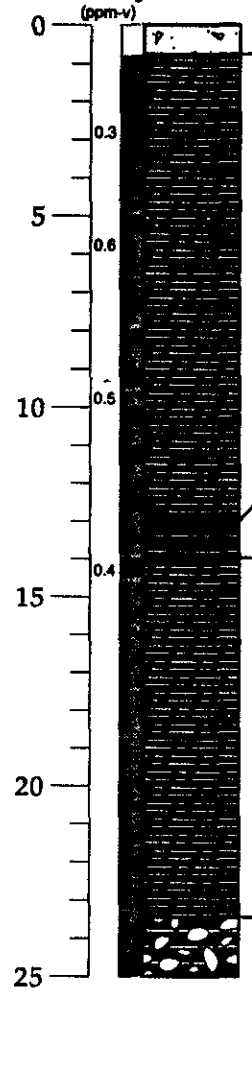
Logged By: Alison Watts
Supervisor: Mary L. Stallard, CEG No. 1704
Drilling Company: Precision Drilling, San Rafael, CA
License Number: C57-636387
Driller: Mike Day
Drilling Method: Push Sampler, Difficult Access Rig
Date Drilled: October 11, 1994
Type of Sampler: Split barrel (2" ID)
PID: Results of field screening with photoionization detector for VOCs in parts per million by volume

Boring Log - Boring B-43 - New Century Beverage Company, 1150 Park Avenue, Emeryville, California

BORING B-45







GRAPHIC LOG

DESCRIPTION

Asphalt/Concrete

Clayey SILT (ML); black; stiff; damp; 35% clay, 65% silt; low plasticity; low K

30% clay, 60% silt, 10% fine sand at 4'

Gray-green; 25% clay, 65% silt, 10% fine sand at 6.5'

Gray; 25% clay, 55% silt, 20% fine sand at 9.5'

Brown; 30% clay, 60% silt, 10% fine sand at 11'

Silty CLAY (CL); light brown; stiff; damp to moist; 65% clay, 35% silt; low plasticity; low K

Clayey SILT (ML); brown; stiff; damp to moist; 30% clay, 60% silt, 10% fine sand; low plasticity; low K

Brown; moist; 35% clay, 60% silt, 5% fine sand at 15'

iron staining; 25% clay, 60% silt, 15% fine sand at 20.5'

Wet; 20% clay, 55% silt, 15% fine sand, 5% angular rock fragments to 0.25" diameter; low to moderate K at 22'

Clayey GRAVEL (GC); brown, iron staining; medium dense; wet; 25% clay, 15% silt, 15% sand, 45% angular gravel to 0.25" diameter; moderate to low K

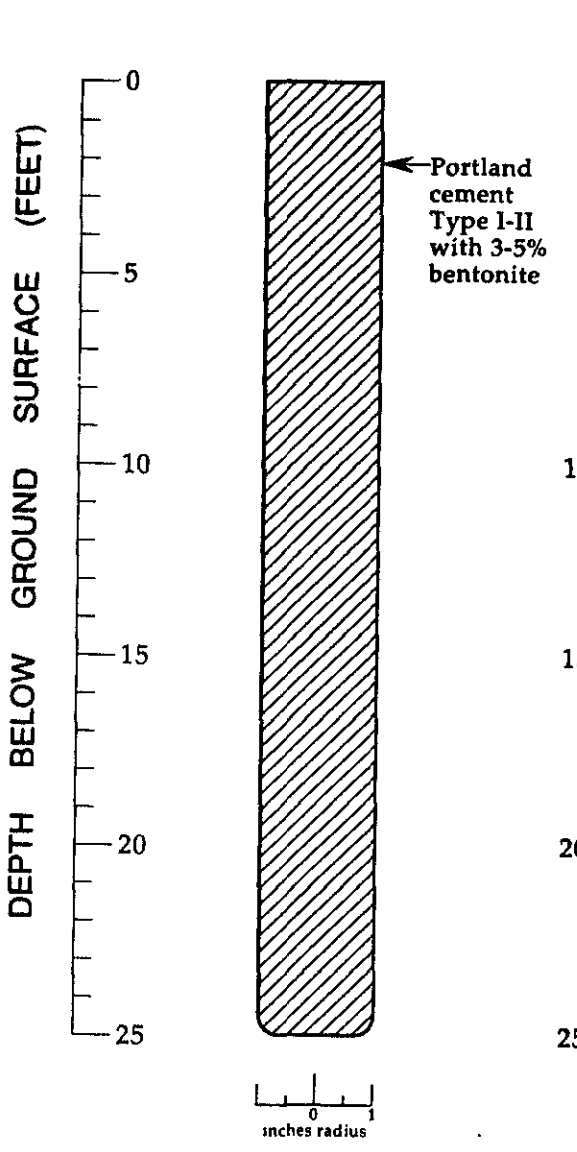
EXPLANATION

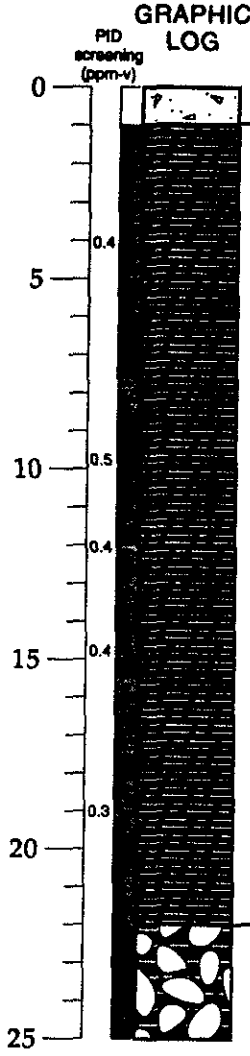
- Water level during drilling (date)
- Water level (date)
- Contact (dotted where approximate)
- Uncertain contact
- Gradational contact
- Location of recovered drive sample
- Location of drive sample sealed for possible chemical analysis
- Cuttings sample
- K = Estimated hydraulic conductivity
- ND = Not detected

Logged By: Jim Ponton
Supervisor: Mary L. Stallard, CEG No. 1704
Drilling Company: Precision Drilling, San Rafael, CA
License Number: C57-636387
Driller: Stuart King
Drilling Method: Push Sampler, XD1 Rig
Date Drilled: October 10 , 1994
Type of Sampler: Split barrel (2" ID)
PID: Results of field screening with photoionization detector for VOCs in parts per million by volume

Boring Log - Boring B-45 - New Century Beverage Company, 1150 Park Avenue, Emeryville, California

BORING B-46





DESCRIPTION
Asphalt/Concrete
Clayey SILT (ML); black; stiff; damp; 30% clay, 60% silt, 10% fine sand; low plasticity; low K
35% clay, 50% silt, 10% fine sand, 5% angular rock fragments to 0.25" diameter at 4'
Black with rust staining; 30% clay, 55% silt, 10% fine sand, 5% rock fragments to 0.25" diameter at 6'
Gray; stiff; 30% clay, 60% silt, 10% fine sand at 9'
Light brown; 25% clay, 65% silt, 10% fine sand; iron oxide staining at 10.5'
35% clay; 60% silt; 5% fine sand at 12.5'
Black manganese oxide nodules, iron staining; damp to wet; 40% clay 50% silt, 10% fine sand at 16'
Silty GRAVEL (GM); medium brown; dense; wet; 30% silt, 15% fine sand, 55% angular gravel to 0.25" diameter; moderate K

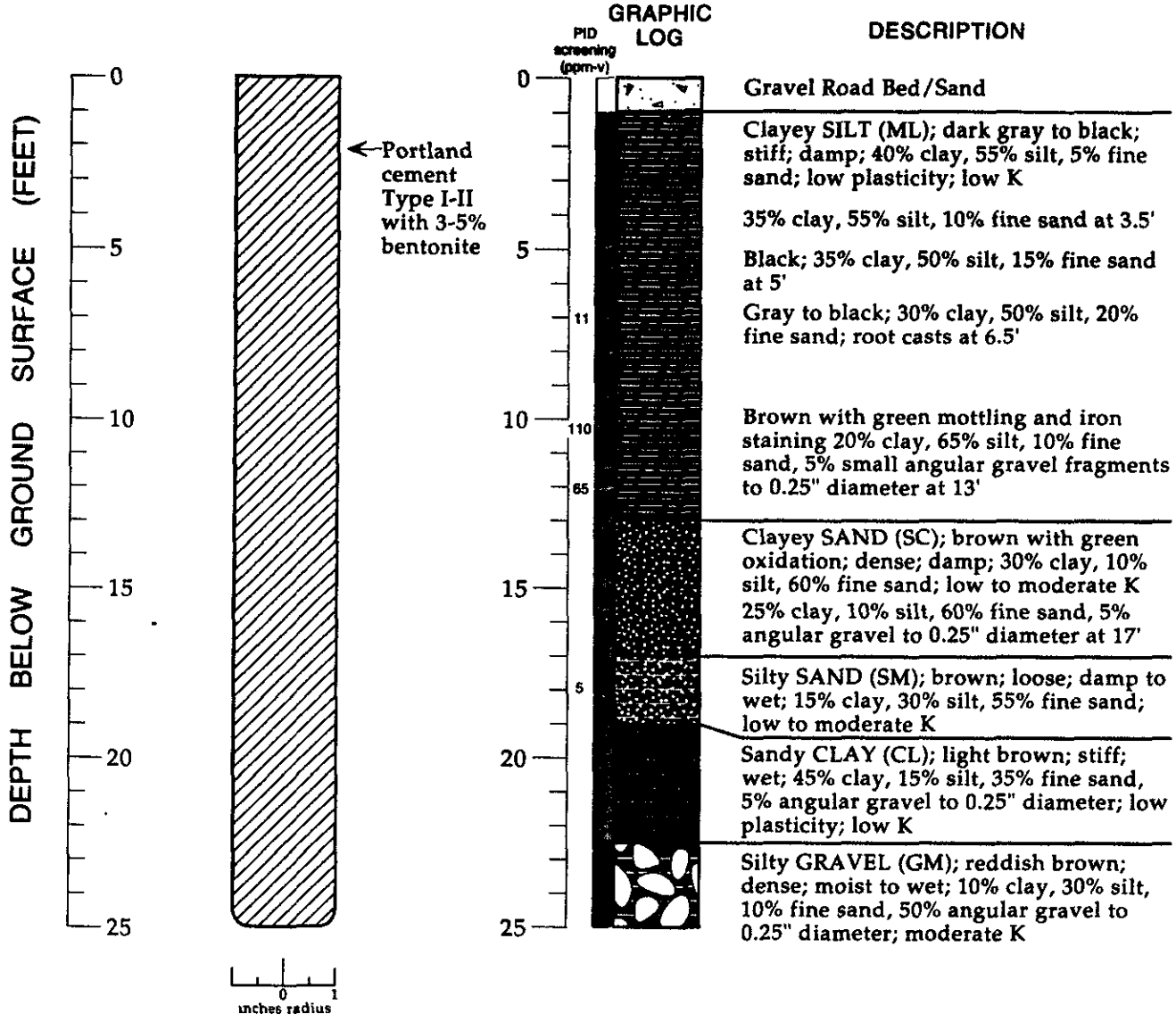
EXPLANATION

- ▼ Water level during drilling (date)
- ▽ Water level (date)
- ——····—— Contact (dotted where approximate)
- —?—?— Uncertain contact
- ////////. Gradational contact
- ▬ Location of recovered drive sample
- ▬ Location of drive sample sealed for possible chemical analysis
- ▩ Cuttings sample
- K = Estimated hydraulic conductivity
- ND = Not detected

Logged By: Jim Ponton
Supervisor: Mary L. Stallard, CEG No. 1704
Drilling Company: Precision Drilling, San Rafael, CA
License Number: C57-636837
Driller: Stuart King
Drilling Method: Push Sampler, XD1 Rig
Date Drilled: October 10 , 1994
Type of Sampler: Split barrel (2" ID)
PID: Results of field screening with photoionization detector for VOCs in parts per million by volume

Boring Log - Boring B-46 - New Century Beverage Company, 1150 Park Avenue, Emeryville, California

BORING B-48



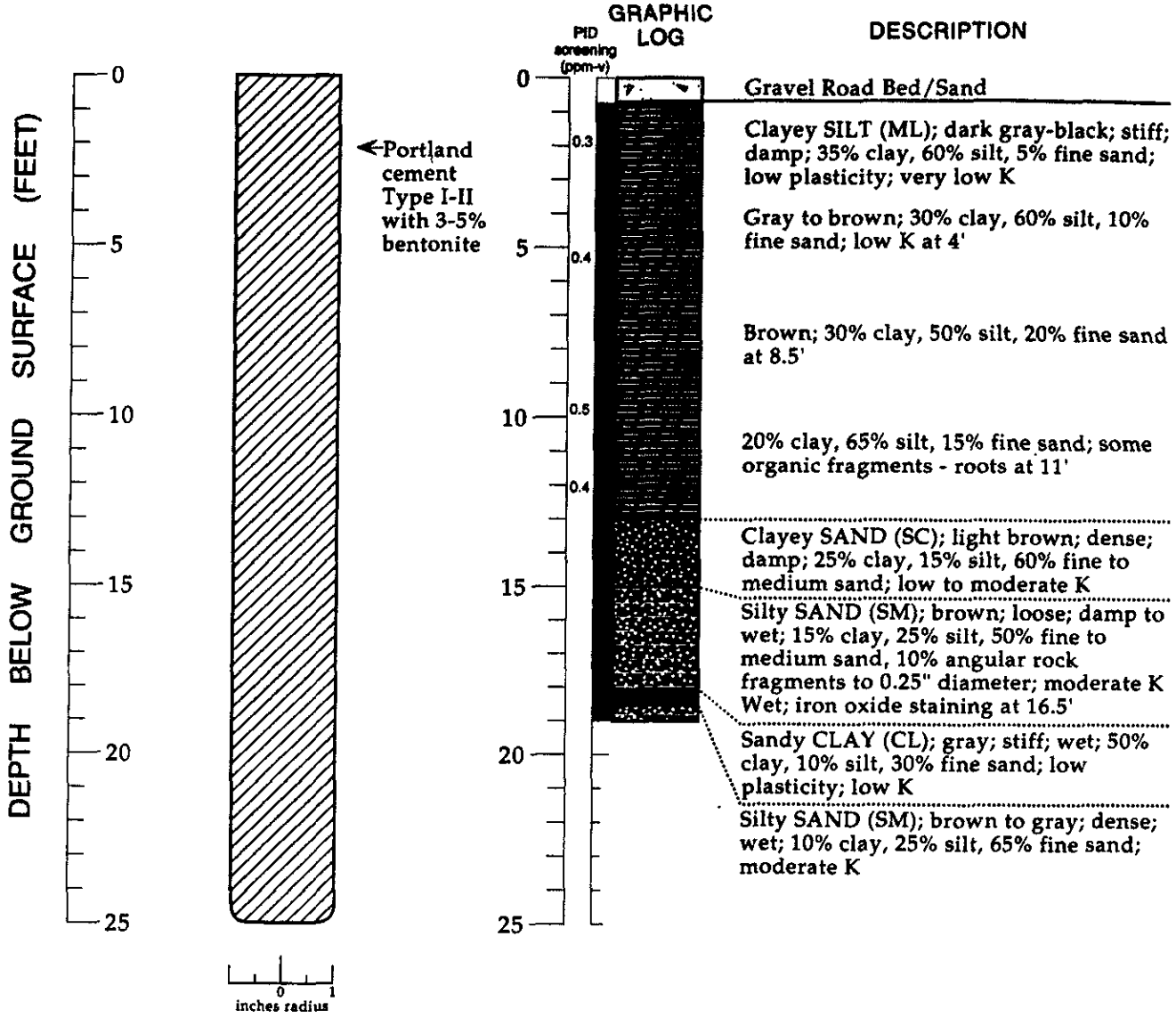
EXPLANATION

- Water level during drilling (date)
- Water level (date)
- Contact (dotted where approximate)
- Uncertain contact
- Gradational contact
- Location of recovered drive sample
- Location of drive sample sealed for possible chemical analysis
- Cuttings sample
- K = Estimated hydraulic conductivity
- ND = Not detected

Logged By: Jim Ponton
Supervisor: Mary L. Stallard, CEG No. 1704
Drilling Company: Precision Drilling, San Rafael, CA
License Number: C57-636837
Driller: Stuart King
Drilling Method: Push Sampler, XD1 Rig
Date Drilled: October 10 , 1994
Type of Sampler: Split barrel (2" ID)
PID: Results of field screening with photoionization detector for VOCs in parts per million by volume

Boring Log - Boring B-48 - New Century Beverage Company, 1150 Park Avenue, Emeryville, California

BORING B-49



EXPLANATION

- ▼ Water level during drilling (date)
- ▽ Water level (date)
- ——····—— Contact (dotted where approximate)
- —?—?— Uncertain contact
- ////////. Gradational contact
- ■ Location of recovered drive sample
- ■ Location of drive sample sealed for possible chemical analysis
- ▩ Cuttings sample
- K = Estimated hydraulic conductivity
- ND = Not detected

Logged By: Jim Ponton
Supervisor: Mary L. Stallard, CEG No. 1704
Drilling Company: Precision Drilling, San Rafael, CA
License Number: C57-636837
Driller: Stuart King
Drilling Method: Push Sampler
Date Drilled: October 10 , 1994
Type of Sampler: Split barrel (2" ID)
PID: Results of field screening with photoionization detector for VOCs in parts per million by volume

Boring Log - Boring B-49 - New Century Beverage Company, 1150 Park Avenue, Emeryville, California

APPENDIX B

ANALYTICAL REPORTS FOR SOIL AND OPEN BOREHOLE WATER SAMPLES AND CHAIN OF CUSTODY DOCUMENTS

Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878
2323 Fifth Street, Berkeley, CA 94710. Phone (510) 486-0900

ANALYTICAL REPORT

Prepared for:

Weiss Associates
5500 Shellmound Street
Emeryville, CA 94608

Date: 22-JUL-94
Lab Job Number: 116403
Project ID: 14-291-01
Location: N/A

Reviewed by:

Reviewed by:

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 116403
CLIENT: WEISS ASSOCIATES
PROJECT ID: 14-291-01

DATE SAMPLED: 07/19/94
DATE RECEIVED: 07/19/94
DATE ANALYZED: 07/19/94
DATE REPORTED: 07/21/94

Total Volatile Hydrocarbons with BTXE in Soils & Wastes
TVH by California DOHS Method/LUFT Manual October 1989
BTXE by EPA 5030/8020

LAB ID	SAMPLE ID	TVH AS GASOLINE (mg/Kg)	BENZENE (ug/Kg)	TOLUENE (ug/Kg)	ETHYL BENZENE (ug/Kg)	TOTAL XYLENES (ug/Kg)
116403-1	T-1-10'	ND(1)	59	ND(5)	9	19
116403-2	T-2-10'	2	ND(5)	ND(5)	7	38

ND = Not detected at or above reporting limit; Reporting limit indicated in parentheses.

QA/QC SUMMARY

RPD, %	1
RECOVERY, %	99

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 116403
CLIENT: WEISS ASSOCIATES
PROJECT ID: 14-291-01

DATE SAMPLED: 07/19/94
DATE RECEIVED: 07/19/94
DATE ANALYZED: 07/20/94
DATE REPORTED: 07/21/94

Total Volatile Hydrocarbons with BTXE in Soils & Wastes
TVH by California DOHS Method/LUFT Manual October 1989
BTXE by EPA 5030/8020

LAB ID	SAMPLE ID	TVH AS GASOLINE (mg/Kg)	BENZENE (ug/Kg)	TOLUENE (ug/Kg)	ETHYL BENZENE (ug/Kg)	TOTAL XYLENES (ug/Kg)
116403-3	T-3-10'	5	140	190	150	870

QA/QC SUMMARY

RPD, %	3
RECOVERY, %	102

Tompkins, Ltd.

LABORATORY NUMBER: 116403
CLIENT: WEISS ASSOCIATES
PROJECT ID: 14-291-01

(19/94
/19/94
7/20/94
21/94
11,22/94

Extractable Petroleum Hydrocarbons in
California DOHS Method
LUFT Manual October 1989

LAB ID	SAMPLE ID	KEROSENE RANGE (mg/Kg)		TG (mg/Kg)
116403-1	T-1-10'	15	***	1
116403-2	T-2-10'	**	4	1
116403-3	T-3-10'	**	9	1
116403-4	T-4-10'	**	74	1
116403-5	D-1-1'	**	22,000	100
116403-6	D-2-1'	**	11,000	100

ND = Not detected at or above reporting limit.

* Reporting limit applies to all analytes.

** Kerosene range not reported due to overlap of hydrocarbon ranges.

*** Diesel range not reported due to overlap of hydrocarbon ranges.

QA/QC SUMMARY

LCS RECOVERY, %	121

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 116403
CLIENT: WEISS ASSOCIATES
PROJECT ID: 14-291-01

DATE SAMPLED: 07/19/94
DATE RECEIVED: 07/19/94
DATE ANALYZED: 07/21/94
DATE REPORTED: 07/21/94

Total Volatile Hydrocarbons with BTXE in Soils & Wastes
TVH by California DOHS Method/LUFT Manual October 1989
BTXE by EPA 5030/8020

LAB ID	SAMPLE ID	TVH AS GASOLINE (mg/Kg)	BENZENE (ug/Kg)	TOLUENE (ug/Kg)	ETHYL BENZENE (ug/Kg)	TOTAL XYLENES (ug/Kg)
116403-4	T-4-10'	170	140*	460	1,900	5,900
116403-5	D-1-1'	180	ND(40)	180	280	4,100
116403-6	D-2-1'	210	80	1,100	940	5,200

* Presence of this compound confirmed by second column; however, the confirmation concentration differed from the reported result by more than a factor of two.

ND = Not detected at or above reporting limit; Reporting limit indicated in parentheses.

QA/QC SUMMARY

RPD, %	1
RECOVERY, %	93

WEISS ASSOCIATES
5500 Shellmound Street, Emeryville, CA 94608
Phone: 415-547-5420 Fax: 415-547-5043

Please send analytic results and a copy of the signed chain of custody form to:

John Duey

Project ID: 14-291-01

Lab Personnel:

☒ PLEASE INCLUDE QA/QC DATA IF BOX IS CHECKED.

1) Specify analytic method and detection limit in report.
2) Notify us if there are any anomalous peaks in GC or other scans.
3) ANY QUESTIONS/CLARIFICATIONS: CALL US.

CHAIN-OF-CUSTODY RECORD AND ANALYTIC INSTRUCTIONS

Sampled by: Jonathan Weingast

Laboratory Name: Curtis & Tompkins

No. of Containers	Sample ID	Container Type[1]	Sample Date	Vol[2]	Fil[3]	Ref[4]	Preservative (specify)	Analyze for	Analytic Method	Turn[5]	COMMENTS
1	T-1-0'	Sml tube	7/19/94	N/A	NA	Ice	NONE	TPH-G TPH-D BTEX	8015 / 8020	overnight	OVERNIGHT TURNAROUND !!
1	T-2-10'										
1	T-3-10'										
1	T-4-10'										
1	D-1-1'										
1	D-2-1'										

1 Jonathan Weingast 7/19/94
Released by (Signature), Date

1 Weiss Associates
Affiliation

2 Mary Pleasant 7/19/94
Received by (Signature), Date

2 Curtis & Tompkins
Affiliation

3 _____
Released by (Signature), Date

3 _____
Affiliation

4 _____
Shipping Carrier, Method, Date

4 _____
Affiliation

5 _____
Released by (Signature), Date

5 _____
Affiliation

6 _____
Received by Lab Personnel, Date

6 _____
Affiliation, Telephone

x _____
Seal Intact?

1 Sample Type Codes: W = Water, S = Soil, Describe Other; Container Type Codes: V = VOA/Teflon Septa, P = Plastic, C or B - Clear/Brown Glass, Describe Other; Cap Codes: PT = Plastic, Teflon Lined 2 = Volume per container; 3 = Filtered (Y/N); 4 = Refrigerated (Y/N)
5 Turnaround [N = Normal, W = 1 Week, R = 24 Hour, HOLD (write out)]
ADDITIONAL COMMENTS, CONDITIONS, PROBLEMS:

Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878
2323 Fifth Street, Berkeley, CA 94710, Phone (510) 486-0900

A N A L Y T I C A L R E P O R T

Prepared for:

Weiss Associates
5500 Shellmound Street
Emeryville, CA 94608

Date: 17-AUG-94
Lab Job Number: 116724
Project ID: 14-219-11
Location: N/A

Reviewed by: Cynthia E. Lehlbach

Reviewed by:

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 116724
CLIENT: WEISS ASSOCIATES
PROJECT ID: 14-219-11

DATE SAMPLED: 08/05/94
DATE RECEIVED: 08/05/94
DATE ANALYZED: 08/10/94
DATE REPORTED: 08/17/94

Total Volatile Hydrocarbons with BTXE in Soils & Wastes
TVH by California DOHS Method/LUFT Manual October 1989
BTXE by EPA 5030/8020

LAB ID	SAMPLE ID	TVH AS GASOLINE (mg/Kg)	BENZENE (ug/Kg)	TOLUENE (ug/Kg)	ETHYL BENZENE (ug/Kg)	TOTAL XYLENES (ug/Kg)
116724-1	P-2-5′	170	230*	290	2800	10000
116724-3	D-2-3.5′	1,300	510	21000	21000	100000
116724-METHOD BLANK		ND(1)	ND(5)	ND(5)	ND(5)	ND(5)

* Presence of this compound confirmed by second column; however, the confirmation concentration differed from the reported result by more than a factor of two.

ND = Not detected at or above reporting limit; Reporting limit indicated in parentheses.

QA/QC SUMMARY

RPD, %	<1
RECOVERY, %	108

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 116724
CLIENT: WEISS ASSOCIATES
PROJECT ID: 14-219-11

DATE SAMPLED: 08/05/94
DATE RECEIVED: 08/05/94
DATE ANALYZED: 08/08/94
DATE REPORTED: 08/17/94

Total Volatile Hydrocarbons with BTXE in Soils & Wastes
TVH by California DOHS Method/LUFT Manual October 1989
BTXE by EPA 5030/8020

LAB ID	SAMPLE ID	TVH AS GASOLINE (mg/Kg)	BENZENE (ug/Kg)	TOLUENE (ug/Kg)	ETHYL BENZENE (ug/Kg)	TOTAL XYLENES (ug/Kg)
116724-2	D-1-4'	1	ND(5)	8	ND(5)	7
116724-METHOD BLANK		ND(1)	ND(5)	ND(5)	ND(5)	ND(5)

ND = Not detected at or above reporting limit; Reporting limit indicated in parentheses.

QA/QC SUMMARY

RPD, %	4
RECOVERY, %	95

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 116724
CLIENT: WEISS ASSOCIATES
PROJECT ID: 14-219-11

DATE SAMPLED: 08/05/94
DATE RECEIVED: 08/05/94
DATE EXTRACTED: 08/09/94
DATE ANALYZED: 08/11-12/94
DATE REPORTED: 08/17/94

Extractable Petroleum Hydrocarbons in Soils & Wastes
California DOHS Method
LUFT Manual October 1989

LAB ID	SAMPLE ID	KEROSENE RANGE (mg/Kg)	DIESEL RANGE (mg/Kg)	REPORTING LIMIT* (mg/Kg)
116724-1	P-2-5'	**	6	1
116724-2	D-1-4'	ND	ND	1
116724-3	D-2-3.5'	**	150	1
116724-METHOD BLANK		ND	ND	1

ND = Not detected at or above reporting limit.

* Reporting limit applies to all analytes.

** Kerosene range not reported due to overlap of hydrocarbon ranges.

QA/QC SUMMARY

RPD,%	16
RECOVERY, %	105

WEISS ASSOCIATES
5500 Shellmound St., Emeryville, CA 94608
Phone: 415-547-5420 FAX: 415-547-5043

Please send analytic results
and a copy of the signed chain of custody form to:

JOHN DUEY

Project ID: 14-219-11

CHAIN-OF-CUSTODY RECORD AND ANALYTIC INSTRUCTIONS

Lab Personnel: 1) Specify analytic method and detection limit in report.
2) Notify us if there are any anomalous peaks on GC or other scans.
3) ANY QUESTIONS/CLARIFICATIONS: CALL US.

Sampled by: HT

Laboratory Name: C&T

No. of Containers	Sample ID	Container Type[1]	Sample Date	Vol[2]	Fil[3]	Ref[4]	Preservative (specify)	Analyze for	Analytic Method	Turn[5]	COMMENTS
2	P.Z. 5'	Brass Tube	8/5/94	Z+6	N	Y	None	TPH-G/TPH-D/BTEX	EPA 8015/8020	5 day	116724-1
	D-1 4'										-2
	D-2-35'										-3

1 Robert Jaon 1510 8/5/94
Released by (Signature), Date

1 Weiss Associates
Affiliation

2 _____
Received by (Signature), Date

2 _____
Affiliation

3 _____
Released by (Signature), Date

3 _____
Affiliation

4 _____
Shipping Carrier, Method, Date

4 _____
Affiliation

5 _____
Released by (Signature), Date

5 _____
Affiliation

6 Teresa L Morris
Received by Lab Personnel, Date

6 8/5/94 C&T
Affiliation, Telephone

x _____
Seal intact?

1 Sample Type Codes: W = Water, S = Soil, Describe Other; Container Type Codes: V = VOA/Teflon Septa, P = Plastic, C or B - Clear/Brown Glass, Describe Other;
Cap Codes: PT = Plastic, Teflon Lined 2 = Volume per container; 3 = Filtered (Y/N); 4 = Refrigerated (Y/N)
5 Turnaround [N = Normal, W = 1 Week, R = 24 Hour, HOLD (write out)]
ADDITIONAL COMMENTS, CONDITIONS, PROBLEMS:

Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878
2323 Fifth Street, Berkeley, CA 94710, Phone (510) 486-0900

ANALYTICAL REPORT

Prepared for:

Weiss Associates
5500 Shellmound Street
Emeryville, CA 94608

Date: 08-AUG-94
Lab Job Number: 116453
Project ID: 14-291-02
Location: N/A

Reviewed by: Teresa K Morris

Reviewed by: Mary Pleasant

Curtis & Tompkins, Ltd.

SAMPLE ID: P-1-3'
LAB ID: 116453-001
CLIENT: Weiss Associates
PROJECT ID: 14-291-02
MATRIX: Soil

DATE SAMPLED: 07/21/94
DATE RECEIVED: 07/21/94
DATE REPORTED: 08/09/94

Metals Analytical Report

Compound	Result (mg/Kg)	Reporting Limit (mg/Kg)	QC Batch	Method	Analysis Date
Lead	13	5.0	15506	EPA 7420	08/08/94

Curtis & Tompkins, Ltd.

CLIENT: Weiss Associates
JOB NUMBER: 116453

DATE REPORTED: 08/08/94

BATCH QC REPORT
PREP BLANK

Compound	Result	Reporting Limit	Units	QC Batch	Method	Analysis Date
Lead	ND	5	mg/Kg	15506	EPA 7420	08/08/94

ND = Not detected at or above reporting limit

Curtis & Tompkins, Ltd.

CLIENT: Weiss Associates
JOB NUMBER: 116453

DATE REPORTED: 08/08/94

BATCH QC REPORT
BLANK SPIKE / BLANK SPIKE DUPLICATE

Compound	Spike Amount	BS Result	BSD Result	Units	BS % Recovery	BSD % Recovery	Average Recovery	RPD	QC Batch	Method	Analysis Date
Lead	2000	1750	1780	ug/L	88	89	89	2	15506	EPA 7420	08/08/94

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 116453
CLIENT: WEISS ASSOCIATES
PROJECT ID: 14-291-02

DATE SAMPLED: 07/21/94
DATE RECEIVED: 07/21/94
DATE EXTRACTED: 08/02/94
DATE ANALYZED: 08/03/94
DATE REPORTED: 08/04/94

Extractable Petroleum Hydrocarbons in Soils & Wastes
California DOHS Method
LUFT Manual October 1989

LAB ID	SAMPLE ID	KEROSENE RANGE (mg/Kg)	DIESEL RANGE (mg/Kg)	REPORTING LIMIT* (mg/Kg)
116453-1	P-1-3'	**	110	1
116453-METHOD BLANK		ND	ND	1

ND = Not detected at or above reporting limit.

* Reporting limit applies to all analytes.
** Kerosene range not reported due to overlap of hydrocarbon ranges.

QA/QC SUMMARY

RPD,%	<1
RECOVERY, %	78

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 116453
CLIENT: WEISS ASSOCIATES
PROJECT ID: 14-291-02

DATE SAMPLED: 07/21/94
DATE RECEIVED: 07/21/94
DATE ANALYZED: 08/04/94
DATE REPORTED: 08/04/94

Total Volatile Hydrocarbons with BTXE in Soils & Wastes
TVH by California DOHS Method/LUFT Manual October 1989
BTXE by EPA 5030/8020

LAB ID	SAMPLE ID	TVH AS GASOLINE (mg/Kg)	BENZENE (ug/Kg)	TOLUENE (ug/Kg)	ETHYL BENZENE (ug/Kg)	TOTAL XYLENES (ug/Kg)
116453-1	P-1-3'	120	ND(70)	350	390	1600
116453-METHOD BLANK		ND(5)	ND(30)	ND(30)	ND(30)	ND(30)

ND = Not detected at or above reporting limit; Reporting limit indicated in parentheses.

QA/QC SUMMARY

RPD, %	1
RECOVERY, %	105

11645

WEISS ASSOCIATES
5500 Shellmound Street, Emeryville, CA 94608
Phone: 415/547-5420 Fax: 415/547-5043

Please send analytic results and a copy of the signed chain of custody form to:
John Duey
Project ID: 4-291-02

Lab Personnel:

☒ PLEASE INCLUDE QA/QC DATA IF BOX IS CHECKED.

1) Specify analytic method and detection limit in report.
2) Notify us if there are any anomalous peaks in QC or other scans.
3) ANY QUESTIONS/CLARIFICATIONS: CALL US.

CHAIN-OF-CUSTODY RECORD AND ANALYTIC INSTRUCTIONS

Sampled by: Jonalla Weigert
Laboratory Name: Curtis & Tompkins

No. of Containers	Sample ID	Container Type	Sample Date	Vol[2]	Fil[3]	Ref[4]	Preservative (specify)	Analyze for	Analytic Method	Turn[5]	COMMENTS
1	B-1-3'	soil	7/24/97	MA	HA	ice	none	~~HOLD~~			
								TVH-G/BTEX	LUFT/EPA# 8020	24hr	RUSH on these two
								TEH-D	LUFT	24hr	
								Total Lead	EPA 7420	Normal	NORMAL ON THIS

Post-it® Fax Note 7671 | Date 8/2/97 | # of pages ▶ 1
To Mary | From John Duey
Co./Dept. Curtis & Tompkins | Co. Weiss Assoc
Phone # 486-0900 | Phone # (510) 450-6129
Fax # 486-0532 | Fax # (510) 547-5043

1 _____ 7/24/97
Released by (Signature), Date

1 West Associates
Affiliation

2 Dollie E. Sellers 07/24/97
Received by (Signature), Date

2 C&T Laboratories
Affiliation

3 _____
Released by (Signature), Date

3 _____
Affiliation

4 _____
Shipping Carrier, Method, Date

4 _____
Affiliation

5 _____
Released by (Signature), Date

5 _____
Affiliation

6 _____
Received by Lab Personnel, Date

6 _____
Affiliation, Telephone

X _____
Seal Intact?

1 Sample Type Codes: W = Water, S = Soil, Describe Other; Container Type Codes: V = VOA/Teflon Septa, P = Plastic, C or B = Clear/Brown Glass, Describe Other;
Cap Codes: PT = Plastic, Teflon Lined 2 = Volume per container; 3 = Filtered (Y/N); 4 = Refrigerated (Y/N)
5 Turnaround: N = Normal, W = 1 Week, R = 24 Hour, HOLD (write out)
ADDITIONAL COMMENTS, CONDITIONS, PROBLEMS:

Curtis & Tompkins, Ltd.

VERBAL ADDITIONS/CANCELLATIONS TO ANALYSIS REQUEST SHEET

Client: Weiss Date: 8/2

Requested By: John Drury Time: ____ AM 2:30 PM

Recorded By: MBP

Current Lab ID (Previous Lab ID)	Client ID	Circle Matrix	Specify add or cancel	Analysis	Due Date
116453-001 ( )		water ~~soil~~ waste oil other	+	TVH/BTXE TEH	ASAP
( )		water soil waste oil other			
( )		water soil waste oil other			
( )		water soil waste oil other			
( )		water soil waste oil other			
( )		water soil waste oil other			

Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878
2323 Fifth Street, Berkeley, CA 94710, Phone (510) 486-0900

ANALYTICAL REPORT

Prepared for:

Weiss Associates
5500 Shellmound Street
Emeryville, CA 94608

Date: 22-JUL-94
Lab Job Number: 116428
Project ID: 14-291-01
Location: N/A

Reviewed by: _____

Reviewed by: _____

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 116428
CLIENT: WEISS ASSOCIATES
PROJECT ID: 14-291-01

DATE SAMPLED: 07/20/94
DATE RECEIVED: 07/20/94
DATE ANALYZED: 07/21,22/94
DATE REPORTED: 07/22/94

Total Volatile Hydrocarbons with BTXE in Soils & Wastes
TVH by California DOHS Method/LUFT Manual October 1989
BTXE by EPA 5030/8020

LAB ID	SAMPLE ID	TVH AS GASOLINE (mg/Kg)	BENZENE (ug/Kg)	TOLUENE (ug/Kg)	ETHYL BENZENE (ug/Kg)	TOTAL XYLENES (ug/Kg)
116428-5	COMP SP-1A,B,C,D	25	ND(5)	ND(5)	26*	120
116428-10	COMP SP-2A,B,C,D	2	ND(5)	ND(5)	ND(5)	10
116428-15	COMP SP-3A,B,C,D	17	ND(5)	ND(5)	17	69

* Presence of this compound confirmed by second column; however, the confirmation concentration differed from the reported result by more tha a factor of two.

ND = Not detected at or above reporting limit; Reporting limit indicated in parentheses.

QA/QC SUMMARY

RPD, %	4
RECOVERY, %	106

CLIENT: Weiss Associates
PROJECT ID: 14-291-01
MATRIX: Soil

DATE REPORTED: 07/22/94

METALS ANALYTICAL REPORT

				Lead				
Sample ID	Lab ID	Sample Date	Receive Date	Result (mg/Kg)	Reporting Limit (mg/Kg)	QC Batch	Method	Analysis Date
COMP SP-1 (A-D)	116428-005	07/20/94	07/20/94	ND	5.0	15221	EPA 7420	07/22/94
COMP SP-2 (A-D)	116428-010	07/20/94	07/20/94	ND	5.0	15221	EPA 7420	07/22/94
COMP SP-3 (A-D)	116428-015	07/20/94	07/20/94	ND	5.0	15221	EPA 7420	07/22/94

ND = Not detected at or above reporting limit

Curtis & Tompkins, Ltd.

Curtis & Tompkins, Ltd.

CLIENT: Weiss Associates
JOB NUMBER: 116428

DATE REPORTED: 07/22/94

BATCH QC REPORT
PREP BLANK

Compound	Result	Reporting Limit	Units	QC Batch	Method	Analysis Date
Lead	ND	5	mg/Kg	15221	EPA 7420	07/22/94

ND = Not detected at or above reporting limit

Curtis & Tompkins, Ltd.

CLIENT: Weiss Associates
JOB NUMBER: 116428

DATE REPORTED: 07/22/94

BATCH QC REPORT
BLANK SPIKE / BLANK SPIKE DUPLICATE

Compound	Spike Amount	BS Result	BSD Result	Units	BS % Recovery	BSD % Recovery	Average Recovery	RPD	QC Batch	Method	Analysis Date
Lead	2000	1910	1940	ug/L	96	97	97	2	15221	EPA 7420	07/22/94

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 116428
CLIENT: WEISS ASSOCIATES
PROJECT ID: 14-291-01

DATE SAMPLED: 07/20/94
DATE RECEIVED: 07/20/94
DATE EXTRACTED: 07/20/94
DATE ANALYZED: 07/22/94
DATE REPORTED: 07/22/94

Extractable Petroleum Hydrocarbons in Soils & Wastes
California DOHS Method
LUFT Manual October 1989

LAB ID	SAMPLE ID	KEROSENE RANGE (mg/Kg)	DIESEL RANGE (mg/Kg)	REPORTING LIMIT* (mg/Kg)
116428-5	COMP SP-1A,B,C,D	**	950	10
116428-10	COMP SP-2A,B,C,D	**	100	1
116428-15	COMP SP-3A,B,C,D	**	350	10

** Kerosene range not reported due to overlap of hydrocarbon ranges.

* Reporting limit applies to all analytes.

QA/QC SUMMARY	
LCS RECOVERY,%	77

WEISS ASSOCIATES
5500 Shellmound Street, Emeryville, CA 94608
Phone: 415-547-5420 Fax: 415-547-5043

Please send analytic results and a copy of the signed chain of custody form to:
John Duey
Project ID: 14-291-01

Lab Personnel:

☒ PLEASE INCLUDE QA/QC DATA IF BOX IS CHECKED.

1) Specify analytic method and detection limit in report.
2) Notify us if there are any anomalous peaks in GC or other scans.
3) ANY QUESTIONS/CLARIFICATIONS: CALL US.

CHAIN-OF-CUSTODY RECORD AND ANALYTIC INSTRUCTIONS

Sampled by: Jonathan Weingart
Laboratory Name: Curtis & Tompkins

No. of Containers	Sample ID	Container Type	Sample Date	Vol[2]	Fil[3]	Ref[4]	Preservative (specify)	Analyze for	Analytic Method	Turn[5]	COMMENTS
1	SP-1 A	Sal Tube	7/2/94	NA	N/A	Yes	None	TPH-G, TPH-G, BTEX	Total Lead / 8015/8020/6410	48	composite into one sample
1	SP-1 B										
1	SP-1 C										
1	SP-1 D										
1	SP-2 A										composite into one sample
1	SP-2 B										
1	SP-2 C										
1	SP-2 D										
1	SP-3 A										composite into one sample
1	SP-3 B										
1	SP-3 C										
1	SP-3 D										

1 [signature] 7/2/94
Released by (Signature), Date

1 Weiss Associates
Affiliation

2 [signature] 7/20/94 2:15pm
Received by (Signature), Date

2 C&T Laboratories
Affiliation

3 _____
Released by (Signature), Date

3 _____
Affiliation

4 _____
Shipping Carrier, Method, Date

4 _____
Affiliation

5 _____
Released by (Signature), Date

5 _____
Affiliation

6 _____ X _____
Received by Lab Personnel, Date Seal intact?

6 _____
Affiliation, Telephone

1 Sample Type Codes: W = Water, S = Soil, Describe Other; Container Type Codes: V = VOA/Teflon Septa, P = Plastic, C or B - Clear/Brown Glass, Describe Other; Cap Codes: PT = Plastic, Teflon Lined 2 = Volume per container; 3 = Filtered (Y/N); 4 = Refrigerated (Y/N)
5 Turnaround [N = Normal, W = 1 Week, R = 24 Hour, HOLD (write out)]
ADDITIONAL COMMENTS, CONDITIONS, PROBLEMS:

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APPENDIX C

ANALYTICAL REPORTS FOR GROUND WATER SAMPLES FROM MONITORING WELLS AND CHAIN OF CUSTODY DOCUMENTS

Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878
2323 Fifth Street, Berkeley, CA 94710, Phone (510) 486-0900

ANALYTICAL REPORT

Prepared for:

Weiss Associates
5500 Shellmound Street
Emeryville, CA 94608

Date: 31-OCT-94
Lab Job Number: 118080
Project ID: 14-0307-06
Location: N/A

Reviewed by: Teresa K Morrison

Reviewed by: Cynthia E Schlag

Curtis & Tompkins, Ltd

LABORATORY NUMBER: 118080
CLIENT: WEISS ASSOCIATES
PROJECT ID: 14-0307-06

DATE SAMPLED: 10/20/94
DATE RECEIVED: 10/20/94
DATE EXTRACTED: 10/27/94
DATE ANALYZED: 10/27/94
DATE REPORTED: 10/31/94

Extractable Petroleum Hydrocarbons in Aqueous Solutions
California DOHS Method
LUFT Manual October 1989

LAB ID	CLIENT ID	KEROSENE RANGE (ug/L)	DIESEL RANGE (ug/L)	REPORTING LIMIT (ug/L)
118080-001	MW-5	9,000*	***	500
	METHOD BLANK	ND	ND	50

* Sample chromatogram does not resemble a kerosene pattern.
*** Diesel range not reported due to overlap of hydrocarbon ranges.
ND = Not detected at or above reporting limit. Reporting limit applies to all analytes.

QA/QC SUMMARY:

RPD, %	9
RECOVERY, %	89

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 118080
CLIENT: WEISS ASSOCIATES
PROJECT ID: 14-0307-06

DATE SAMPLED: 10/20/94
DATE RECEIVED: 10/20/94
DATE ANALYZED: 10/25/94
DATE REPORTED: 10/27/94

Total Volatile Hydrocarbons with BTXE in Aqueous Solutions
TVH by California DOHS Method/LUFT Manual October 1989
BTXE by EPA 5030/8020

LAB ID	SAMPLE ID	TVH AS GASOLINE (ug/L)	BENZENE (ug/L)	TOLUENE (ug/L)	ETHYL BENZENE (ug/L)	TOTAL XYLENES (ug/L)
118080-001	MW-5	770	230	ND(1)	19	77
	METHOD BLANK	ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)

ND = Not detected at or above reporting limit; Reporting limit indicated in parentheses.

QA/QC SUMMARY

RPD, %	3
RECOVERY, %	90

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 118080
CLIENT: WEISS ASSOCIATES
PROJECT ID: 14-0307-06

DATE SAMPLED: 10/20/94
DATE RECEIVED: 10/20/94
DATE EXTRACTED: 10/25/94
DATE ANALYZED: 10/26/94
DATE REPORTED: 10/26/94

Extractable Petroleum Hydrocarbons in Aqueous Solutions
California DOHS Method
LUFT Manual October 1989

LAB ID	CLIENT ID	KEROSENE RANGE (ug/L)	DIESEL RANGE (ug/L)	REPORTING LIMIT (ug/L)
118080-002	MW-6	ND	ND	50
	METHOD BLANK	ND	ND	50

ND = Not detected at or above reporting limit. Reporting limit applies to all analytes.

QA/QC SUMMARY:

RPD, %	6
RECOVERY, %	97

Curtis & Tompkins, Ltd

LABORATORY NUMBER: 118080
CLIENT: WEISS ASSOCIATES
PROJECT ID: 14-0307-06

DATE SAMPLED: 10/20/94
DATE RECEIVED: 10/20/94
DATE EXTRACTED: 10/24/94
DATE ANALYZED: 10/25/94
DATE REPORTED: 10/26/94

Extractable Petroleum Hydrocarbons in Aqueous Solutions
California DOHS Method
LUFT Manual October 1989

LAB ID	CLIENT ID	KEROSENE RANGE (ug/L)	DIESEL RANGE (ug/L)	REPORTING LIMIT (ug/L)
118080-003	MW-7	ND	ND	50
118080-004	MW-8	ND	ND	50
	METHOD BLANK	ND	ND	50

ND = Not detected at or above reporting limit. Reporting limit applies to all analytes.

QA/QC SUMMARY:

RPD, %	8
RECOVERY, %	89

Curtis & Tompkins, Ltd

LABORATORY NUMBER: 118080
CLIENT: WEISS ASSOCIATES
PROJECT ID: 14-0307-06

DATE SAMPLED: 10/20/94
DATE RECEIVED: 10/20/94
DATE ANALYZED: 10/24/94
DATE REPORTED: 10/27/94

Total Volatile Hydrocarbons with BTXE in Aqueous Solutions
TVH by California DOHS Method/LUFT Manual October 1989
BTXE by EPA 5030/8020

LAB ID	SAMPLE ID	TVH AS GASOLINE (ug/L)	BENZENE (ug/L)	TOLUENE (ug/L)	ETHYL BENZENE (ug/L)	TOTAL XYLENES (ug/L)
118080-002	MW-6	55	ND(0.5)	ND(0.5)	2.1	2.4
118080-003	MW-7	ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)
118080-004	MW-8	ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)
118080-005	TB-LB	ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)
	METHOD BLANK	ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)

ND = Not detected at or above reporting limit; Reporting limit indicated in parentheses.

QA/QC SUMMARY

RPD, %	10
RECOVERY, %	80

11 8080

WEISS ASSOCIATES
5500 Shellmound Street, Emeryville, CA 94608
Phone: 415-547-5420 Fax: 415-547-5043

Please send analytic results and a copy of the signed chain of custody form to:
JIM PONTON
Project ID: 14-0307-06

Lab Personnel:

☒ PLEASE INCLUDE QA/QC DATA IF BOX IS CHECKED.

1) Specify analytic method and detection limit in report.
2) Notify us if there are any anomalous peaks in GC or other scans.
3) ANY QUESTIONS/CLARIFICATIONS: CALL US.

CHAIN-OF-CUSTODY RECORD AND ANALYTIC INSTRUCTIONS

Sampled by: HT + RRM

Laboratory Name: CURTIS & TOMPKINS

No. of Containers	Sample ID	Container Type	Sample Date	Vol[2]	Fil[3]	Ref[4]	Preservative (specify)	Analyze for	Analytic Method	Turn[5]	COMMENTS
4	MW-5	W/V	10/20/94	40ML	N	Y	HCL	TVH/BTEX	EPA (MODIFIED) 8015 8020	7 DAY	
1	↓	B/G		1 LIT.	↓	↓	NONE	T.E.H.	EPA 8015 (MODIFIED)	↓	
4	MW-6	W/V		40ML	↓	↓	HCL	TVH/BTEX	EPA 8015/8020 (MOD.)	↓	
1	↓	B/G		1 LIT.	↓	↓	NONE	TEH.	EPA 8015 (MOD.)	↓	
4	MW-7	W/V		40ML	↓	↓	HCL	TVH/BTEX	EPA 8015/8020 (MOD.)	↓	
1	↓	B/G		1 LIT.	↓	↓	NONE	TEH.	EPA 8015 (MOD.)	↓	
4	MW-8	W/V		40ML	↓	↓	HCL	TVH/BTEX	EPA 8015/8020 MOD.	↓	
1	↓	B/G		1 LIT.	↓	↓	NONE	TEH	EPA 8015 MOD.	↓	
4	MW10	W/V		40ML	↓	↓	HCL	TVH/BTEX	EPA 8015/8020 MOD	24 HR.	
1	↓	B/G		1 LIT.	↓	↓	NONE	TEH	EPA 8015 MOD	↓	
4	MW-11	W/V		40ML	↓	↓	HCL	TVH/BTEX	EPA 8015/8020 MOD.	↓	
1	↓	B/G		1 LIT.	↓	↓	NONE	TEH	EPA 8015 MOD.	↓	
4	MW-12	W/V		40 ML	↓	↓	HCL	TVH/BTEX	EPA 8015/8020 MOD	↓	
1	↓	B/G		1 LIT.	↓	↓	NONE	TEH	EPA 8015 MOD	↓	
BLB	↓	W/V	10/20/94	40ML	↓	↓	HCL	TVH/BTEX	EPA 8015/8020 (MOD.)	7 DAY	

1 Released by (Signature), Date: Judy R. Mangus

1 Affiliation: WEISS ASSOCIATES

2 Received by (Signature), Date

2 Affiliation

3 Released by (Signature), Date

3 Affiliation

4 Shipping Carrier, Method, Date

4 Affiliation

5 Released by (Signature), Date

5 Affiliation

6 Received by Lab Personnel, Date: 10/20/94 Time: 1725 Seal intact? X

6 Affiliation, Telephone

1 Sample Type Codes: W = Water, S = Soil, Describe Other; Container Type Codes: V = VOA/Teflon Septa, P = Plastic, C or B - Clear/Brown Glass, Describe Other;
Cap Codes: PT = Plastic, Teflon Lined 2 = Volume per container; 3 = Filtered (Y/N); 4 = Refrigerated (Y/N)
5 Turnaround [N = Normal, W = 1 Week, R = 24 Hour, HOLD (write out)]

ADDITIONAL COMMENTS, CONDITIONS, PROBLEMS:

Page ___ of ___

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Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878
2323 Fifth Street, Berkeley, CA 94710, Phone (510) 486-0900

A N A L Y T I C A L R E P O R T

Prepared for:

Weiss Associates
5500 Shellmound Street
Emeryville, CA 94608

Date: 24-OCT-94
Lab Job Number: 118074
Project ID: 14-0307-06
Location: N/A

Reviewed by: _____

Reviewed by: _____

Curtis & Tompkins, Ltd

LABORATORY NUMBER: 118074
CLIENT: WEISS ASSOCIATES
PROJECT ID: 14-0307-06

DATE SAMPLED: 10/20/94
DATE RECEIVED: 10/20/94
DATE EXTRACTED: 10/21/94
DATE ANALYZED: 10/24/94
DATE REPORTED: 10/24/94

Extractable Petroleum Hydrocarbons in Aqueous Solutions
California DOHS Method
LUFT Manual October 1989

LAB ID	CLIENT ID	KEROSENE RANGE (ug/L)	DIESEL RANGE (ug/L)	REPORTING LIMIT (ug/L)
118074-001	MW-10	ND	ND	50
118074-002	MW-11	ND	ND	50
118074-003	MW-12	130*	ND	50
	METHOD BLANK	ND	ND	50

ND = Not detected at or above reporting limit. Reporting limit applies to all analytes.

* Sample chromatogram does not resemble the kerosene standard.

QA/QC SUMMARY:

RPD, %	13
RECOVERY, %	123

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 118074
CLIENT: WEISS ASSOCIATES
PROJECT ID: 14-0307-06

DATE SAMPLED: 10/20/94
DATE RECEIVED: 10/20/94
DATE ANALYZED: 10/21/94
DATE REPORTED: 10/21/94

Total Volatile Hydrocarbons with BTXE in Aqueous Solutions
TVH by California DOHS Method/LUFT Manual October 1989
BTXE by EPA 5030/8020

LAB ID	SAMPLE ID	TVH AS GASOLINE (ug/L)	BENZENE (ug/L)	TOLUENE (ug/L)	ETHYL BENZENE (ug/L)	TOTAL XYLENES (ug/L)
118074-001	MW-10	ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)
118074-002	MW-11	ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)
118074-003	MW-12	87	6.3	ND(0.5)	1.4	2.7
118074-METHOD BLANK		ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)

ND = Not detected at or above reporting limit; Reporting limit indicated in parentheses.

QA/QC SUMMARY

RPD, %	2
RECOVERY, %	82

110074

WEISS ASSOCIATES
5500 Shellmound Street, Emeryville, CA 94608
Phone: 415/547-5420 Fax: 415/547-5043

Please send analytic results and a copy of the signed chain of custody form to:
JIM BENTON
Project ID: 14-0307-06

Lab Personnel:

☒ PLEASE INCLUDE QA/QC DATA IF BOX IS CHECKED.

1) Specify analytic method and detection limit in report.
2) Notify us if there are any anomalous peaks in GC or other scans.
3) ANY QUESTIONS/CLARIFICATIONS: CALL US.

CHAIN-OF-CUSTODY RECORD AND ANALYTIC INSTRUCTIONS

Sampled by: HT + RRM

Laboratory Name: CURTIS & TOMPKINS

No. of Containers	Sample ID	Container Type	Sample Date	Vol[2]	Fil[3]	Ref[4]	Preservative (specify)	Analyze for	Analytic Method	Turn[5]	COMMENTS
4	MW-5	W/V	10/20/94	40ML	N	Y	HCL	TVH/BTEX	EPA (MODIFIED) 8015 8020	7 DAY	
1	↓	B/G	↓	1LIT.	↓	↓	NONE	T.E.H.	EPA 8015 (MODIFIED)	↓	
4	MW-6	W/V	↓	40ML	↓	↓	HCL	TVH/BTEX	EPA 8015/8020 (MOD.)	↓	
1	↓	B/G	↓	1LIT.	↓	↓	NONE	TEH.	EPA 8015 (MOD.)	↓	
4	MW-7	W/V	↓	40ML	↓	↓	HCL	TVH/BTEX	EPA 8015/8020 (MOD)	↓	
1	↓	B/G	↓	1LIT.	↓	↓	NONE	TEH.	EPA 8015 (MOD)	↓	
4	MW-8	W/V		40ML	↓		HCL	TVH/BTEX	EPA 8015/8020 MOD.	↓	
1	↓	B/G	↓	1LIT.	↓	↓	NONE	TEH	EPA 8015 MOD.	↓	
4	MW-10	W/V		40ML	↓		HCL	TVH/BTEX	EPA 8015/8020 MOD	24 HR.	
1	↓	B/G	↓	1LIT.	↓	↓	NONE	TEH	EPA 8015 MOD	↓	
4	MW-11	W/V		40ML	↓		HCL	TVH/BTEX	EPA 8015/8020 MOD.	↓	
1	↓	B/G	↓	1LIT.	↓	↓	NONE	TEH	EPA 8015 MOD.	↓	
4	MW-12	W/V		40ML	↓		HCL	TVH/BTEX	EPA 8015/8020 MOD	↓	
1	↓	B/G	↓	1LIT.	↓	↓	NONE	TEH	EPA 8015 MOD.	↓	
4		W/V	10/20/94	40ML	↓	↓	HCL	TVH/BTEX	EPA 8015/8020 (MOD.)	7 DAY	

1 Released by (Signature), Date
Affiliation

2 Received by (Signature), Date
Affiliation

3 Released by (Signature), Date
Affiliation

4 Shipping Carrier, Method, Date
Affiliation

5 Released by (Signature), Date
Affiliation

6 Received by Lab Personnel, Date 10/20/94 1725
Affiliation, Telephone

Seal Intact? X

1 Sample Type Codes: W = Water, S = Soil, Describe Other; Container Type Codes: V = VOA/Teflon Septa, P = Plastic, C or B - Clear/Brown Glass, Describe Other;
Cap Codes: PT = Plastic, Teflon Lined 2 = Volume per container; 3 = Filtered (Y/N); 4 = Refrigerated (Y/N)
5 Turnaround [N = Normal, W = 1 Week, R = 24 Hour, HOLD (write out)]

ADDITIONAL COMMENTS, CONDITIONS, PROBLEMS:

Page ___ of ___

110074

WEISS ASSOCIATES
500 Shellmound Street, Emeryville, CA 94608
Phone: 4155475420 Fax: 4155475043

Please send analytic results and a copy of the signed chain of custody form to:
JIM RONTON
Project ID: 14-0307-06

Lab Personnel: ☒ PLEASE INCLUDE QA/QC DATA IF BOX IS CHECKED.

1) Specify analytic method and detection limit in report.
2) Notify us if there are any anomalous peaks in GC or other scans.
3) ANY QUESTIONS/CLARIFICATIONS: CALL US.

CHAIN-OF-CUSTODY RECORD AND ANALYTIC INSTRUCTIONS

Sampled by: HT + RRM Laboratory Name: CURTIS & TOMPKINS

No. of Containers	Sample ID	Container Type	Sample Date	Vol[2]	Fil[3]	Ref[4]	Preservative (specify)	Analyze for	Analytic Method	Turn[5]	COMMENTS
4	MW-5	W/V	10/20/94	40ML	N	4	HCL	TVH/BTEX	EPA (MODIFIED) 8015 8020	7 DAY	
1	↓	B/G	↓	1LIT.	↓	↓	NONE	T.E.H.	EPA 8015 (MODIFIED)	↓	
4	MW-6	W/V	↓	40ML	↓	↓	HCL	TVH/BTEX	EPA 8015/8020 (MOD.)	↓	
1	↓	B/G	↓	1LIT.	↓	↓	NONE	T.E.H.	EPA 8015 (MOD.)	↓	
4	MW-7	W/V	↓	40ML	↓	↓	HCL	TVH/BTEX	EPA 8015/8020 (MOD.)	↓	
1	↓	B/G	↓	1LIT.	↓	↓	NONE	T.E.H.	EPA 8015 (MOD.)	↓	
4	MW-8	W/V	↓	40ML	↓	↓	HCL	TVH/BTEX	EPA 8015/8020 MOD.	↓	
1	↓	B/G	↓	1LIT.	↓	↓	NONE	T.E.H.	EPA 8015 MOD.	↓	
4	MW10	W/V	↓	40ML	↓	↓	HCL	TVH/BTEX	EPA 8015/8020 MOD.	24 HR.	
1	↓	B/G	↓	1LIT.	↓	↓	NONE	T.E.H.	EPA 8015 MOD.	↓	
4	MW-11	W/V	↓	40ML	↓	↓	HCL	TVH/BTEX	EPA 8015/8020 MOD.	↓	
1	↓	B/G	↓	1LIT.	↓	↓	NONE	T.E.H.	EPA 8015 MOD.	↓	
4	MW-12	W/V	↓	40ML	↓	↓	HCL	TVH/BTEX	EPA 8015/8020 MOD.	↓	
1	↓	B/G	↓	1LIT.	↓	↓	NONE	T.E.H.	EPA 8015 MOD.	↓	
4	↓	W/V	10/20/94	40ML	↓	↓	HCL	TVH/BTEX	EPA 8015/8020 (MOD.)	7 DAY	

1 Released by (Signature), Date: Rudy R. Marques
Affiliation: WEISS ASSOCIATES

3 Released by (Signature), Date:
Affiliation:

5 Released by (Signature), Date:
Affiliation:

2 Received by (Signature), Date:
Affiliation:

4 Shipping Carrier, Method, Date:
Affiliation:

6 Received by Lab Personnel, Date: 10/20/94 1725
Affiliation, Telephone:
Seal Intact? X

1. Sample Type Codes: W = Water, S = Soil, Describe Other; Container Type Codes: V = VOA/Teflon Septa, P = Plastic, C or B - Clear/Brown Glass, Describe Other;
Cap Codes: PT = Plastic, Teflon Lined 2 = Volume per container; 3 = Filtered (Y/N); 4 = Refrigerated (Y/N)
5. Turnaround (N = Normal, W = 1 Week, R = 24 Hour, HOLD (write out))
ADDITIONAL COMMENTS, CONDITIONS, PROBLEMS:

WEST LABORATORY

October 24, 1994
Sample Log 10559

Jim Ponton
Weiss Associates
5500 Shellmound Street
Emeryville, CA 94608-2411

Subject: Analytical Results for 4 Water Samples
Identified as: Project # 14-0307-06
Received: 10/21/94

Dear Mr. Ponton:

Analysis of the sample(s) referenced above has been completed. This report is written to confirm results communicated on October 24, 1994 and describes procedures used to analyze the samples.

Water samples were received in 40-mL glass bottles sealed with TFE septae, and in 1-L glass bottles sealed with TFE-lined caps. Each sample was received under documented chain of custody and stored at 4 degrees C until analysis was performed.

Sample(s) were analyzed using the following method(s):

"BTEX" (EPA Method 602/Purge-and-Trap)
"TPH as Gasoline" (Modified EPA Method 8015/Purge-and-Trap)
"TPH as Diesel,Motor Oil,Jet/Kerosene" (Mod. 8015/Extraction)

Please refer to the following table(s) for summarized analytical results and contact us at 916-753-9500 if you have questions regarding procedures or results. The chain-of-custody document is enclosed.

Approved by:

Joel Kiff
Senior Chemist

WEST LABORATORY

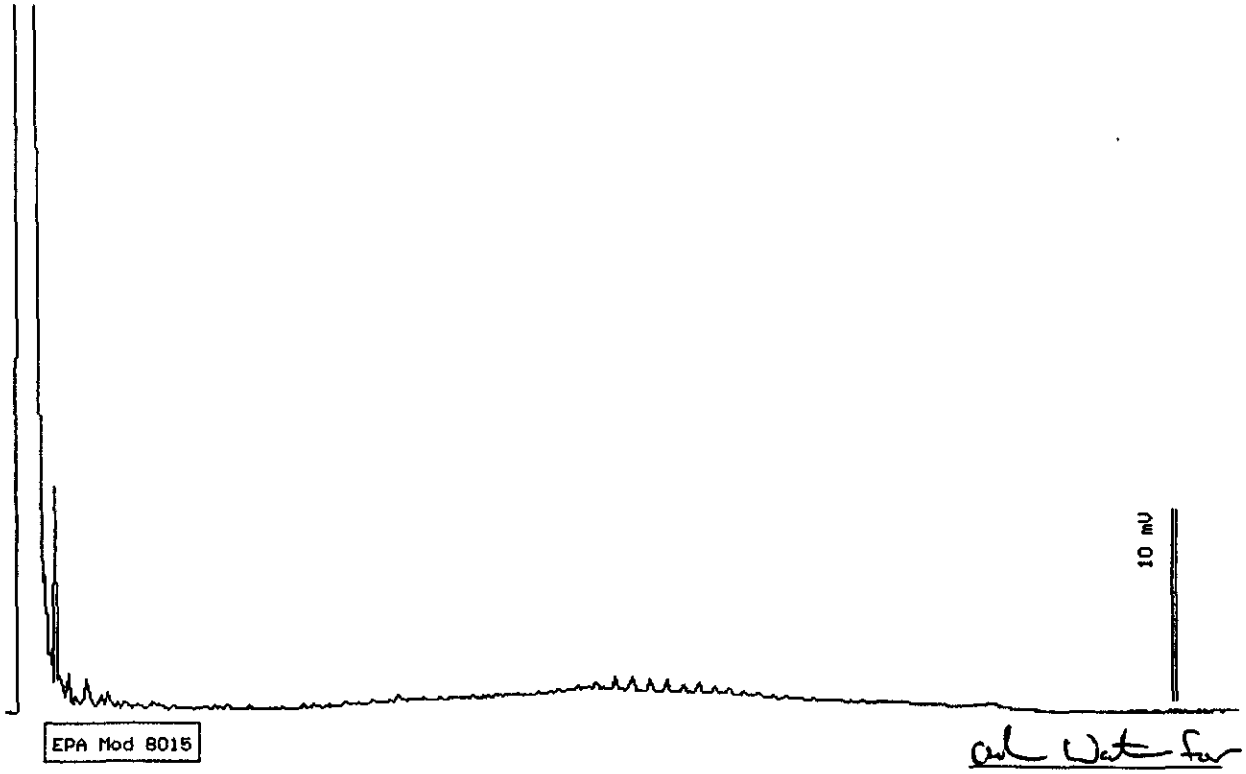
Sample Log 10559

10559-1

Sample: **MW-5LD**

From : Project # 14-0307-06
Sampled : 10/20/94
Extracted: 10/21/94 QC Batch : DW941018
Dilution : 1:1 Run Log : 7226H
Matrix : Water

Parameter	(MRL) ug/L	Measured Value ug/L
TPH as Diesel	(50)	<50
TPH as Motor Oil	(100)	<100



EPA Mod 8015

Date: 10-22-94 Time: 16:30:06
Column : 0.53mm ID X 15m DBI (J&W Scientific)

Stewart Podolsky
Senior Chemist

WEST LABORATORY

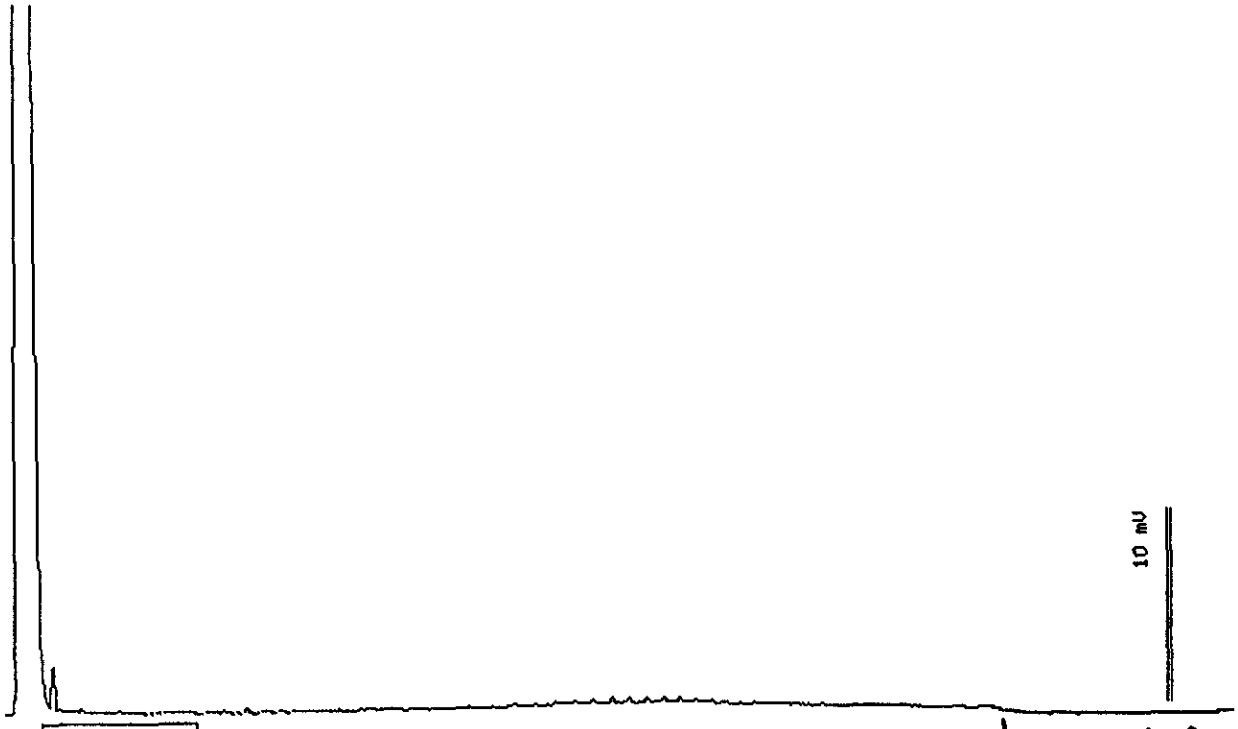
Sample Log 10559

10559-2

Sample: **MW-11LD**

From : Project # 14-0307-06
Sampled : 10/20/94
Extracted: 10/21/94 QC Batch : DW941018
Dilution : 1:1 Run Log : 7226H
Matrix : Water

Parameter	(MRL) ug/L	Measured Value ug/L
TPH as Diesel	(50)	<50
TPH as Motor Oil	(100)	<100



EPA Mod 8015

Date: 10-22-94 Time: 17:04:17
Column : 0.53mm ID X 15m DB1 (J&W Scientific)

Steuart Podolsky
Senior Chemist

WEST LABORATORY

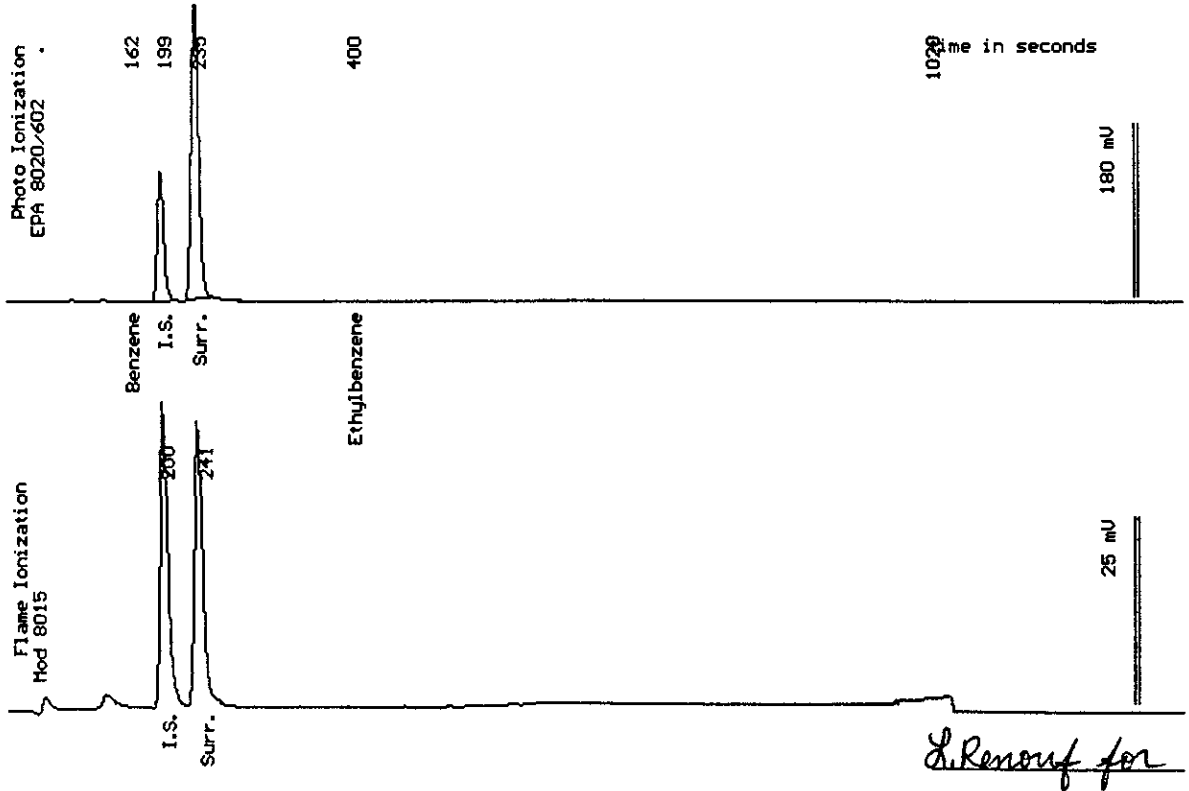
Sample Log 10559

10559-2

Sample: **MW-11LD**

From : Project # 14-0307-06
Sampled : 10/20/94
Dilution : 1:1 QC Batch : 2106Q
Matrix : Water

Parameter	(MRL) ug/L	Measured Value ug/L
Benzene	(.30)	<.30
Toluene	(.30)	<.30
Ethylbenzene	(.30)	<.30
Total Xylenes	(.50)	<.50
TPH as Gasoline	(50)	<50
Surrogate Recovery		97 %



Date Analyzed: 10-21-94
Column : 0.53mm ID X 30m DBWAX (J&W Scientific)

L Renouf for
Mitra Sarkhosh
Senior Chemist

WEST LABORATORY

Sample Log 10559

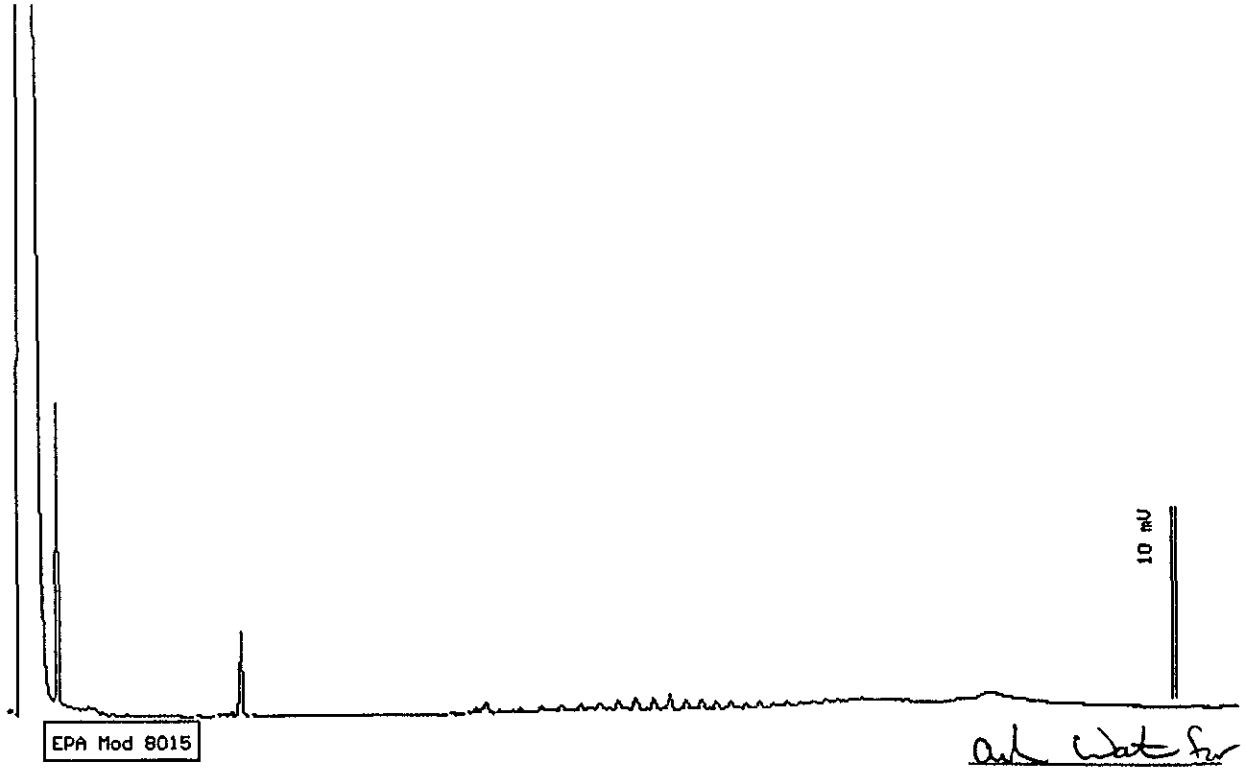
10559-3

Sample: **MW-12LD**

From : Project # 14-0307-06
Sampled : 10/20/94
Extracted: 10/21/94
Dilution : 1:1
Matrix : Water

QC Batch : DW941018
Run Log : 8196G

Parameter	(MRL) ug/L	Measured Value ug/L
TPH as Diesel	(50)	<50
TPH as Motor Oil	(100)	<100



Date: 10-22-94 Time: 15:55:52
Column : 0.53mm ID X 15m DB1 (J&W Scientific)

Stewart Podolsky
Senior Chemist

WEST LABORATORY

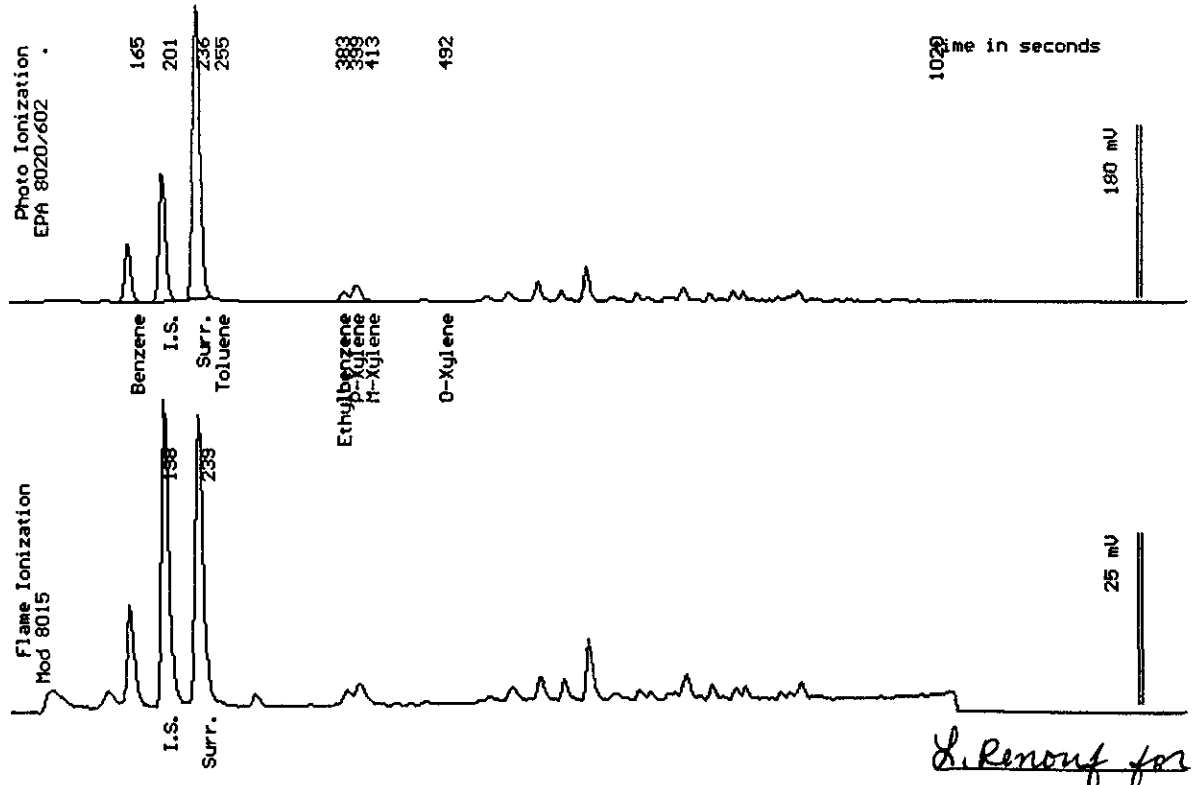
Sample Log 10559

10559-3

Sample: **MW-12LD**

From : Project # 14-0307-06
Sampled : 10/20/94
Dilution : 1:1 QC Batch : 2106Q
Matrix : Water

Parameter	(MRL) ug/L	Measured Value ug/L
Benzene	(.30)	7.3
Toluene	(.30)	<.30
Ethylbenzene	(.30)	1.6
Total Xylenes	(.50)	2.9
TPH as Gasoline	(50)	57
Surrogate Recovery		96 %



Date Analyzed: 10-21-94
Column : 0.53mm ID X 30m DBWAX (J&W Scientific)

L. Renouf for
Mitra Sarkhosh
Senior Chemist

WEST LABORATORY

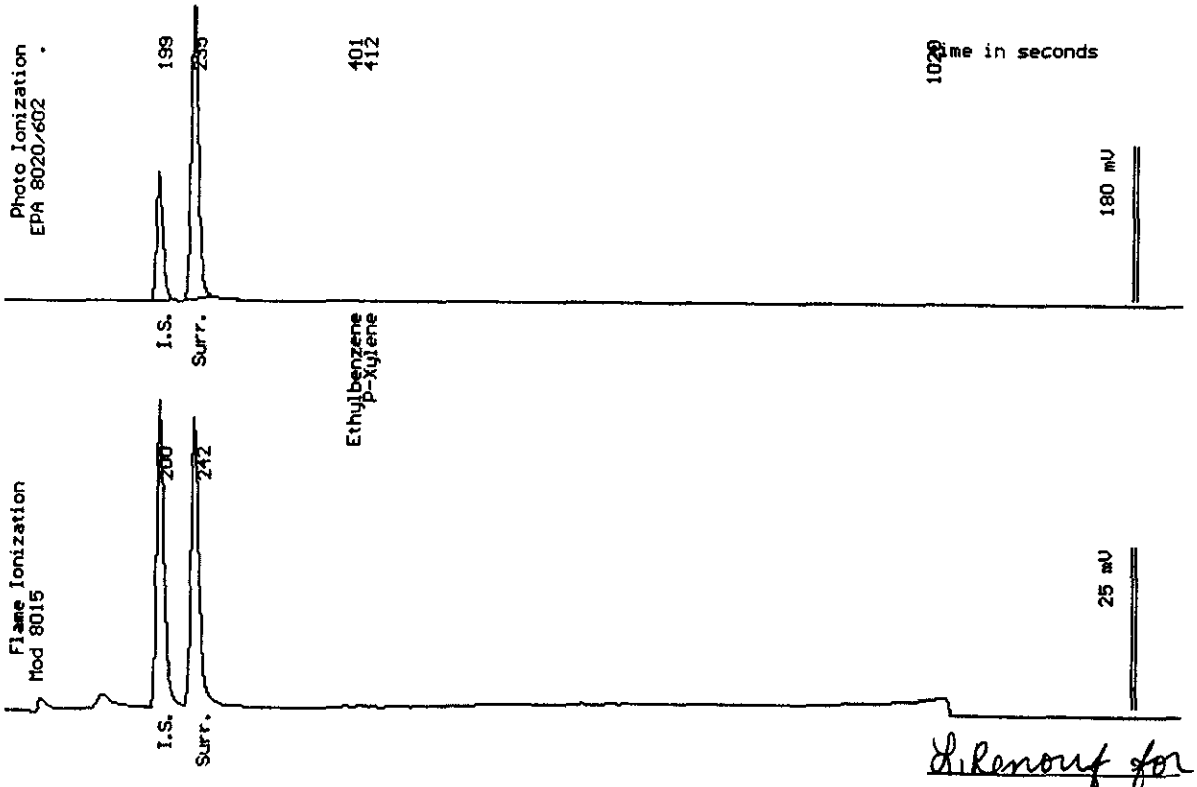
Sample Log 10559

10559-4

Sample: **TB/LB**

From : Project # 14-0307-06
Sampled : 10/20/94
Dilution : 1:1 QC Batch : 2106Q
Matrix : Water

Parameter	(MRL) ug/L	Measured Value ug/L
Benzene	(.30)	<.30
Toluene	(.30)	<.30
Ethylbenzene	(.30)	<.30
Total Xylenes	(.50)	<.50
TPH as Gasoline	(50)	<50
Surrogate Recovery		96 %



Date Analyzed: 10-21-94
Column : 0.53mm ID X 30m DBWAX (J&W Scientific)

Mitra Sarkhosh
Senior Chemist

WEISS ASSOCIATES
5500 Shellmound St., Emeryville, CA 94608
Phone: 415-547-5420 (510) FAX: 415-547-5043 (510)

Please send analytic results
and a copy of the signed chain of custody form to:

JIM PONTON

Project ID: 14-0307-06

CHAIN-OF-CUSTODY RECORD AND ANALYTIC INSTRUCTIONS

Lab Personnel: 1) Specify analytic method and detection limit in report.
2) Notify us if there are any anomalous peaks on GC or other scans.
3) ANY QUESTIONS/CLARIFICATIONS: CALL US.

Sampled by: HT/RRM

Laboratory Name: WEST

No. of Containers	Sample ID	Container Type[1]	Sample Date	Vol[2]	Fil[3]	Ref[4]	Preservative (specify)	Analyze for	Analytic Method	Turn[5]	COMMENTS
1	MW-5LD	B	10/20/94	1L	N	Y	None	TEH	EPA 8015 (modified)	7 DAY	
4	MW-11LD	W/V		40ml			HCl	TVH/BTEX	EPA 8015 (modified) 8020	24hr	
1	↓	B		1L			None	TEH	EPA 8015 (modified)		
4	MW-12LD	W/V		40ml			HCl	TVH/BTEX	EPA 8015 (modified) 8020		
1	↓	B	↓	1L	↓	↓	None	TEH	EPA 8015 (modified)	↓	
2	TB-LD	W/V	↓	40ml	↓	↓	HCl	TVH/BTEX	EPA 8015 (modified) 8020	↓	

1 Released by (Signature), Date: Ident Jon 10/21/94 0635

1 Affiliation: WEISS ASSOCIATES 10/21/94

2 Received by (Signature), Date: Jenny A. Jungo 08:38

2 Affiliation: W.E.S.T. Labs

3 Released by (Signature), Date: Jenny A. Jungo 10/21/94 09:50

3 Affiliation: W.E.S.T. Labs

4 Shipping Carrier, Method, Date:

4 Affiliation:

5 Released by (Signature), Date:

5 Affiliation:

6 Received by Lab Personnel, Date: 10/21/94 0955

6 Affiliation, Telephone: WEST 751-4651

x Seal intact?

WEST LAB
INITIAL
TEMP
DATE TIME
RECEIVED
RECEIVED
DATE 10/21/94 TIME 09:55
TEMP 4.0
INITIAL
WEST LAB

1 Sample Type Codes: W = Water, S = Soil, Describe Other; Container Type Codes: V = VOA/Teflon Septa, P = Plastic, C or B - Clear/Brown Glass, Describe Other;
Cap Codes: PT = Plastic, Teflon Lined 2 = Volume per container; 3 = Filtered (Y/N); 4 = Refrigerated (Y/N)
5 Turnaround IN = Normal, W = 1 Week, R = 24 Hour, HOLD (write out)]

ADDITIONAL COMMENTS, CONDITIONS, PROBLEMS: STORED OVERNIGHT IN SECURE AREA

F:\ALL\ADMIN\FORMS\COC.WP2

Superior Precision Analytical, Inc.
A member of ESSCON Environmental Support Service Consortium

Weiss Associates
Attn: JIM PONTON

Project 14-0307-06
Reported 21-October-1994

ANALYSIS FOR GASOLINE, BENZENE, TOLUENE, ETHYLBENZENE, AND XYLENES
by EPA SW-846 Methods 5030/8015M/8020.

Chronology — Laboratory Number 58862

Identification	Sampled	Received	Extracted	Analyzed	Run #	Lab #
TB/LB	10/20/94	10/21/94	10/21/94	10/21/94		4

Certified Laboratories

825 Arnold Dr., Suite 114
Martinez, California 94553

1555 Burke St., Unit I
San Francisco, California 94124

309 S. Cloverdale St., Suite B-24
Seattle, Washington 98108

Weiss Associates
Attn: JIM PONTON

Project 14-0307-06
Reported 21-October-1994

ANALYSIS FOR GASOLINE, BENZENE, TOLUENE, ETHYLBENZENE, AND XYLENES

Laboratory Number	Sample Identification	Matrix
58862- 4	TB/LB	Water

RESULTS OF ANALYSIS

Laboratory Number: 58862- 4

Gasoline_Range:	ND<50
Benzene:	ND<0.5
Toluene:	ND<0.5
Ethyl Benzene:	ND<0.5
Total Xylenes:	ND<0.5
Concentration:	ug/L

-- Surrogate % Recoveries --
Trifluorotoluene (SS): 115

Certified Laboratories

825 Arnold Dr., Suite 114
Martinez, California 94553

1555 Burke St., Unit I
San Francisco, California 94124
(415) 647-2081 / fax (415) 821-7123

309 S. Cloverdale St., Suite B-24
Seattle, Washington 98108
(206) 763-2992 / fax (206) 763-8429

ANALYSIS FOR GASOLINE, BENZENE, TOLUENE, ETHYLBENZENE, AND XYLENES
Quality Assurance and Control Data - Water

Laboratory Number 58862

Compound	Method Blank (ug/L)	RL (ug/L)	Spike Recovery (%)	Limits (%)	RPD (%)
Gasoline_Range:	ND<50	50	97/101	56-117	4%
Benzene:	ND<0.5	0.5	96/107	59-149	11%
Toluene:	ND<0.5	0.5	96/109	59-149	13%
Ethyl Benzene:	ND<0.5	0.5	87/95	59-149	9%
Total Xylenes:	ND<0.5	0.5	91/100	59-149	9%

Definitions:
ND = Not Detected
RPD = Relative Percent Difference
RL = Reporting Limit
ug/L = Parts per billion (ppb)
QC File No. 58862

Cecilia G Joaquin 10/24/94
Senior Chemist
Account Manager

Certified Laboratories

825 Arnold Dr., Suite 114
Martinez, California 94553
(510) 229-1512 / fax (510) 229-1526

1555 Burke St., Unit I
San Francisco, California 94124
(415) 647-2081 / fax (415) 821-7123

309 S. Cloverdale St., Suite B-24
Seattle, Washington 98108
(206) 763-2992 / fax (206) 763-8429

Superior Precision Analytical, Inc.
A member of ESSCON Environmental Support Service Consortium

Weiss Associates
Attn: JIM PONTON

Project 14-0307-06
Reported 22-October-1994

TOTAL PETROLEUM HYDROCARBONS AS DIESEL
BY EPA SW-846 METHOD 8015M

Chronology

Laboratory Number 58862

Identification	Sampled	Received	Extracted	Analyzed	Run #	Lab #
MW-6LD	10/20/94	10/21/94	10/21/94	10/21/94		1
MW-8LD	10/20/94	10/21/94	10/21/94	10/21/94		2
MW-10LD	10/20/94	10/21/94	10/21/94	10/21/94		3

Certified Laboratories

825 Arnold Dr., Suite 114
Martinez, California 94553

1555 Burke St., Unit I
San Francisco, California 94124

309 S. Cloverdale St., Suite B-24
Seattle, Washington 98108

Weiss Associates
Attn: JIM PONTON

Project 14-0307-06
Reported 22-October-1994

TOTAL PETROLEUM HYDROCARBONS AS DIESEL

Laboratory Number	Sample Identification	Matrix
58862- 1	MW-6LD	Water
58862- 2	MW-8LD	Water
58862- 3	MW-10LD	Water

RESULTS OF ANALYSIS

Laboratory Number:	58862- 1	58862- 2	58862- 3
Diesel Range:	270	ND<50	ND<50
Concentration:	ug/L	ug/L	ug/L

Certified Laboratories

825 Arnold Dr., Suite 114
Martinez, California 94553
(510) 229-1512 / fax (510) 229-1526

1555 Burke St., Unit I
San Francisco, California 94124
(415) 647-7081 / fax (415) 821-7123

309 S. Cloverdale St., Suite B-24
Seattle, Washington 98108
(206) 763-2992 / fax (206) 763-8429

Superior Precision Analytical, Inc.
A member of ESSCON Environmental Support Service Consortium

TOTAL PETROLEUM HYDROCARBONS AS DIESEL
Quality Assurance and Control Data - Water

Laboratory Number 58862

Compound	Method Blank (ug/L)	RL (ug/L)	Spike Recovery (%)	Limits (%)	RPD (%)
Diesel Range:	ND<50	50	87/92	50-150	6%

Definitions:
ND = Not Detected
RPD = Relative Percent Difference
RL = Reporting Limit
ug/L = Parts per billion (ppb)
QC File No. 58862

Cecilia G. Joaquin 10/24/94
Senior Chemist
Account Manager

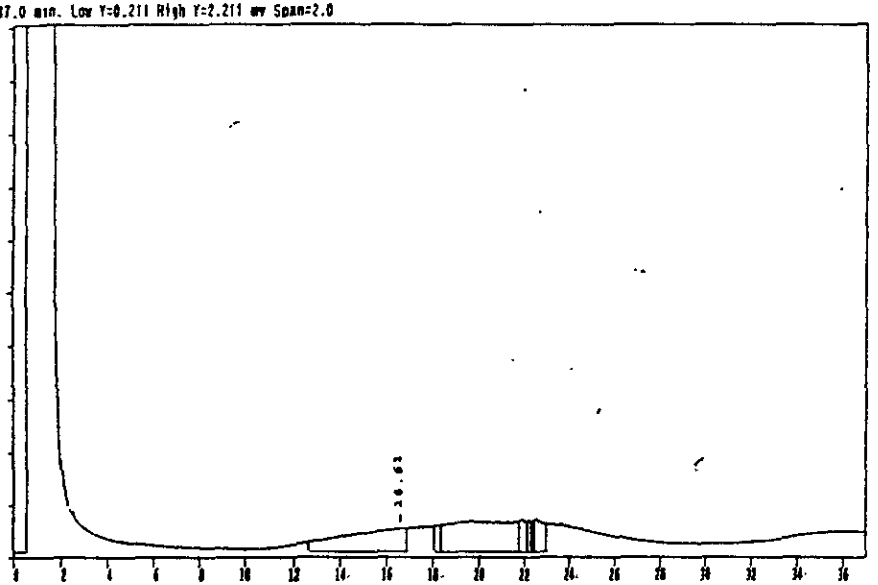
Certified Laboratories

825 Arnold Dr., Suite 114
Martinez, California 94553

1555 Burke St., Unit I
San Francisco, California 94124

309 S. Cloverdale St., Suite B-24
Seattle, Washington 98108

File:C:\CP\TPH\102194T.11R Date printed:10-21-1994 Time: 20:23:40
Sample Name=58862-01
0.0 to 37.0 min. Low Y=0.211 High Y=2.211 my Span=2.0



********** SUPERIOR ANALYTICAL SAN FRANCISCO LAB **********
DATE RUN: OCT 21, 1994 19:41:58 OPERATOR: BERT

SAMPLE NAME: 58862-01 MW-6LD

RAW DATA FILE NAME..C:\CP\TPH\102194T.11R INSTRUMENT: 2728A14299
METHOD FILE: C:\CP\TPH\DS24.MET VERSION: 16
CALIBRATION FILE: C:\CP\TPH\DIESSUR.CAL VERSION: 51
DILUTION:40 HP FILE NAME Q934FD86B#878
GC-7 HP 5890 II DB-1 0.32 mm ID 30-M SPLIT 1:8 5 uL INJ.
TPH ANALYSIS BY 8015 MODIFIED DIRECT INJECTION WITH C24 SURROGATE
*
*
*

Peak #	Ret Time (min)	Peak Area	Peak Name	CONCENTRATION MG/L(KG)
Diesel	Hydrocarbons Area Sum(C10-C24)7-28 MIN = 26329.16			

TOTAL=10.68964<2000??

* diesel pattern mump

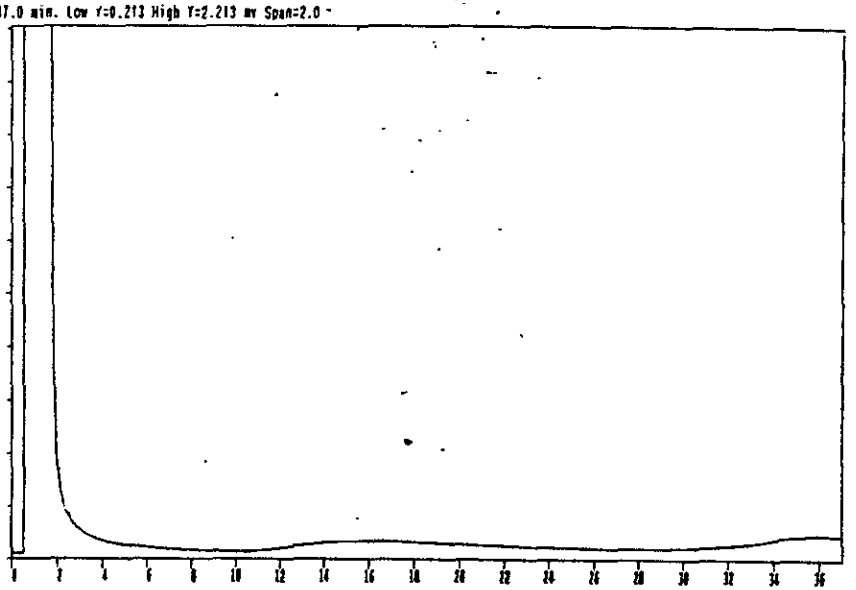
CONC =.267241
Units=mg/L or mg/kg

2700 ppb

Surrogate Recovery:0 %

REVIEWED BY:_____ DATE:_____

File:C:\CP\TPH\102194T.12R Date printed:10-21-1994 Time: 21:10:45
Sample Name=58862-02
0.0 to 37.0 min. Low Y=0.213 High Y=2.213 my Span=2.0



********** SUPERIOR ANALYTICAL SAN FRANCISCO LAB **********
DATE RUN: OCT 21, 1994 20:29:28 OPERATOR: BERT

SAMPLE NAME: 58862-02 MW-8LD

RAW DATA FILE NAME..C:\CP\TPH\102194T.12R INSTRUMENT: 2728A14299
METHOD FILE: C:\CP\TPH\DS24.MET VERSION: 16
CALIBRATION FILE: C:\CP\TPH\DIESSUR.CAL VERSION: 51
DILUTION:40 HP FILE NAME Q93508A8B#879
GC-7 HP 5890 II DB-1 0.32 mm ID 30-M SPLIT 1:8 5 uL INJ.
TPH ANALYSIS BY 8015 MODIFIED DIRECT INJECTION WITH C24 SURROGATE
*
*
*

Peak #	Ret Time (min)	Peak Area	Peak Name	CONCENTRATION MG/L(KG)
Diesel	Hydrocarbons Area Sum(C10-C24)7-28 MIN = 0			

TOTAL=0 <2000??

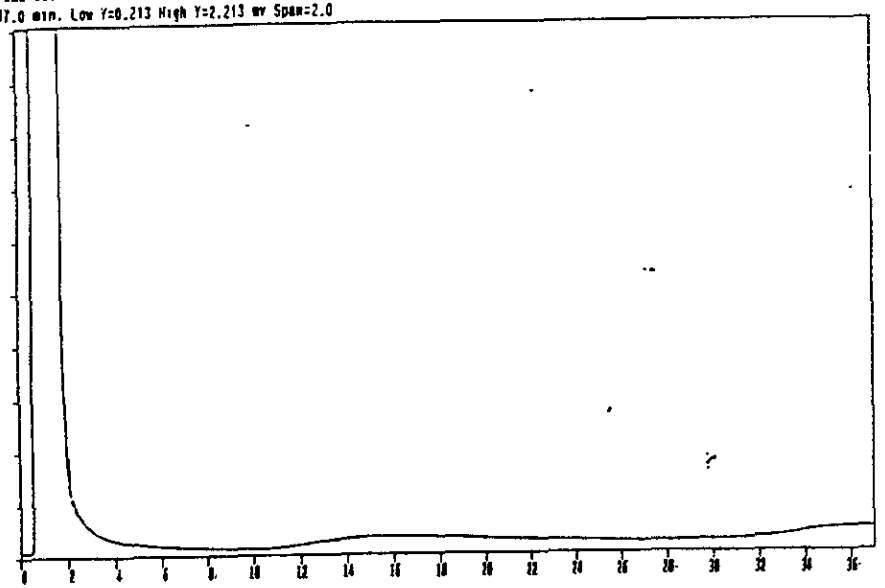
CONC =0
Units=mg/L or mg/kg

NDLSOppb

Surrogate Recovery:0 %

REVIEWED BY:_____ DATE:_____

=C:\CP\TPH\102194T.13R Date printed:10-21-1994 Time= 21:58:27
ile Name=58862-03
co 37.0 min. Low Y=0.213 High Y=2.213 mv Span=2.0



********** SUPERIOR ANALYTICAL SAN FRANCISCO LAB **********
DATE RUN: OCT 21, 1994 21:16:47 OPERATOR: BERT

SAMPLE NAME: 58862-03 MW-10LD

RAW DATA FILE NAME..C:\CP\TPH\102194T.13R INSTRUMENT: 2728A14299
METHOD FILE: C:\CP\TPH\DS24.MET VERSION: 16
CALIBRATION FILE: C:\CP\TPH\DIESSUR.CAL VERSION: 51
DILUTION:40 HP FILE NAME Q93513BFb#880
GC-7 HP 5890 II DB-1 0.32 mm ID 30-M SPLIT 1:8 5 uL INJ.
TPH ANALYSIS BY 8015 MODIFIED DIRECT INJECTION WITH C24 SURROGATE
*
*
*

Peak #	Ret Time (min)	Peak Area	Peak Name	CONCENTRATION MG/L(KG)
Diesel	Hydrocarbons Area Sum(C10-C24)7-28 MIN = 0			

TOTAL=0 <2000??

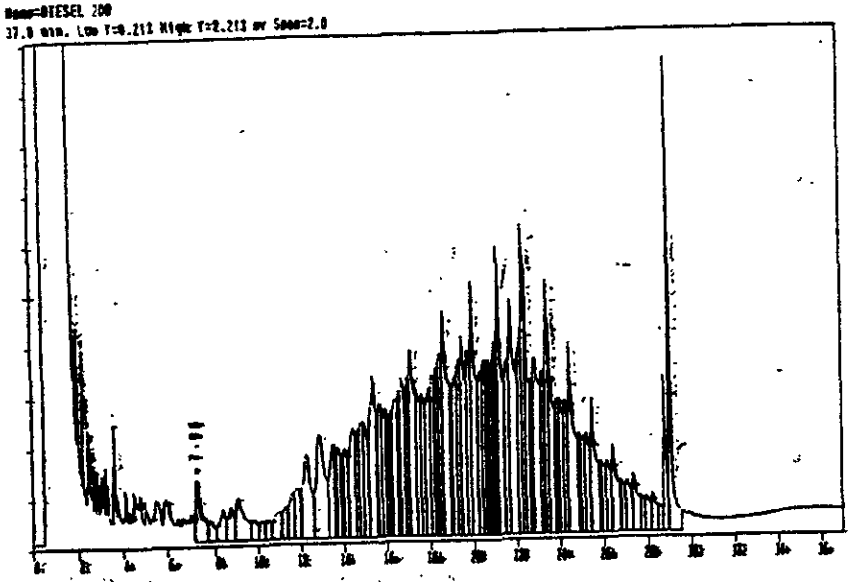
NDLSOP

CONC =0
Units=mg/L or mg/kg

Surrogate Recovery:0 %

REVIEWED BY:_____ DATE:_____

File=C:\CP\TPH\102194T.07R Data acquired=10-21-1994 Time= 17:13:24
Sample Name=DIESEL 200
8.0 to 37.0 min. Low Y=0.212 High Y=2.213 mv Scan=2.0



SUPERIOR ANALYTICAL SAN FRANCISCO LAB

DATE RUN: OCT 21, 1994 16:32:02 OPERATOR: BERT

Standard

SAMPLE NAME: DIESEL 200

RAW DATA FILE NAME..C:\CP\TPH\102194T.07R INSTRUMENT: 2728A14299
METHOD FILE: C:\CP\TPH\DS2A.MET VERSION: 4
CALIBRATION FILE: C:\CP\TPH\DIESSUR.CAL VERSION: 51
DILUTION:1 HP FILE NAME Q934D102B874
GC-7 HP 5890 II DB-1 0.32 mm ID 30-M SPLIT 1:8 5 uL INJ.
TPH ANALYSIS BY 8015 MODIFIED DIRECT INJECTION WITH C24 SURROGATE

Peak #	Ret Time (min)	Peak Area	Peak Name	CONCENTRATION MG/L(KG)
78	29.030	13086	TETRACOSANE	111.3873

Diesel Range Organics Area Sum (C10-C28) 7-32.8 MIN.= 465549.4

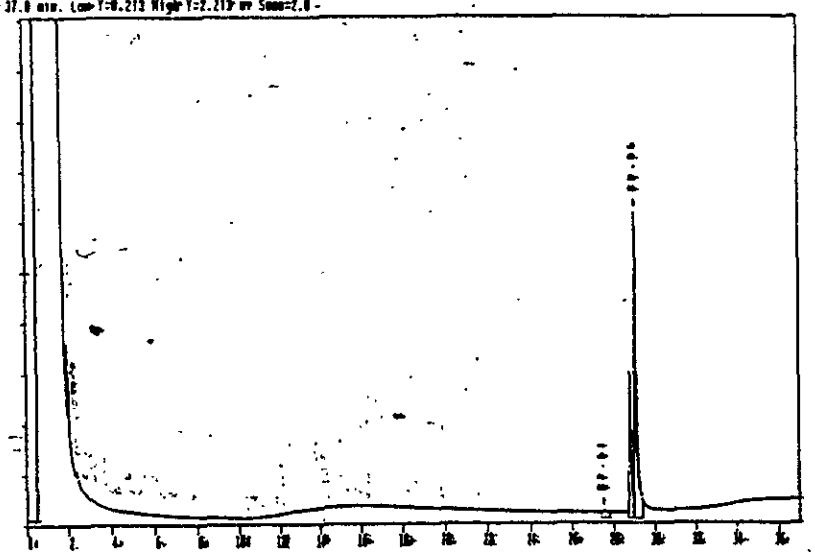
TOTAL=184.0419<2000??

CONC =184.0419
Units=mg/L or mg/kg

Surrogate Recovery:78.49248 %

REVIEWED BY:_____ DATE:_____

File=C:\CP\TPH\102194T.10R Data acquired=10-24-1994 Time= 10:44:43
Sample Name=METHOD BLK
8.0 to 37.0 min. Low Y=0.213 High Y=2.213 mv Scan=2.0



SUPERIOR ANALYTICAL SAN FRANCISCO LAB

DATE RUN: OCT 21, 1994 19:54:01 OPERATOR: BERT

Blank

SAMPLE NAME: METHOD BLK

RAW DATA FILE NAME..C:\CP\TPH\102194T.10R INSTRUMENT: 2728A14299
METHOD FILE: C:\CP\TPH\DS2A.MET VERSION: 16
CALIBRATION FILE: C:\CP\TPH\DIESSUR.CAL VERSION: 51
DILUTION:40 HP FILE NAME Q934F249B877
GC-7 HP 5890 II DB-1 0.32 mm ID 30-M SPLIT 1:8 5 uL INJ.
TPH ANALYSIS BY 8015 MODIFIED DIRECT INJECTION WITH C24 SURROGATE

Peak #	Ret Time (min)	Peak Area	Peak Name	CONCENTRATION MG/L(KG)
3	29.054	9604	TETRACOSANE	3271.5386

Diesel Hydrocarbons Area Sum(C10-C24)7-28 MIN = 4886.29

TOTAL=1.902634<2000??

CONC =8.756584E-02
Units=mg/L or mg/kg

Surrogate Recovery:81.80937 %

REVIEWED BY:_____ DATE:_____

WEISS ASSOCIATES
5500 Shellmound Street, Emeryville, CA 94608
Phone: 415-547-5420 Fax: 415-547-5043

Please send analytic results and a copy of the signed chain of custody form to:

Jim Ponton

Project ID: 14-0307-06

588862

Lab Personnel:

☐ PLEASE INCLUDE QA/QC DATA IF BOX IS CHECKED.

1) Specify analytic method and detection limit in report.
2) Notify us if there are any anomalous peaks in GC or other scans.
3) ANY QUESTIONS/CLARIFICATIONS: CALL US.

CHAIN-OF-CUSTODY RECORD AND ANALYTIC INSTRUCTIONS

Sampled by: HT/RRM

Laboratory Name: SPA

No. of Containers	Sample ID	Container Type[1]	Sample Date	Vol[2]	Fil[3]	Ref[4]	Preservative (specify)	Analyze for	Analytic Method	Turn[5]	COMMENTS
1	MW-6LD	B	10/20/94	1L	N	Y	None	TEH	EPA 8015 (modified)	7DAY	TPH as Diesel ? per Jim Ponton
1	MW-8LD	B	10/20/94	1L	N	Y	None	TEH	EPA 8015 (modified)	7DAY	TPH as Diesel ? per Jim Ponton
1	MW-10LD	B	10/20/94	1L	N	Y	None	TEH	EPA 8015 (modified)	7DAY	TPH as Diesel ? per Jim Ponton
2	TB/LB	V/V	10/20/94	40ml	N	Y	HCl	TVH/BTEX	EPA 8015 (modified)/8020	24hr	TPH gas / BTXE

Please initial:
Samples Stored in ice
Appropriate containers
Samples preserved
VOA's without headspace
Comments:

1 Herb Judd 10/21/94 10:15
Released by (Signature), Date

1 WEISS ASSOCIATES
Affiliation

2 M. Wright 10-21-94
Received by (Signature), Date

2 AERO Dez. 1015
Affiliation

3 M. Wright 10-21-94
Released by (Signature), Date

3 AERO 1645
Affiliation

4
Shipping Carrier, Method, Date

4
Affiliation

5
Released by (Signature), Date

5
Affiliation

6 Cecilia G Joaquin 10/21/94 1050
Received by Lab Personnel, Date

Seal intact? x

6 Superior Lab 4156472081
Affiliation, Telephone

1 Sample Type Codes: W = Water, S = Soil, Describe Other; Container Type Codes: V = VOA/Teflon Septa, P = Plastic, C or B - Clear/Brown Glass, Describe Other; Cap Codes: PT = Plastic, Teflon Lined 2 = Volume per container; 3 = Filtered (Y/N); 4 = Refrigerated (Y/N)
5 Turnaround [N = Normal, W = 1 Week, R = 24 Hour, HOLD (write out)]

ADDITIONAL COMMENTS, CONDITIONS, PROBLEMS: STORED OVERNIGHT IN SECURE AREA

▼ Pls provide chromatograms
▼ Note on report if pattern is not typical of Diesel

D:\ALL\ADMIN\FORMS\COC.WP2

Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878
2323 Fifth Street, Berkeley, CA 94710, Phone (510) 486-0900

ANALYTICAL REPORT

Prepared for:

Weiss Associates
5500 Shellmound Street
Emeryville, CA 94608

Date: 21-OCT-94
Lab Job Number: 117917
Project ID: 14-0307-06
Location: N/A

Reviewed by: Cynthia E. Lehrley

Reviewed by: Kathy O'B

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 117917
CLIENT: WEISS ASSOCIATES
PROJECT ID: 14-0307-06

DATE SAMPLED: 10/10/94
DATE RECEIVED: 10/11/94
DATE ANALYZED: 10/16/94
DATE REPORTED: 10/21/94

Total Volatile Hydrocarbons with BTXE in Soils & Wastes
TVH by California DOHS Method/LUFT Manual October 1989
BTXE by EPA 5030/8020

LAB ID	SAMPLE ID	TVH AS GASOLINE (mg/Kg)	BENZENE (ug/Kg)	TOLUENE (ug/Kg)	ETHYL BENZENE (ug/Kg)	TOTAL XYLENES (ug/Kg)
117917-002	B40-10	390	1,700	2,800	13,000	49,000
117917-METHOD BLANK		ND(5)	ND(30)	ND(30)	ND(30)	ND(30)

ND = Not detected at or above reporting limit; Reporting limit indicated in parentheses.

QA/QC SUMMARY

RPD, %	3
RECOVERY, %	96

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 117917
CLIENT: WEISS ASSOCIATES
PROJECT ID: 14-0307-06

DATE SAMPLED: 10/10/94
DATE RECEIVED: 10/11/94
DATE EXTRACTED: 10/11/94
DATE ANALYZED: 10/14,17/94
DATE REPORTED: 10/18/94

Extractable Petroleum Hydrocarbons in Soils & Wastes
California DOHS Method
LUFT Manual October 1989

LAB ID	SAMPLE ID	KEROSENE RANGE (mg/Kg)	DIESEL RANGE (mg/Kg)	REPORTING LIMIT (mg/Kg)
117917-1	B40-5	35*	***	1
117917-2	B40-10	100*	***	1
117917-3	B41-5	ND	ND	1
117917-4	B41-10	4*	ND	1
117917-5	B42-5	ND	ND	1
117917-7	B43-5	ND	ND	1
117917-METHOD BLANK		ND	ND	1

ND = Not detected at or above reporting limit; reporting limit applies to all analytes.

* Sample chromatogram does not match hydrocarbon standard.
*** Diesel range not reported due to overlap of hydrocarbon ranges.

QA/QC SUMMARY

RPD,%	2
RECOVERY, %	103

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 117917
CLIENT: WEISS ASSOCIATES
PROJECT ID: 14-0307-06

DATE SAMPLED: 10/10/94
DATE RECEIVED: 10/11/94
DATE ANALYZED: 10/12/94
DATE REPORTED: 10/21/94

Total Volatile Hydrocarbons with BTXE in Soils & Wastes
TVH by California DOHS Method/LUFT Manual October 1989
BTXE by EPA 5030/8020

LAB ID	SAMPLE ID	TVH AS GASOLINE (mg/Kg)	BENZENE (ug/Kg)	TOLUENE (ug/Kg)	ETHYL BENZENE (ug/Kg)	TOTAL XYLENES (ug/Kg)
117917-001	B40-5	64	98*	280	740	1,200
117917-004	B41-10	5	11	12	13	ND(5)
117917-005	B42-5	ND(1)	ND(5)	ND(5)	ND(5)	ND(5)
117917-007	B43-5	ND(1)	ND(5)	ND(5)	ND(5)	ND(5)
117917-021	B-44-5.0	ND(1)	ND(5)	ND(5)	ND(5)	ND(5)
117917-022	B-44-9.0	ND(1)	ND(5)	ND(5)	ND(5)	ND(5)
117917-025	B-48-5.0	3	7	ND(5)	ND(5)	160
117917-METHOD BLANK		ND(1)	ND(5)	ND(5)	ND(5)	ND(5)

* Presence of this compound confirmed by second column; however, the confirmation concentration differed from the reported result by more than a factor of two.

ND = Not detected at or above reporting limit; Reporting limit indicated in parentheses.

QA/QC SUMMARY

RPD, %	5
RECOVERY, %	113

Curtis & Tompkins, Ltd

LABORATORY NUMBER: 117917
CLIENT: WEISS ASSOCIATES
PROJECT ID: 14-0307-06

DATE SAMPLED: 10/10/94
DATE RECEIVED: 10/11/94
DATE ANALYZED: 10/12/94
DATE REPORTED: 10/21/94

Total Volatile Hydrocarbons with BTXE in Soils & Wastes
TVH by California DOHS Method/LUFT Manual October 1989
BTXE by EPA 5030/8020

LAB ID	SAMPLE ID	TVH AS GASOLINE (mg/Kg)	BENZENE (ug/Kg)	TOLUENE (ug/Kg)	ETHYL BENZENE (ug/Kg)	TOTAL XYLENES (ug/Kg)
117917-026	B-48-10.0	470	1,500	770	8,000	42,000
117917-METHOD BLANK		ND(20)	ND(100)	ND(100)	ND(100)	ND(100)

ND = Not detected at or above reporting limit; Reporting limit indicated in parentheses.

QA/QC SUMMARY

RPD, %	<1
RECOVERY, %	91

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 117917
CLIENT: WEISS ASSOCIATES
PROJECT ID: 14-0307-06

DATE SAMPLED: 10/10/94
DATE RECEIVED: 10/11/94
DATE EXTRACTED: 10/11/94
DATE ANALYZED: 10/11/94
DATE REPORTED: 10/12/94

Extractable Petroleum Hydrocarbons in Soils & Wastes
California DOHS Method
LUFT Manual October 1989

LAB ID	SAMPLE ID	KEROSENE RANGE (mg/Kg)	DIESEL RANGE (mg/Kg)	REPORTING LIMIT* (mg/Kg)
117917-21	B-44-5.0	ND	ND	1
117917-22	B-44-9.0	ND	ND	1
117917-25	B-48-5.0	1.8**	ND	1
117917-26	B-48-10.0	52**	***	1
117917-28	B-49-5.0	ND	ND	1
117917-29	B-49-10.0	ND	ND	1
117917-METHOD BLANK		ND	ND	1

ND = Not detected at or above reporting limit.

* Reporting limit applies to all analytes.
** Sample chromatogram does not match the kerosene standard pattern.
Gasoline components contributing to kerosene range quantitation.
*** Diesel range not reported due to overlap of hydrocarbon ranges.

QA/QC SUMMARY

RPD,%	2
RECOVERY, %	103

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 117917
CLIENT: WEISS ASSOCIATES
PROJECT ID: 14-0307-06

DATE SAMPLED: 10/10/94
DATE RECEIVED: 10/11/94
DATE ANALYZED: 10/13/94
DATE REPORTED: 10/21/94

Total Volatile Hydrocarbons with BTXE in Soils & Wastes
TVH by California DOHS Method/LUFT Manual October 1989
BTXE by EPA 5030/8020

LAB ID	SAMPLE ID	TVH AS GASOLINE (mg/Kg)	BENZENE (ug/Kg)	TOLUENE (ug/Kg)	ETHYL BENZENE (ug/Kg)	TOTAL XYLENES (ug/Kg)
117917-003	B41-5	ND(1)	ND(5)	ND(5)	ND(5)	ND(5)
117917-028	B-49-5	ND(1)	ND(5)	ND(5)	ND(5)	ND(5)
117917-029	B-49-10	ND(1)	ND(5)	ND(5)	ND(5)	ND(5)
117917-METHOD BLANK		ND(1)	ND(5)	ND(5)	ND(5)	ND(5)

ND = Not detected at or above reporting limit; Reporting limit indicated in parentheses.

QA/QC SUMMARY

RPD, %	5
RECOVERY, %	102

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 117917
CLIENT: WEISS ASSOCIATES
PROJECT ID: 14-0307-06

DATE SAMPLED: 10/10/94
DATE RECEIVED: 10/11/94
DATE ANALYZED: 10/11/94
DATE REPORTED: 10/18/94

Total Volatile Hydrocarbons with BTXE in Aqueous Solutions
TVH by California DOHS Method/LUFT Manual October 1989
BTXE by EPA 5030/8020

LAB ID	SAMPLE ID	TVH AS GASOLINE (ug/L)	BENZENE (ug/L)	TOLUENE (ug/L)	ETHYL BENZENE (ug/L)	TOTAL XYLENES (ug/L)
117917-11	B46-WATER	ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)
117917-12	TB-2	ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)
117917-14	B45-WATER	ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)
117917-32	B44-WATER	ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)
117917-34	TRIP BLANK 1	ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)
117917-35	B49-WATER	ND(50)	0.7	ND(0.5)	ND(0.5)	1.6
117917-37	B48-WATER	170	3.0	ND(0.5)	4.0	19
117917-METHOD BLANK		ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)

ND = Not detected at or above reporting limit; Reporting limit indicated in parentheses.

QA/QC SUMMARY

RPD, %	8
RECOVERY, %	103

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 117917
CLIENT: WEISS ASSOCIATES
PROJECT ID: 14-0307-06

DATE SAMPLED: 10/10/94
DATE RECEIVED: 10/11/94
DATE EXTRACTED: 10/11/94
DATE ANALYZED: 10/12/94
DATE REPORTED: 10/12/94
DATE REVISED: 11/08/94

Extractable Petroleum Hydrocarbons in Aqueous Solutions
California DOHS Method
LUFT Manual October 1989

LAB ID	CLIENT ID	KEROSENE RANGE (ug/L)	DIESEL RANGE (ug/L)	REPORTING LIMIT (ug/L)
117917-11	B46-WATER	ND*	ND	50
117917-14	B45-WATER	100*	***	50
117917-32	B44-WATER	ND*	ND	50
117917-35	B49-WATER	69*	***	50
117917-37	B48-WATER	130*	***	50
117917-METHOD BLANK		ND	ND	50

* Sample chromatogram does not match the kersosene standard pattern. Results obtained by omitting a single peak at 4.36 minutes tentively identified as benzoic acid by GC/MS.
*** Diesel range not reported due to overlap of hydrocarbon ranges.

ND = Not detected at or above reporting limit. Reporting limit applies to all analytes.

QA/QC SUMMARY:

RPD, %	2
RECOVERY, %	98

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 117917
CLIENT: WEISS ASSOCIATES
PROJECT ID: 14-0307-06

DATE SAMPLED: 10/10/94
DATE RECEIVED: 10/11/94
DATE EXTRACTED: 10/11/94
DATE ANALYZED: 10/12/94
DATE REPORTED: 10/12/94

Extractable Petroleum Hydrocarbons in Aqueous Solutions
California DOHS Method
LUFT Manual October 1989

LAB ID	CLIENT ID	KEROSENE RANGE (ug/L)	DIESEL RANGE (ug/L)	REPORTING LIMIT (ug/L)
117917-11	B46-WATER	74*	ND	50
117917-14	B45-WATER	440*	***	50
117917-32	B44-WATER	230*	***	50
117917-35	B49-WATER	340*	***	50
117917-37	B48-WATER	470*	***	50
117917-METHOD BLANK		ND	ND	50

* Sample chromatogram does not match the kersosene standard pattern.
  Single peak contibutes to sample result.
*** Diesel range not reported due to overlap of hydrocarbon ranges.

ND = Not detected at or above reporting limit. Reporting limit applies to all analytes.

QA/QC SUMMARY:

RPD, %	2
RECOVERY, %	98

117917

WEISS ASSOCIATES
5500 Shellmound Street, Emeryville, CA 94608
Phone: 415/547-5420 Fax: 415/547-5043

Please send analytic results and a copy of the signed chain of custody form to:

Project ID: 14-0307-06

Lab Personnel:

☐ PLEASE INCLUDE QA/QC DATA IF BOX IS CHECKED.

1) Specify analytic method and detection limit in report.
2) Notify us if there are any anomalous peaks in GC or other scans.
3) ANY QUESTIONS/CLARIFICATIONS: CALL US.

CHAIN-OF-CUSTODY RECORD AND ANALYTIC INSTRUCTIONS

Sampled by: Alison Watts Laboratory Name: Curtis & Tompkins

	No. of Containers	Sample ID	Container Type	Sample Date	Vol[2]	Fil[3]	Ref[4]	Preservative (specify)	Analyze for	Analytic Method	Turn[5]	COMMENTS
-1	1	B40-5	steel tube	10/10/94	1"x6"	N	Y	None	TVH/TEH/BTEX	mod 8015/8020	~~24 hr~~ N	
-2	1	B40-10	"	"	"	"	"	"	"	"	N	
-3	1	B41-5	"	"	"	"	"	"	"	"	N	
-4	1	B41-10	"	"	"	"	"	"	"	"	N	
-5	1	B42-5	"	"	"	"	"	"	"	"	N	
-6	1	B42-10	"	"	"	"	"	"	"	"	N	
-7	1	B43-5	"	"	"	"	"	"	"	"	N	HOLD
-8	1	B43-10	"	"	"	"	"	"	"	"	N	
	4										N	HOLD

1 Alison Watts 10/10/94
Released by (Signature), Date

1 Weiss Assoc
Affiliation

2 James D Owen 10/11/94
Received by (Signature), Date

2 WA
Affiliation

3 James D Owen 10/11/94
Released by (Signature), Date

3 WA
Affiliation

4
Shipping Carrier, Method, Date

4
Affiliation

5
Released by (Signature), Date

5
Affiliation

6 Joy E. Smith 10-11-94
Received by Lab Personnel, Date

X
Seal Intact?

6 C&T 486-0900
Affiliation, Telephone

1 Sample Type Codes: W = Water, S = Soil, Describe Other; Container Type Codes: V = VOA/Teflon Septa, P = Plastic, C or B - Clear/Brown Glass, Describe Other; Cap Codes: PT = Plastic, Teflon Lined 2 = Volume per container; 3 = Filtered (Y/N); 4 = Refrigerated (Y/N)
5 Turnaround [N = Normal, W = 1 Week, R = 24 Hour, HOLD (write out)]
ADDITIONAL COMMENTS, CONDITIONS, PROBLEMS:

D:\ALL\ADMIN\FORMS\COC.WP2

11791

WEISS ASSOCIATES
5500 Shellmound Street, Emeryville, CA 94608
Phone: 415-547-5420 Fax: 415-547-5043

Please send analytic results and a copy of the signed chain of custody form to:

James D Pinnon

Project ID: 14-0307-06

Lab Personnel: ☑ PLEASE INCLUDE QA/QC DATA IF BOX IS CHECKED.

1) Specify analytic method and detection limit in report.
2) Notify us if there are any anomalous peaks in GC or other scans.
3) ANY QUESTIONS/CLARIFICATIONS: CALL US.

CHAIN-OF-CUSTODY RECORD AND ANALYTIC INSTRUCTIONS

Sampled by: James D Pinnon / Alison Watts Laboratory Name: Curtis & Tompkins

No. of Containers	Sample ID	Container Type	Sample Date	Vol[2]	Fil[3]	Ref[4]	Preservative (specify)	Analyze for	Analytic Method	Turn[5]	COMMENTS
9 1	B4W-15	Steel tube	10/10/94				None	TEH	Modified 8015	24 hr	Hold
								TVH	Modified 8015	24 hr	Hold
								BTEX	EPA 8020	24 hr	Hold
10 2	B46 Bailey blank	V	10/10/94	40ml			HCl	TVH / BTEX	Modified 8015	24 hr	Hold
									EPA 8020	24hr	HOLD
11 4	B46-Water	V	10/10/94	40ml			HCl	TVH/BTEX	Modified 8015	24 hr	
									EPA 8020	24 hr	
12 2	TB-2	V	10/10/94	40ml			HCl	TVH/BTEX	Modified 8015	24 hr	
									EPA 8020	24 hr	
3 2	B45-Bailey Blank	V	10/10/94	40ml			HCl	TVH/BTEX	Modified 8015	24 hr	Hold
									EPA 8020	24 hr	HOLD
4 4	B45-Water	V	10/10/94	40ml			HCl	TVH/BTEX	Modified 8015	24 hr	
									EPA 8020	24 hr	

1 James D Pinnon 10/11/94
Released by (Signature), Date

1 Weiss
Affiliation

2
Received by (Signature), Date

2
Affiliation

3
Released by (Signature), Date

3
Affiliation

4
Shipping Carrier, Method, Date

4
Affiliation

5
Released by (Signature), Date

5
Affiliation

6 Jacqueline Wanda 10-11-94
Received by Lab Personnel, Date

6 C&T 486-0900
Affiliation, Telephone

x
Seal Intact?

1 Sample Type Codes: W = Water, S = Soil, Describe Other; Container Type Codes: V = VOA/Teflon Septa, P = Plastic, C or B - Clear/Brown Glass, Describe Other; Cap Codes: PT = Plastic, Teflon Lined 2 = Volume per container; 3 = Filtered (Y/N); 4 = Refrigerated (Y/N)
5 Turnaround [N = Normal, W = 1 Week, R = 24 Hour, HOLD (write out)]
ADDITIONAL COMMENTS, CONDITIONS, PROBLEMS:

16748

WEISS ASSOCIATES
5500 Shellmound Street, Emeryville, CA 94608
Phone: 415/547-5420 Fax: 415/547-5043

Please send analytic results and a copy of the signed chain of custody form to:
James D. Ponton

Project ID: 14-0307-06

Lab Personnel: ☑ PLEASE INCLUDE QA/QC DATA IF BOX IS CHECKED.

1) Specify analytic method and detection limit in report.
2) Notify us if there are any anomalous peaks in GC or other scans.
3) ANY QUESTIONS/CLARIFICATIONS: CALL US.

CHAIN-OF-CUSTODY RECORD AND ANALYTIC INSTRUCTIONS

Sampled by: Jim Ponton Laboratory Name: Curtis & Tompkins

No. of Containers	Sample ID	Container Type[1]	Sample Date	Vol[2]	Fil[3]	Ref[4]	Preservative (specify)	Analyze for	Analytic Method	Turn[5]	COMMENTS
1	B46-Water	A	10/10/94	1 Liter			None	TEH	Modified 8015	24 hr	
2	B45-Water	A	10/10/94	1 Liter			None	TEH	Modified 8015	24 hr	

1 James D Ponton 10/11/94
Released by (Signature), Date

1 WA
Affiliation

2
Received by (Signature), Date

2
Affiliation

3
Released by (Signature), Date

3
Affiliation

4
Shipping Carrier, Method, Date

4
Affiliation

5
Released by (Signature), Date

5
Affiliation

6 Irma E. Brady 10-11-94 x
Received by Lab Personnel, Date Seal Intact?

6 C&T 486-0900
Affiliation, Telephone

1 Sample Type Codes: W = Water, S = Soil, Describe Other; Container Type Codes: V = VOA/Teflon Septa, P = Plastic, C or B - Clear/Brown Glass, Describe Other; Cap Codes: PT = Plastic, Teflon Lined 2 = Volume per container; 3 = Filtered (Y/N); 4 = Refrigerated (Y/N)
5 Turnaround IN = Normal, W = 1 Week, R = 24 Hour, HOLD (write out)]
ADDITIONAL COMMENTS, CONDITIONS, PROBLEMS:

11791

WEISS ASSOCIATES
5500 Shellmound Street, Emeryville, CA 94608
Phone: 4155547520 Fax: 4155547503

Please send analytic results and a copy of the signed chain of custody form to:

James D. Ponton

Project ID: 14-0307-06

Lab Personnel:

☑ PLEASE INCLUDE QA/QC DATA IF BOX IS CHECKED.

1) Specify analytic method and detection limit in report.
2) Notify us if there are any anomalous peaks in GC or other scans.
3) ANY QUESTIONS/CLARIFICATIONS: CALL US.

CHAIN-OF-CUSTODY RECORD AND ANALYTIC INSTRUCTIONS

Sampled by: Jim Ponton Alison Watts Laboratory Name: Curtis & Tompkins

No. of Containers	Sample ID	Container Type[1]	Sample Date	Vol[2]	Fil[3]	Ref[4]	Preservative (specify)	Analyze for	Analytic Method	Turn[5]	COMMENTS
5 1	B-45-5.0	Steel TUBE	10/10/94				None	~~TPH~~ TVH	Modified 8015	24hr	HOLD
								TEH	Modified 8015	24hr	HOLD
								BTEX	EPA 8020	24hr	HOLD
6 1	B-45-8.0	STEEL TUBE	10/10/94				None	TVH	Modified 8015	24hr	HOLD
								TEH	Modified 8015	24hr	HOLD
								BTEX	EPA Method 8020	24hr	HOLD
7 1	B-45-10.0	STEEL TUBE	10/10/94				None	TVH	Modified 8015	24 hr	HOLD
								TEH	Modified 8015	24 hr	HOLD
								BTEX	EPA Method 8020	24hr	HOLD
8 1	B-45-14.0	STEEL TUBE	10/10/94				None	TVH	Modified 8015	24hr	HOLD
								TEH	Modified 8015	24hr	HOLD
								BTEX	EPA Method 8020	24hr	HOLD

1 James D. Ponton 10/11/94
Released by (Signature), Date

1 Weiss
Affiliation

2 _____
Received by (Signature), Date

2 _____
Affiliation

3 _____
Released by (Signature), Date

3 _____
Affiliation

4 _____
Shipping Carrier, Method, Date

4 _____
Affiliation

5 _____
Released by (Signature), Date

5 _____
Affiliation

6 Greg E. Wanek 10-11-94 x _____
Received by Lab Personnel, Date Seal Intact?

6 C&T 486-0900
Affiliation, Telephone

1 Sample Type Codes: W = Water, S = Soil, Describe Other; Container Type Codes: V = VOA/Teflon Septa, P = Plastic, C or B - Clear/Brown Glass, Describe Other; Cap Codes: PT = Plastic, Teflon Lined 2 = Volume per container; 3 = Filtered (Y/N); 4 = Refrigerated (Y/N)
5 Turnaround [N = Normal, W = 1 Week, R = 24 Hour, HOLD (write out)]
ADDITIONAL COMMENTS, CONDITIONS, PROBLEMS:

1C791F

WEISS ASSOCIATES
5500 Shellmound Street, Emeryville, CA 94608
Phone: 4155547520 Fax: 4155547503

Please send analytic results and a copy of the signed chain of custody form to:

James D. Ponton

Project ID: 14-0307-06

Lab Personnel: ☑ PLEASE INCLUDE QA/QC DATA IF BOX IS CHECKED.

1) Specify analytic method and detection limit in report.
2) Notify us if there are any anomalous peaks in GC or other scans.
3) ANY QUESTIONS/CLARIFICATIONS: CALL US.

CHAIN-OF-CUSTODY RECORD AND ANALYTIC INSTRUCTIONS

Sampled by: James D Ponton / ALISON WATTS Laboratory Name: Curtis & Tompkins

No. of Containers	Sample ID	Container Type	Sample Date	Vol[2]	Fil[3]	Ref[4]	Preservative (specify)	Analyze for	Analytic Method	Turn[5]	COMMENTS
1	B46-11.5	Steel Tube	10/1/94				None	TVH	Modified 8015	24 hr	HOLD
								TEH	Modified 8015	24hr	HOLD
								BTEX	EPA 8020	24hr	HOLD
1	B46-15.5	Steel tube	10/10/94				None	TVH	Modified 8015	24hr	HOLD
								TEH	Modified 8015	24hr	HOLD
								BTEX	EPA 8020	24hr	HOLD
1	B44-5.0	Steel tube	10/10/94				None	TVH	Modified 8015	24 hr	
								TEH	Modified 8015	24 hr	
								BTEX	EPA 8020	24 hr	
1	B44-9.0	Steel tube	10/10/94				None	TVH	Modified 8015	24	
								TEH	Modified 8015	24	
								BTEX	EPA 8020	24	

1 James D Ponton 10/11/94
Released by (Signature), Date

3 Released by (Signature), Date

5 Released by (Signature), Date

1 Weiss
Affiliation

3 Affiliation

5 Affiliation

2 Received by (Signature), Date

4 Shipping Carrier, Method, Date

6 Greg E. Wyatt 10-11-94 x
Received by Lab Personnel, Date Seal Intact?

2 Affiliation

4 Affiliation

6 C&T 486-0900
Affiliation, Telephone

1 Sample Type Codes: W = Water, S = Soil, Describe Other; Container Type Codes: V = VOA/Teflon Septa, P = Plastic, C or B - Clear/Brown Glass, Describe Other; Cap Codes: PT = Plastic, Teflon Lined 2 = Volume per container; 3 = Filtered (Y/N); 4 = Refrigerated (Y/N)
5 Turnaround [N = Normal, W = 1 Week, R = 24 Hour, HOLD (write out)]
ADDITIONAL COMMENTS, CONDITIONS, PROBLEMS:

11771

WEISS ASSOCIATES
5500 Shellmound Street, Emeryville, CA 94608
Phone: 415/547-5420 Fax: 415/547-5043

Please send analytic results and a copy of the signed chain of custody form to:

James D. Ponton

Project ID: 14-0307-06

Lab Personnel: ☑ PLEASE INCLUDE QA/QC DATA IF BOX IS CHECKED.

1) Specify analytic method and detection limit in report.
2) Notify us if there are any anomalous peaks in GC or other scans.
3) ANY QUESTIONS/CLARIFICATIONS: CALL US.

CHAIN-OF-CUSTODY RECORD AND ANALYTIC INSTRUCTIONS

Sampled by: Jim D. Ponton Laboratory Name: Curtis & Tompkins

No. of Containers	Sample ID	Container Type	Sample Date	Vol[2]	Fil[3]	Ref[4]	Preservative (specify)	Analyze for	Analytic Method	Turn[5]	COMMENTS
3 1	B45-9.0	Steel tube	10/1/94				NONE	TPH	Modified 8015	24hr	Hold
								TEH	Modified 8015	24hr	Hold
								BTEX	EPA 8020	24hr	Hold
24 1	B45-11.0	Steel tube	10/10/94				NONE	TPH	Mod. 8015	24 hr	Hold
								TEH	Mod. 8015	24 hr	Hold
								BTEX	EPA 8020	24 hr	Hold
5 1	B48-5.0	Steel Tube	10/10/94				NONE	TPH	Modified 8015	24hr	
								TEH	Modified 8015	24hr	
								BTEX	EPA 8020	24hr	
6 1	B48-10.0	Steel tube	10/10/94				NONE	TPH	Modified 8015	24hr	
								TEH	Modified 8015	24hr	
								BTEX	EPA 8020	24hr	
7 1	B48-13.0	Steel tube	10/10/94				NONE	TPH	Modified 8015	24hr	Hold
								TEH	Modified 8015	24hr	Hold
								BTEX	EPA 8020	24 hr	Hold

1 James D. Ponton 10/11/94
Released by (Signature), Date

1 Weiss Assoc.
Affiliation

2 _____
Received by (Signature), Date

2 _____
Affiliation

3 _____
Released by (Signature), Date

3 _____
Affiliation

4 _____
Shipping Carrier, Method, Date

4 _____
Affiliation

5 _____
Released by (Signature), Date

5 _____
Affiliation

6 Ingrid E. Wunsch 10-11-94 x _____
Received by Lab Personnel, Date Seal Intact?

6 C+T 486-0900
Affiliation, Telephone

1 Sample Type Codes: W = Water, S = Soil, Describe Other; Container Type Codes: V = VOA/Teflon Septa, P = Plastic, C or B - Clear/Brown Glass, Describe Other; Cap Codes: PT = Plastic, Teflon Lined 2 = Volume per container; 3 = Filtered (Y/N); 4 = Refrigerated (Y/N)
5 Turnaround [N = Normal, W = 1 Week, R = 24 Hour, HOLD (write out)]
ADDITIONAL COMMENTS, CONDITIONS, PROBLEMS:

Page ___ of ___

D:\ALL\ADMIN\FORMS\COC.WP2

1179

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5500 Shellmound Street, Emeryville, CA 94608
Phone: 415-547-5420 Fax: 415-547-5043

Please send analytic results and a copy of the signed chain of custody form to:

James D Ponton

Project ID: ~~94-0307-06~~ 14-0307-06

Lab Personnel: ☑ PLEASE INCLUDE QA/QC DATA IF BOX IS CHECKED.

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2) Notify us if there are any anomalous peaks in GC or other scans.
3) ANY QUESTIONS/CLARIFICATIONS: CALL US.

CHAIN-OF-CUSTODY RECORD AND ANALYTIC INSTRUCTIONS

Sampled by: Jim D. Ponton Laboratory Name: Curtis & Tompkins

No. of Containers	Sample ID	Container Type[1]	Sample Date	Vol[2]	Fil[3]	Ref[4]	Preservative (specify)	Analyze for	Analytic Method	Turn[5]	COMMENTS
28 1	B49-5	Steel tube	10/10/94				None	TVH	Modified 8015	24 hr	
								TEH	Modified 8015	24 hr	
								BTEX	EPA 8020	24 hr	
9 1	B49-10	Steel tube	10/10/94				None	TVH	Modified 8015	24 hr	
								TEH	Modified 8015	24 hr	
		Steel						BTEX	EPA 8020	24 hr	
30 1	B49-15	Steel tube	10/10/94				None	TVH	Modified 8015	24 hr	Hold
								TEH	Modified 8015	24 hr	Hold
								BTEX	EPA 8020	24 hr	Hold
3) 1	B-46-5.0	Steel tube	10/10/94				None	TVH	Modified 8015	24 hr	Hold
								TEH	Modified 8015	24 hr	Hold
								BTEX	EPA 8020	24 hr	Hold

1 James D Ponton 10/11/94 3 _____ 5 _____
Released by (Signature), Date

1 WA 3 _____ 5 _____
Affiliation

2 _____ 4 _____ 6 Doug E. Winkler 10-11-94 X _____
Received by (Signature), Date / Shipping Carrier, Method, Date / Received by Lab Personnel, Date / Seal Intact?

2 _____ 4 _____ 6 C&T 486-0900
Affiliation / Affiliation / Affiliation, Telephone

1 Sample Type Codes: W = Water, S = Soil, Describe Other; Container Type Codes: V = VOA/Teflon Septa, P = Plastic, C or B - Clear/Brown Glass, Describe Other; Cap Codes: PT = Plastic, Teflon Lined 2 = Volume per container; 3 = Filtered (Y/N); 4 = Refrigerated (Y/N)
5 Turnaround [N = Normal, W = 1 Week, R = 24 Hour, HOLD (write out)]
ADDITIONAL COMMENTS, CONDITIONS, PROBLEMS:

117917

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5500 Shellmound Street, Emeryville, CA 94608
Phone: 415/547-5420 Fax: 415/547-5043

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Project ID: 14-0307-06

Lab Personnel:

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1) Specify analytic method and detection limit in report.
2) Notify us if there are any anomalous peaks in GC or other scans.
3) ANY QUESTIONS/CLARIFICATIONS: CALL US.

CHAIN-OF-CUSTODY RECORD AND ANALYTIC INSTRUCTIONS

Sampled by: Alison Watts Laboratory Name: Curtis+Tompkins

	No. of Containers	Sample ID	Container Type	Sample Date	Vol[2]	Fil[3]	Ref[4]	Preservative (specify)	Analyze for	Analytic Method	Turn[5]	COMMENTS
32	4	B44-water	VOA	10/10/94	40ml	N	Y	HCL	TVH	mod 8015	24hr	
									BTEX	EPA 8020	"	
	1	B44-water bailer	1 liter	10/10/94	1 liter	N	Y	none	TEH	mod 8015	"	
33	2	B44 trip blank	VOA	10/10/94	40ml	N	Y	HCL	TVH	mod 8015	"	HOLD
									BTEX	EPA 8020	"	HOLD
34	2	Trip Blank 1	VOA	10/10/94	40ml	N	Y	HCL	TVH	mod 8015	"	
									BTEX	EPA 8020	"	

1 Alison Watts 10/10/94
Released by (Signature), Date

1 Weiss Assoc.
Affiliation

2 James D Ponton 10/10/94
Received by (Signature), Date

2 WA
Affiliation

3 James D Ponton 10/11/94
Released by (Signature), Date

3 WA
Affiliation

Shipping Carrier, Method, Date

4
Affiliation

5
Released by (Signature), Date

5
Affiliation

6 Mary E Smith 10-11-94
Received by Lab Personnel, Date

x
Seal Intact?

6 C+T 486-0900
Affiliation, Telephone

1 Sample Type Codes: W = Water, S = Soil, Describe Other; Container Type Codes: V = VOA/Teflon Septa, P = Plastic, C or B - Clear/Brown Glass, Describe Other; Cap Codes: PT = Plastic, Teflon Lined 2 = Volume per container; 3 = Filtered (Y/N); 4 = Refrigerated (Y/N)
5 Turnaround [N = Normal, W = 1 Week, R = 24 Hour, HOLD (write out)]
ADDITIONAL COMMENTS, CONDITIONS, PROBLEMS:

11791.

WEISS ASSOCIATES
5500 Shellmound Street, Emeryville, CA 94608
Phone: 415-547-5420 Fax: 415-547-5043

Please send analytic results and a copy of the signed chain of custody form to:

Project ID: 14-0307-06

Lab Personnel:

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1) Specify analytic method and detection limit in report.
2) Notify us if there are any anomalous peaks in GC or other scans.
3) ANY QUESTIONS/CLARIFICATIONS: CALL US.

CHAIN-OF-CUSTODY RECORD AND ANALYTIC INSTRUCTIONS

Sampled by: Alison Watts Laboratory Name: Curtis + Tomplins

No. of Containers	Sample ID	Container Type	Sample Date	Vol[2]	Fil[3]	Ref[4]	Preservative (specify)	Analyze for	Analytic Method	Turn[5]	COMMENTS
4	B49-water	VOA	10/10/94	40ml	N	Y	HCL	TVH	mod. 8015	24hr	
								BTEX	EPA 8020	24	
2 (1L)	B49-water	Amber	10/10/94	1Liter	N	Y	none	TEH	Mod. 8015	24	
2	B49-bailedblank	VOA	10/10/94	40ml	N	Y	HCL	TVH	mod 8015	24	HOLD
								BTEX	EPA 8020	24	HOLD
4	B48-water	VOA (1L) Amber	10/10/94	40ml	N	Y	HCL	TVH	mod 8015	24	
								BTEX	EPA 8020	24	
2	B48-water	Amber	10/10/94	Liter	N	Y	none	TEH	mod 8015	24	
2	B48-Bailedblank	VOA	10/10/94	40ml	N	Y	HCL	TVH	mod 8015		HOLD
								BTEX	EPA 8020		HOLD

1 Released by (Signature), Date: 10/10/94
1 Affiliation: WA
2 Received by (Signature), Date: 10/10/94
2 Affiliation: WA

3 Released by (Signature), Date: 10/11/94
3 Affiliation: WA
4 Shipping Carrier, Method, Date:
4 Affiliation:

5 Released by (Signature), Date:
5 Affiliation:
6 Received by Lab Personnel, Date: 10-11-94 Seal Intact? X
6 Affiliation, Telephone: C&T 486-0900

1 Sample Type Codes: W = Water, S = Soil, Describe Other; Container Type Codes: V = VOA/Teflon Septa, P = Plastic, C or B - Clear/Brown Glass, Describe Other; Cap Codes: PT = Plastic, Teflon Lined 2 = Volume per container; 3 = Filtered (Y/N); 4 = Refrigerated (Y/N)
5 Turnaround [N = Normal, W = 1 Week, R = 24 Hour, HOLD (write out)]
ADDITIONAL COMMENTS, CONDITIONS, PROBLEMS:

42798

Curtis & Tompkins, Ltd.
2323 Fifth Street
Berkeley, CA 94710
(510) 486-0900 Phone
(510) 486-0532 Fax

Sampler: Alison Watts

Report to: Mary Stelland

Project No: 14-0307-06

Company: Weiss Associates

Project Name:

Telephone: 510 450-6132

Turnaround Time: 24 HR (BY 12 NOON)

Fax: 510 547-5043

Analyses

Laboratory Number	Sample ID.	Sampling Date	Time	Soil	Water	Waste		# of Containers	HCL	H_2SO_4	HNO_3	ICE		Field Notes	TEH - kerosene/diesel
	B45-H2O	10/10/94			X			1							X
	B48-H2O	10/6/94			X			1							X

Logged in: PT
Samples Stored in ice: ✓
Appropriate containers: ✓
Samples preserved: NO
VOA's without headspace: NO
Comments:

[illegible] called cost

NOTES:
check for field contamination peak.

RELINQUISHED BY:		RECEIVED BY:	
Cynthia E. Schlz	10/13/94 10:50 DATE/TIME		DATE/TIME
	DATE/TIME		DATE/TIME
Flanigan	10-13-94 DATE/TIME 11:45 PM		DATE/TIME

Curtis & Tompkins, Ltd.
2323 Fifth Street
Berkeley, CA 94710
(510) 486-0900 Phone
(510) 486-0532 Fax

Sampler: Alison Watts

Report to: Mary Stallard

Company: Weiss Associates

Telephone: 510 450-6132

Fax: 510 547-5043

Project No: 14-0307-06

Project Name:

Turnaround Time: 24 HR (BY 12 NOON)

Analyses: TEH - Kerosene/diesel

Laboratory Number	Sample ID.	Sampling Date Time	Matrix: Soil	Water	Waste	# of Containers	Preservative: HCL	H_2SO_4	HNO_3	ICE	Field Notes
	B45-H2O	10/10/94		X		1					
	B48-H2O	10/10/94		X		1					

NOTES:
Check for fluid contamination peaks

RELINQUISHED BY:

Cynthia L. Stallard 10/13/94 10:50 DATE/TIME

DATE/TIME

Flanagan 10-13-94 11:45 PM DATE/TIME

RECEIVED BY:

DATE/TIME

DATE/TIME

DATE/TIME

Superior Precision Analytical, Inc.
A member of ESSCON Environmental Support Service Consortium

Weiss Associates
Attn: John Dewey

Project 14-0307-06
Reported 14-October-1994

TOTAL PETROLEUM HYDROCARBONS AS DIESEL
BY EPA METHOD 8015 MODIFIED

Chronology

Laboratory Number 92798

Identification	Sampled	Received	Extracted	Analyzed	Run #	Lab #
B45-H2O	10/10/94	10/13/94	10/13/94	10/13/94		1
B48-H2O	10/10/94	10/13/94	10/13/94	10/13/94		2

Certified Laboratories

825 Arnold Dr., Suite 1.14
Martinez, California 94553
(510) 229-1512 / fax (510) 229-1526

1555 Burke St., Unit I
San Francisco, California 94124
(415) 647-2081 / fax (415) 821-7123

309 S. Cloverdale St., Suite B-24
Seattle, Washington 98108
(206) 763-2992 / fax (206) 763-8429

APPENDIX D

SLUG TEST DATA AND RESULTS

Table D-1 : Parameters used in Slug Test Analysis

Well ID	Casing Diameter [in]	Borehole Diameter [in]	Internal Radius [ft]	Effective Radius [ft]	Bottom of Screen [ft]	Screen Length [ft]	Ground Water Elevation [ft]	Min Sat Thickness [ft]	Max Sat Thickness [ft]	Thickness of Static Water Column [ft]
MW-5	2.067	8	0.09	0.33	16.00	4.5	6.304	0.50	7.00	9.70
MW-6	2.067	8	0.09	0.33	15.00	3.5	4.496	0.50	5.00	10.50
MW-10	4.026	10	0.17	0.42	17.00	10	5.79	2.00	11.00	11.21
MW-11	4.026	10	0.17	0.42	18.00	11	7.7	5.50	11.00	10.30
MW-12	4.026	10	0.17	0.42	17.00	10	6.081	4.00	11.00	10.92

SLUG TEST FOR CONFINED AQUIFERS

REFERENCE: Cooper, H. H., J. D. Bredehoeft, and S. S. Papadopulos, response of a finite-diameter well to an instantaneous charge of water, Water Resources Research, vol. 3, no. 1, pp. 263-269.

ASSUMPTIONS:
aquifer has infinite areal extent
aquifer is homogeneous, isotropic, and of uniform thickness
aquifer potentiometric surface is initially horizontal
a volume of water, V, is injected into or discharged from the well instantaneously
pumping well is fully penetrating
flow to pumping well is horizontal
aquifer is confined
flow is unsteady
water is released instantaneously from storage with decline of hydraulic head
diameter of pumping well is very small so that storage in the well can be neglected

SOLUTION:

Integral solution for dimensionless drawdown in well:

$$H/H_0 = \frac{8\alpha}{\pi^2} \int_0^\infty \frac{e^{-\beta u^2/\alpha}}{u \cdot \{[uJ_0(u)-2\alpha J_1(u)]^2 + [uY_0-2\alpha Y_1(u)]^2\}}\, du$$

Laplace solution for response in well:

$$\bar{h} = \frac{r_w S H_0 K_0(rq)}{T q [r_w q K_0(r_w q) + 2\alpha K_1(r_w q)]}$$

$q = (pS/T)^{1/2}$

p = Laplace transform variable

where:

H = head in well at time t [L]

H_0 = initial head in well well due to slug injection or extraction [L]

$\alpha = r_w^2 S/r_c^2$ [dimensionless]

SLUG TEST FOR CONFINED AQUIFERS
(continued)

r_w = effective radius of well [L]

r_c = internal radius of well casing [L]

β = Tt/r_c^2

J_0 = Bessel function of first kind, zero order

J_1 = Bessel function of first kind, first order

Y_0 = Bessel function of second kind, zero order

Y_1 = Bessel function of second kind, first order

K_0 = modified Bessel function of second kind, zero order

K_1 = modified Bessel function of second kind, first order

Table D-2: Results of Slug Test Analysis

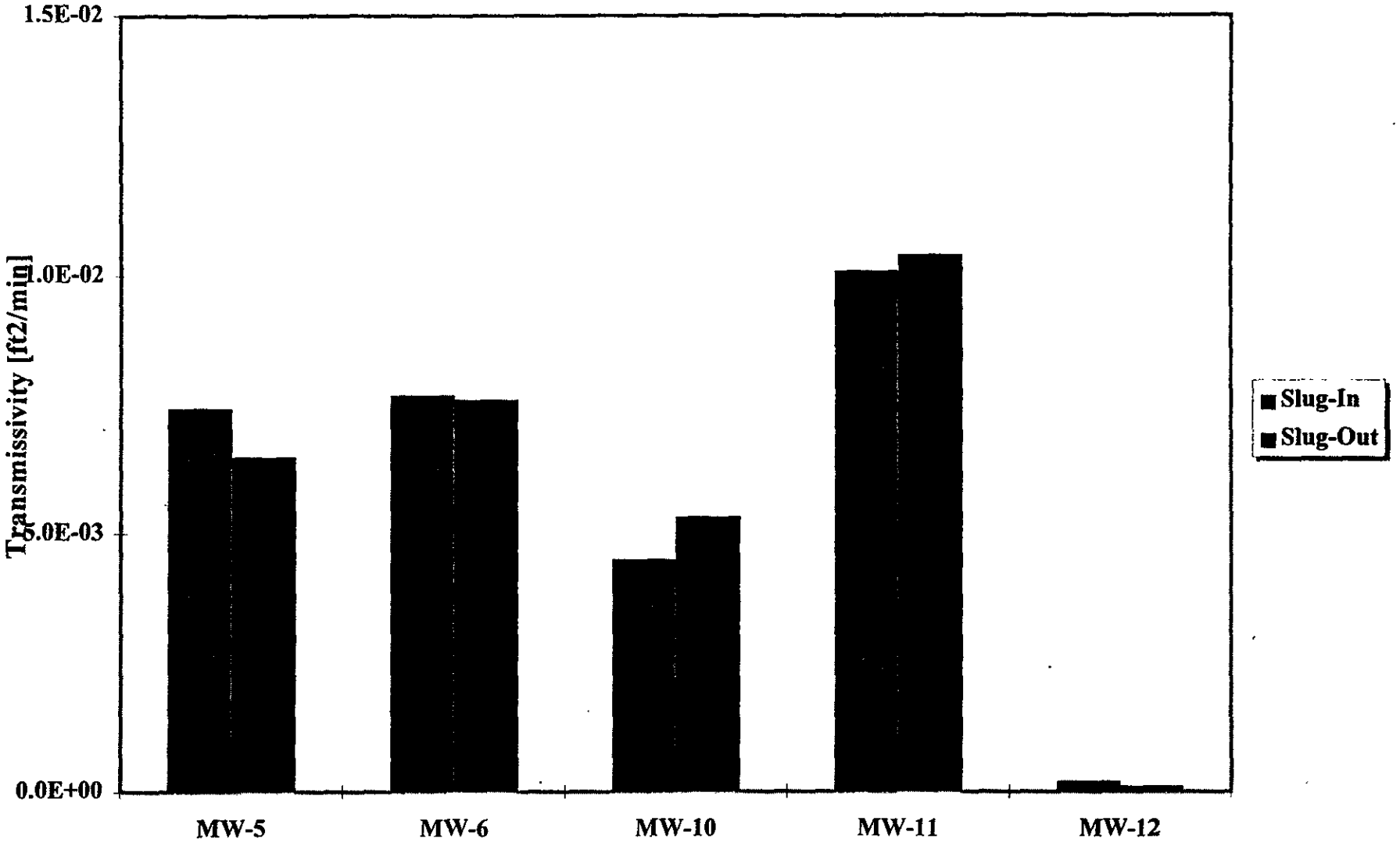
	Transmissivity [ft2/min]			Storativity [–]		
	Slug-In	Slug-Out	Mean	Slug-In	Slug-Out	Mean
MW-5	7.4E-03	6.5E-03	6.9E-03	8.7E-04	1.1E-03	9.8E-04
MW-6	7.7E-03	7.6E-03	7.6E-03	2.8E-04	3.0E-03	1.6E-03
MW-10	4.5E-03	5.3E-03	4.9E-03	1.5E-02	2.8E-02	2.2E-02
MW-11	1.0E-02	1.0E-02	1.0E-02	6.0E-04	5.0E-02	2.5E-02
MW-12	2.0E-04	1.1E-04	1.5E-04	2.0E-03	7.7E-02	4.0E-02

Table D-3: Results of Slug-Test Analysis

	Average Transmissivity [a]	Estimated Effective Thickness		Hydraulic Conductivity	
	T	min	max	min	max
	[ft²/min]	[ft]	[ft]	[ft/d]	[ft/d]
MW-5	6.9E-03	0.50	7.00	1.43	20.01
MW-6	7.6E-03	0.50	5.00	2.20	21.99
MW-10	4.9E-03	2.00	11.00	0.64	3.54
MW-11	1.0E-02	5.50	11.00	1.34	2.68
MW-12	1.5E-04	4.00	11.00	0.02	0.06
		Arithmetric Mean:		1.13	9.66

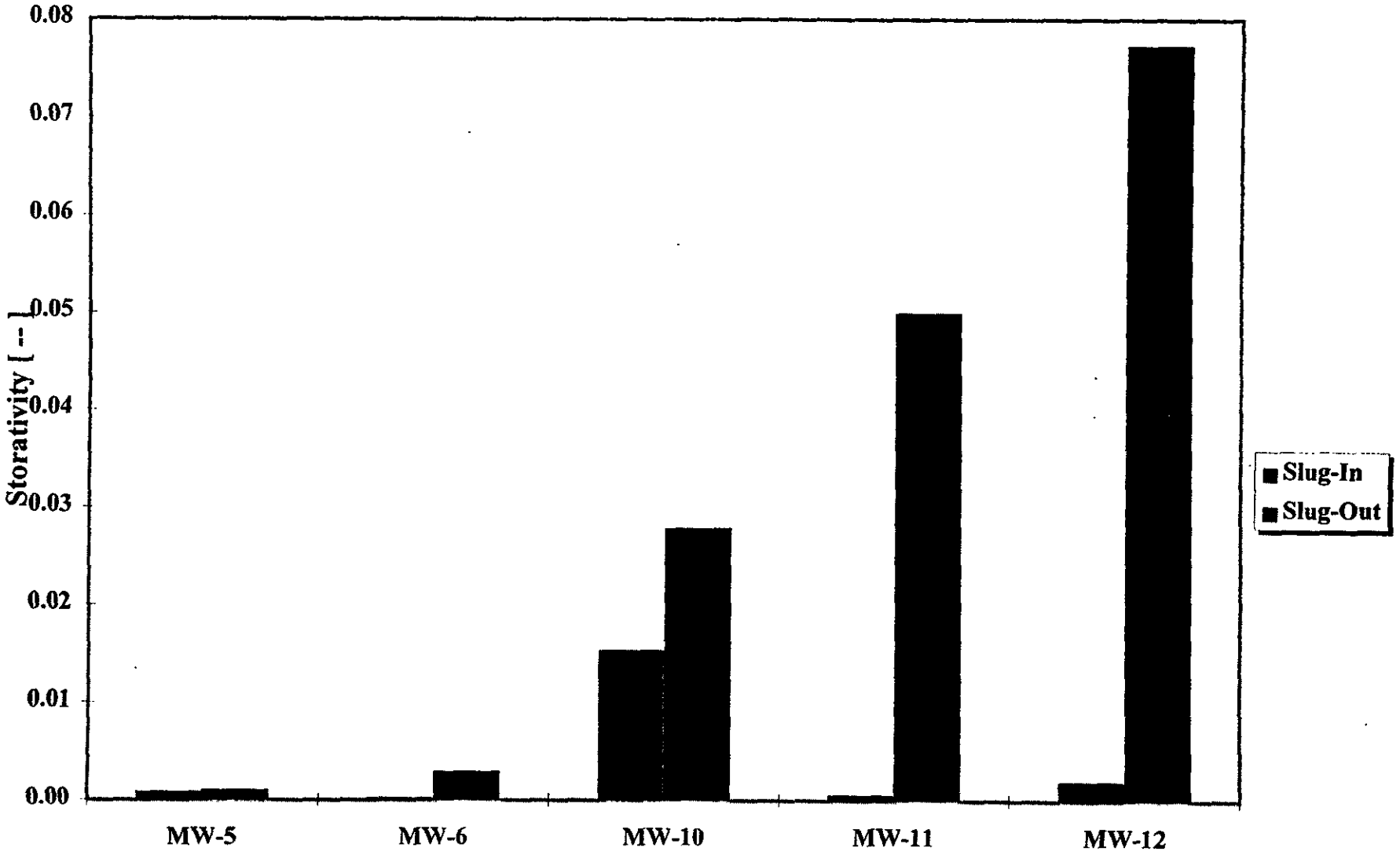
(a): Arithmetric mean of slug-in and slug-out analysis

Figure D-1: Results of Slug Test Analysis (Transmissivity)

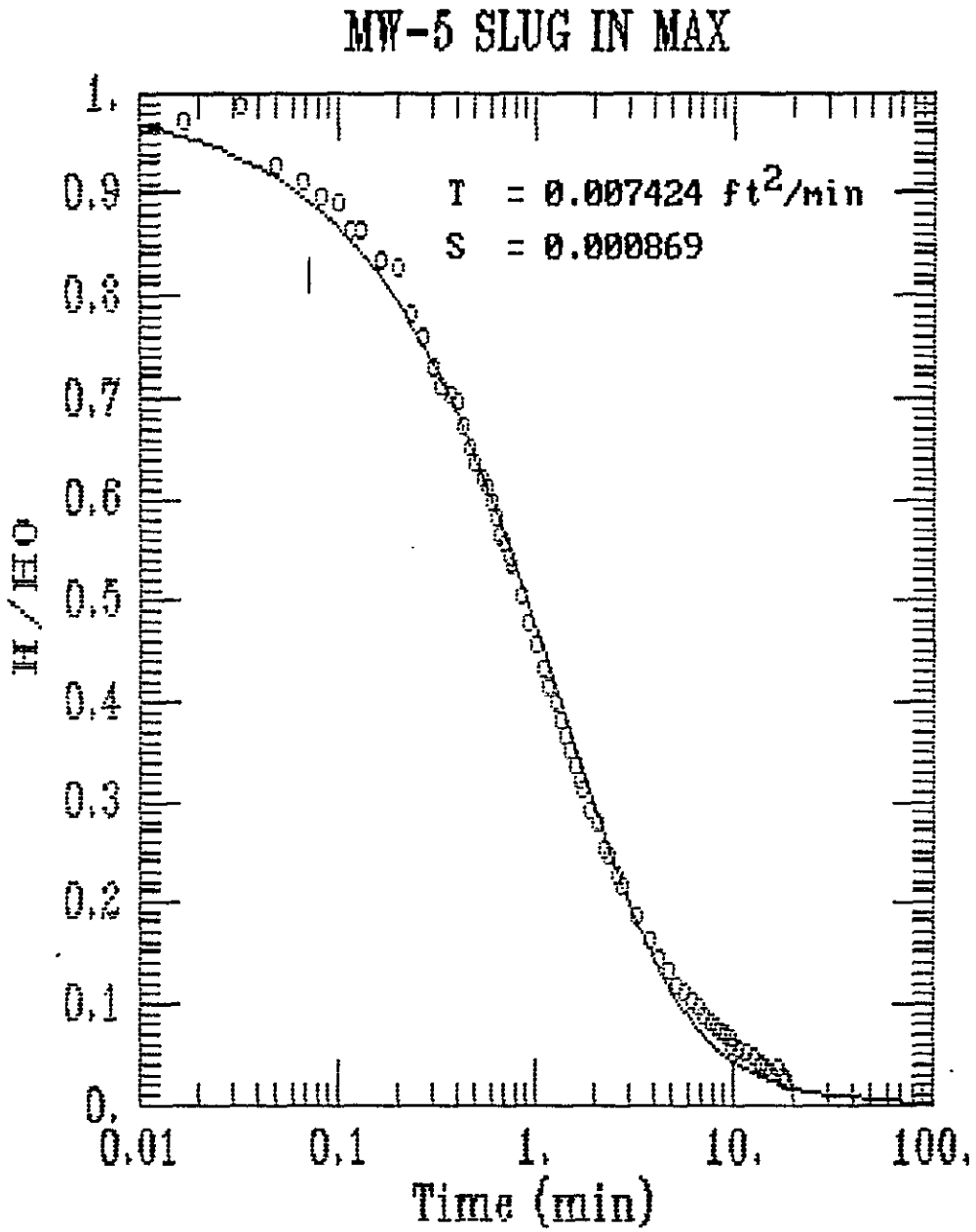


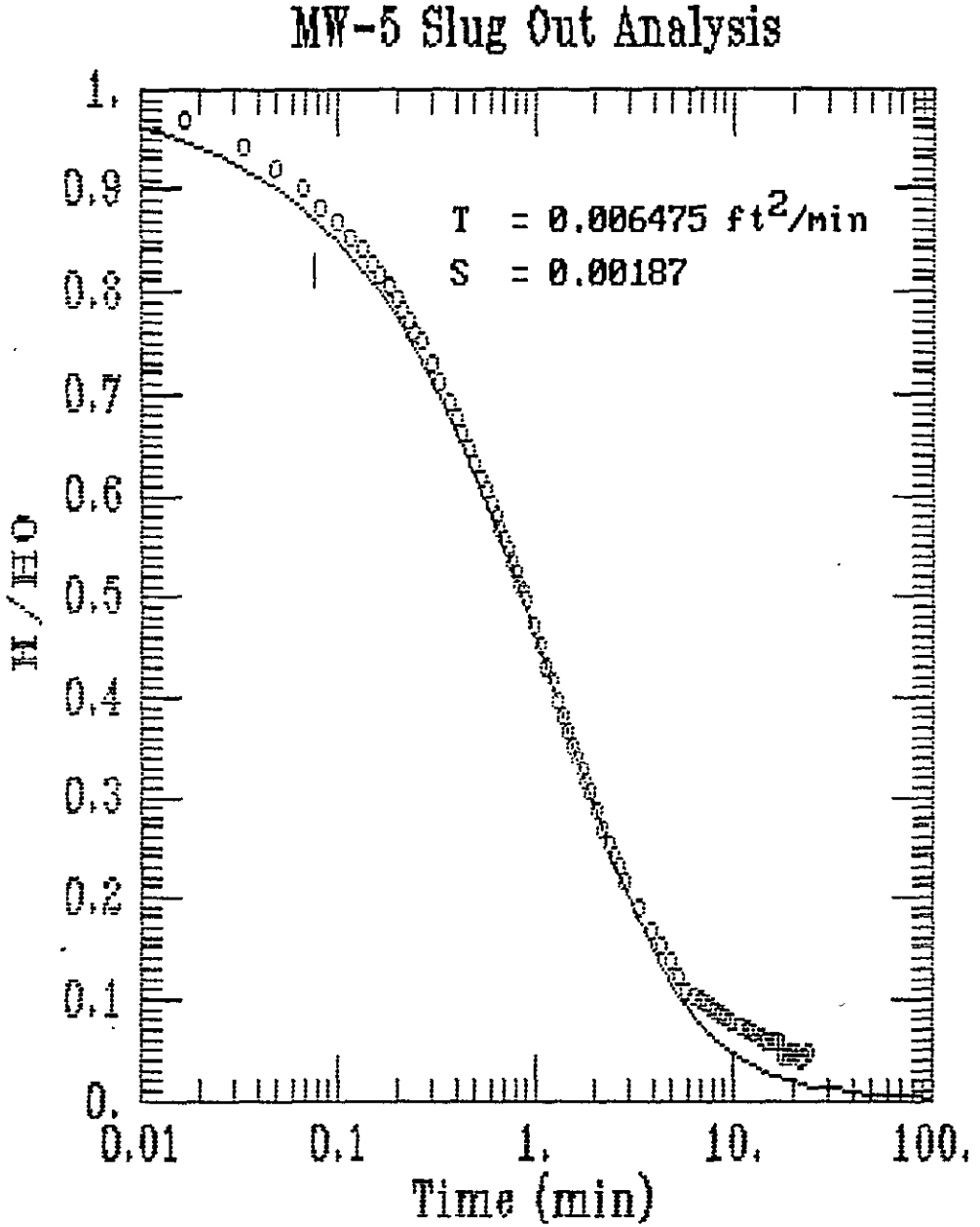
11/8/9 42:23 PM TRANSMISSIVITIES Chart 1

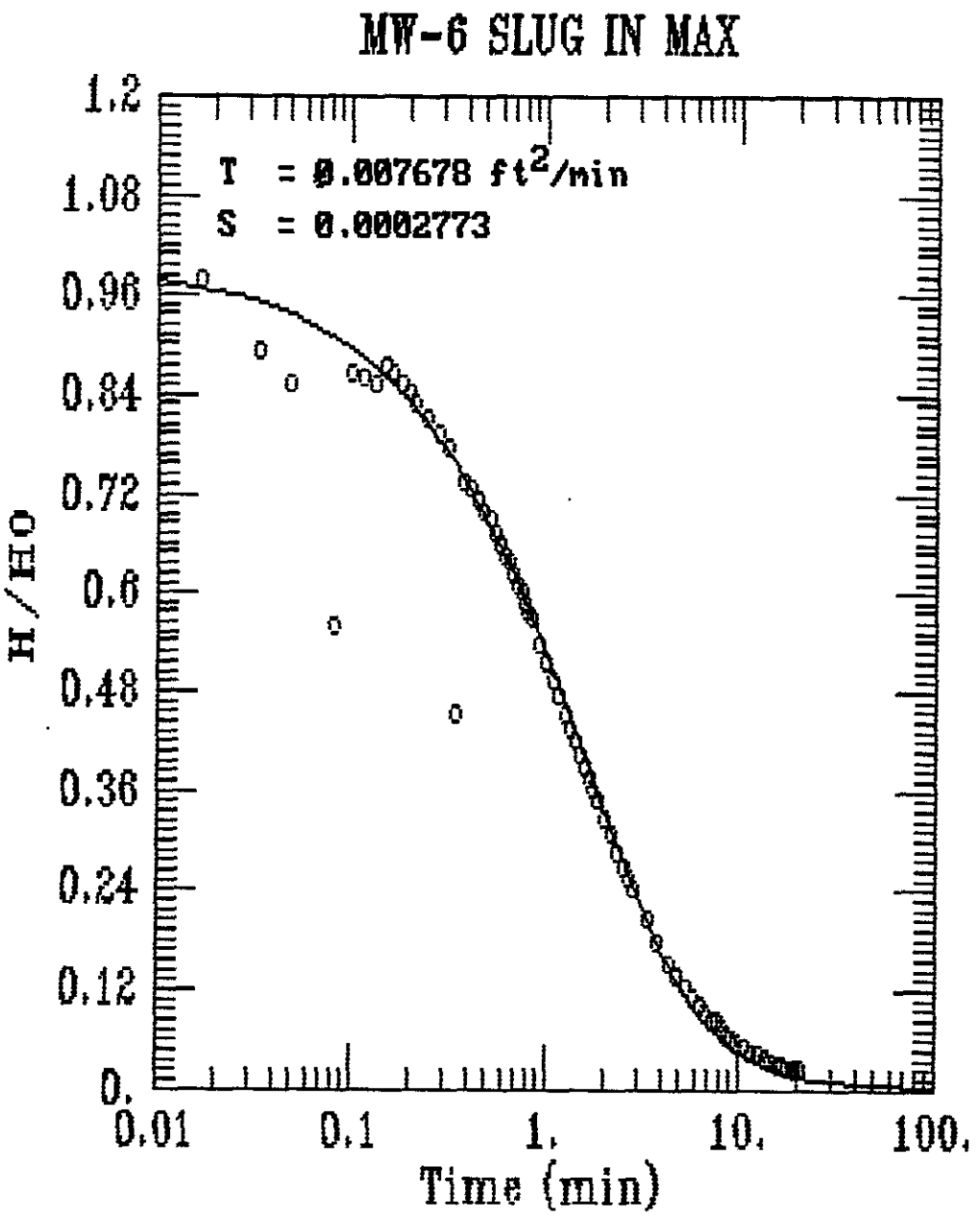
Figure D-2: Results of Slug Test Analysis (Storativity)

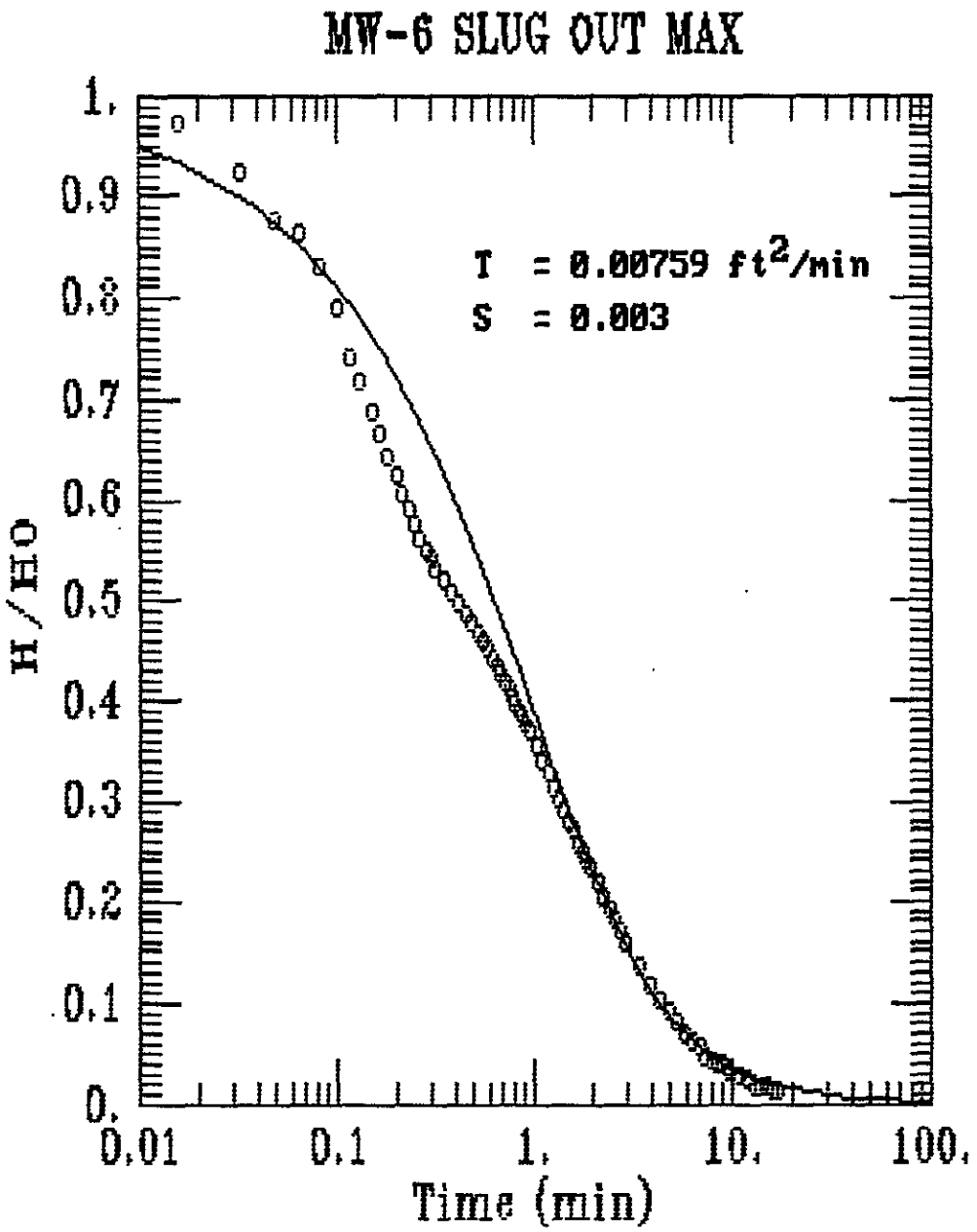


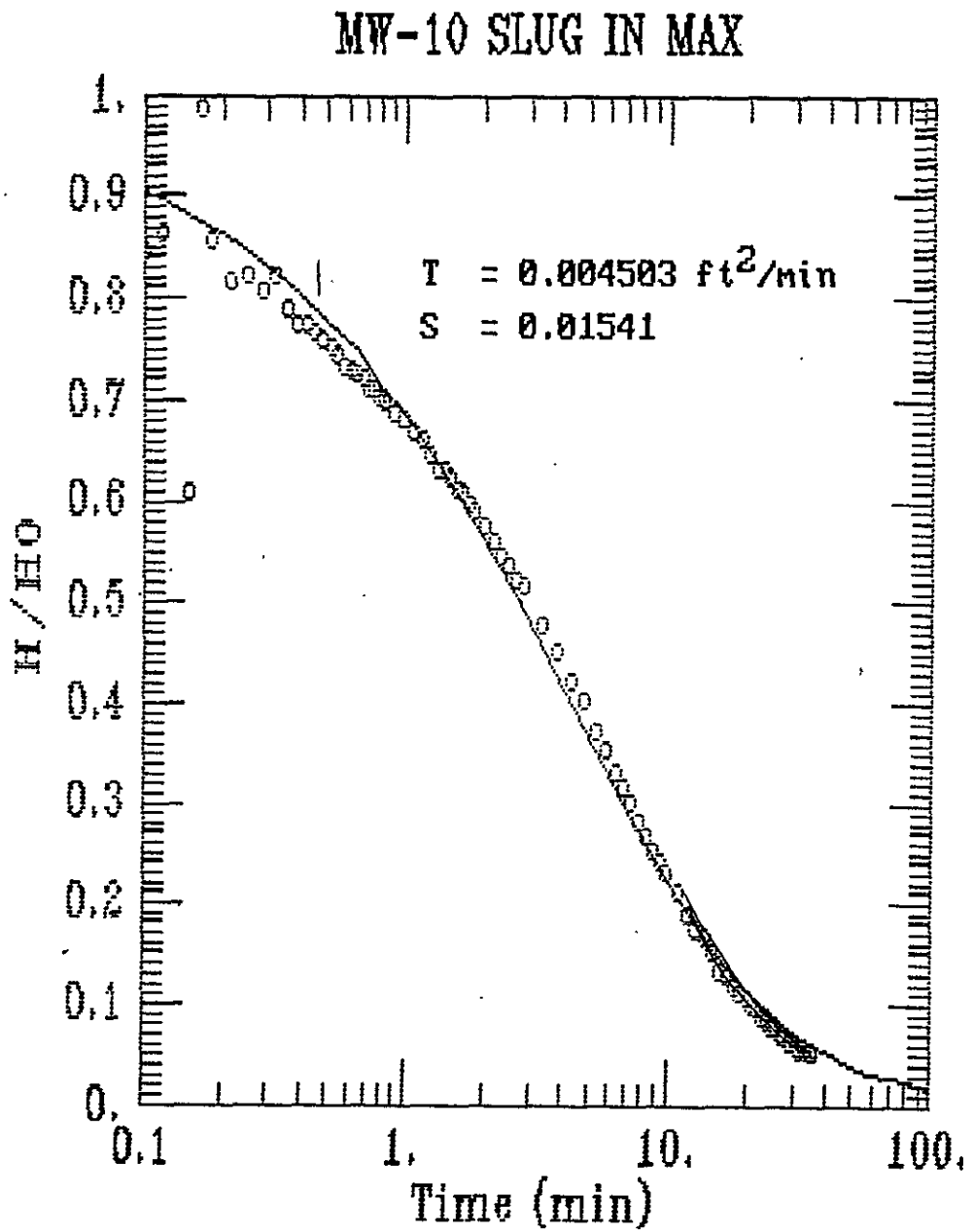
11/8/94 2:26 PM "TRANSMISSIVITIES Chart 1-1

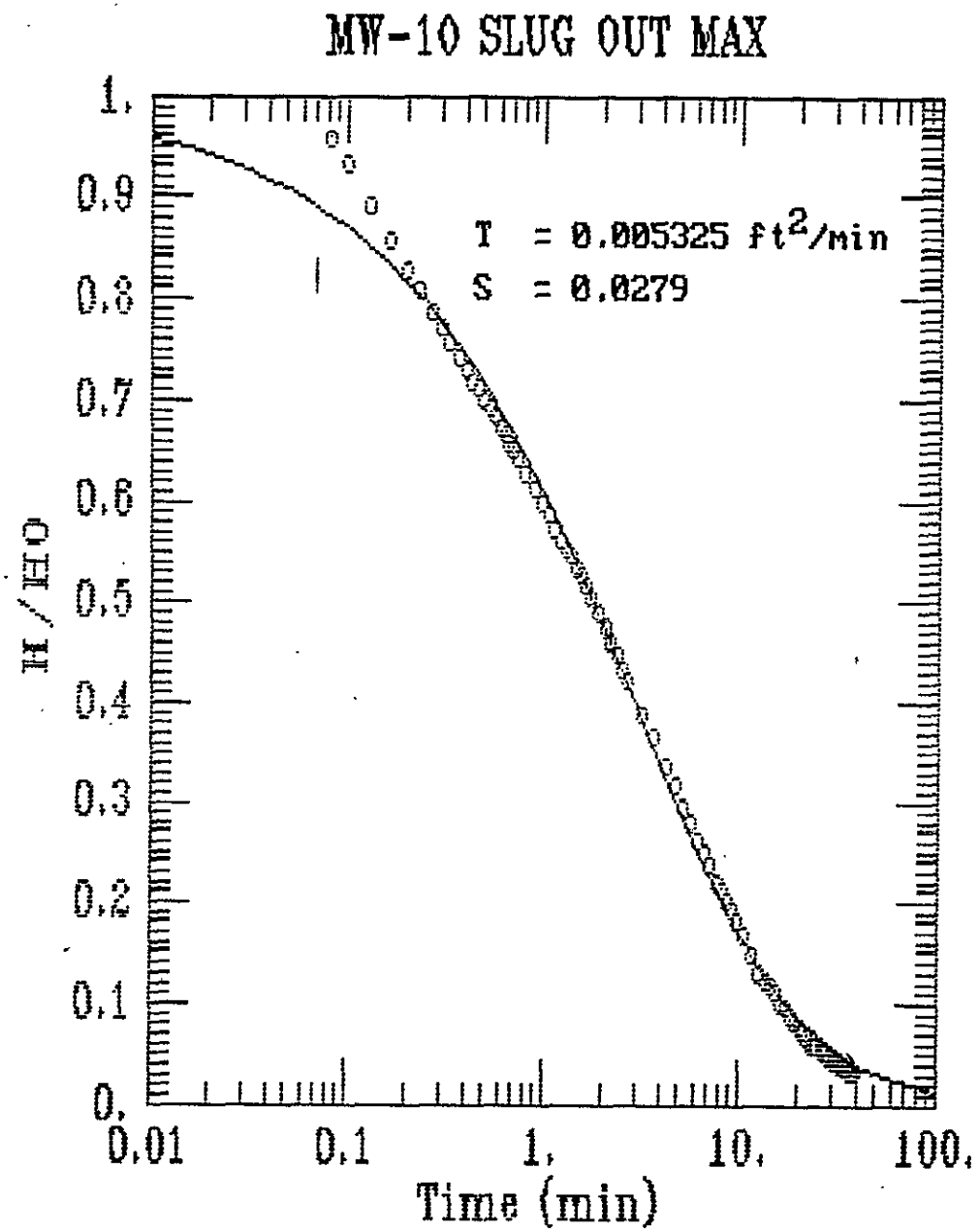

MW-5 SLUG IN MAX
T = 0.007424 ft²/min
S = 0.000869
H / H0
1.
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.
0.01
0.1
1.
10.
100.
Time (min)

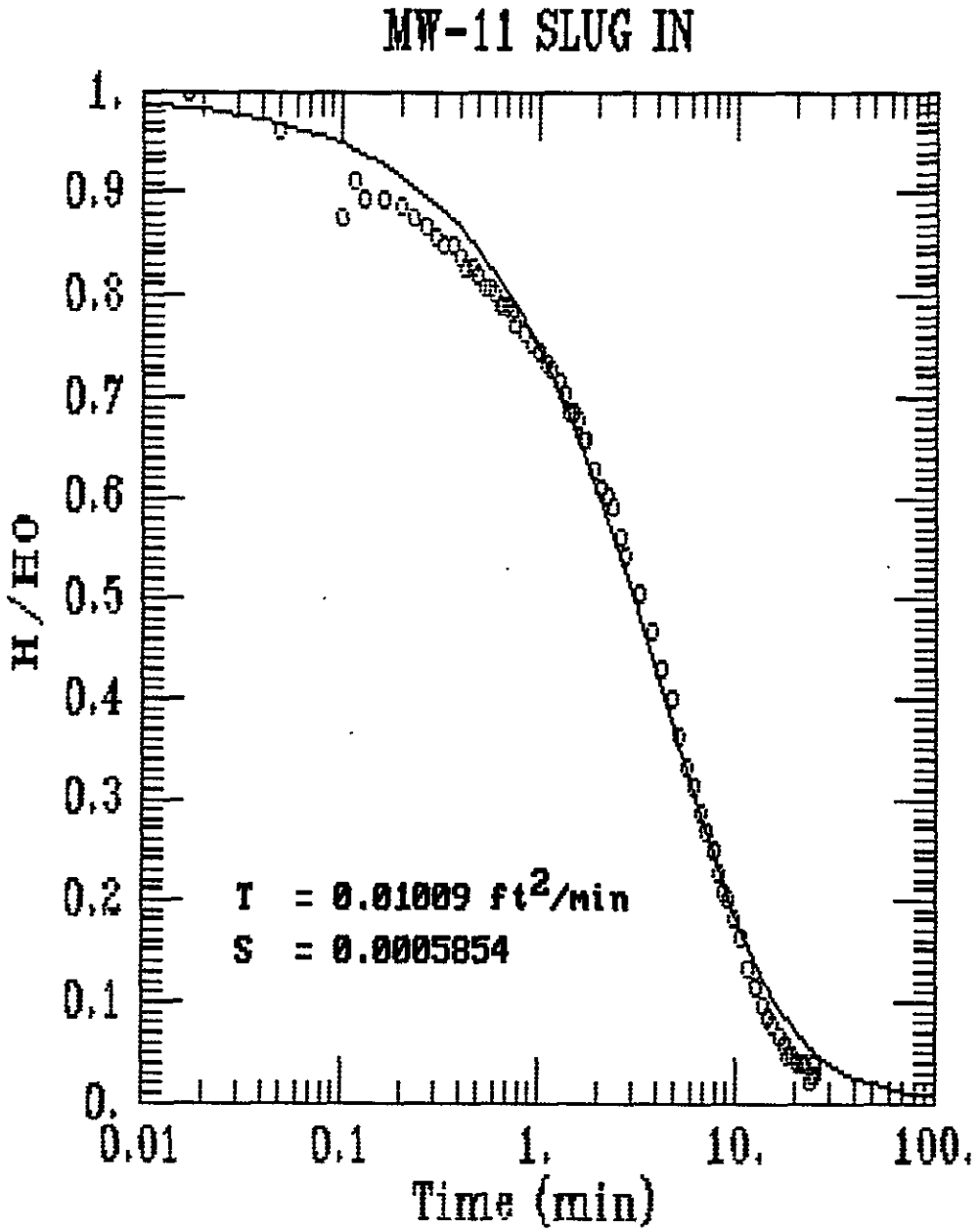

MW-5 Slug Out Analysis
T = 0.006475 ft²/min
S = 0.00187
H/H0
1.
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.
0.01
0.1
1.
10.
100.
Time (min)

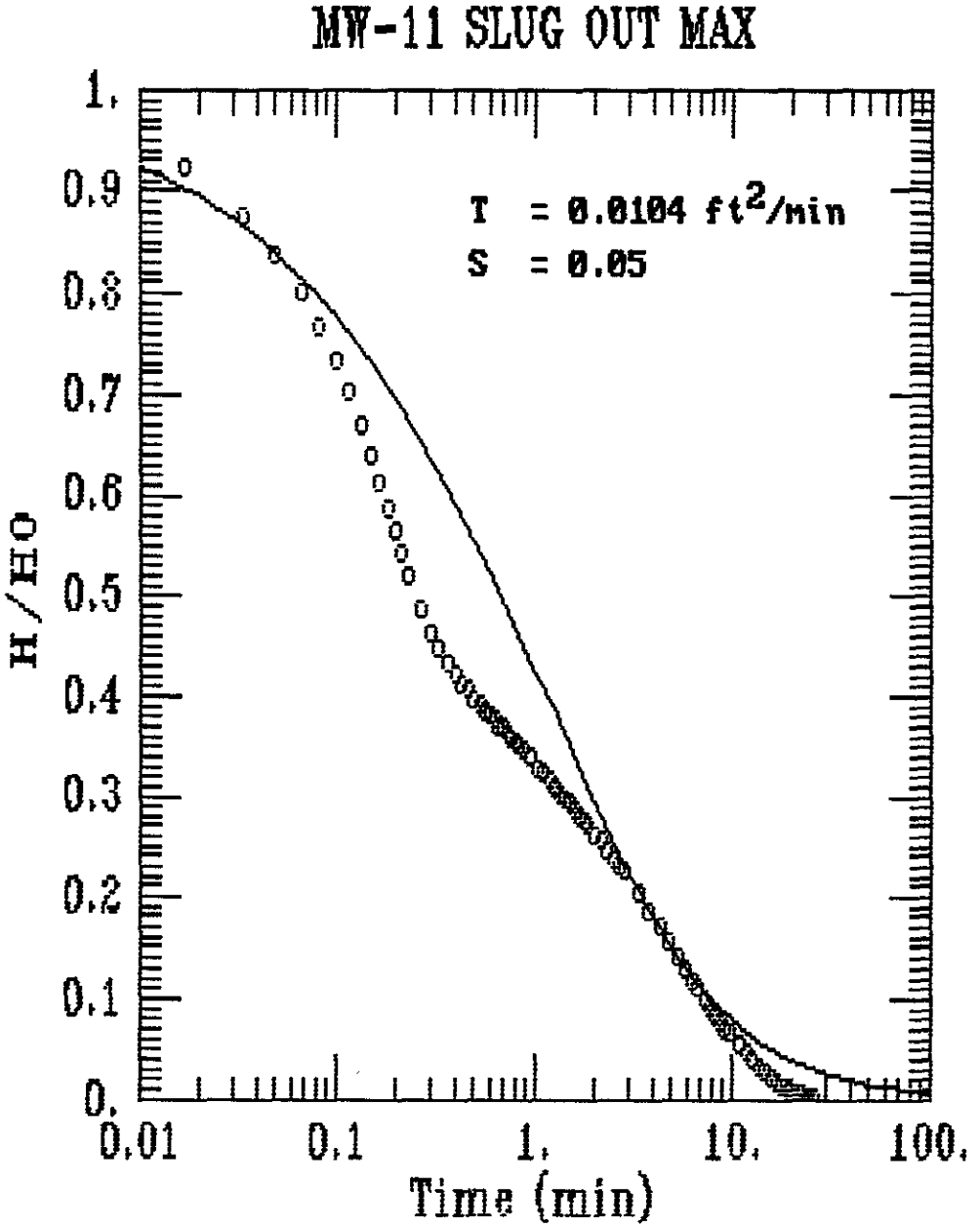

MW-6 SLUG IN MAX
T = 0.007678 ft²/min
S = 0.0002773
H/HO
1.2
1.08
0.96
0.84
0.72
0.6
0.48
0.36
0.24
0.12
0.
0.01
0.1
1.
10.
100.
Time (min)

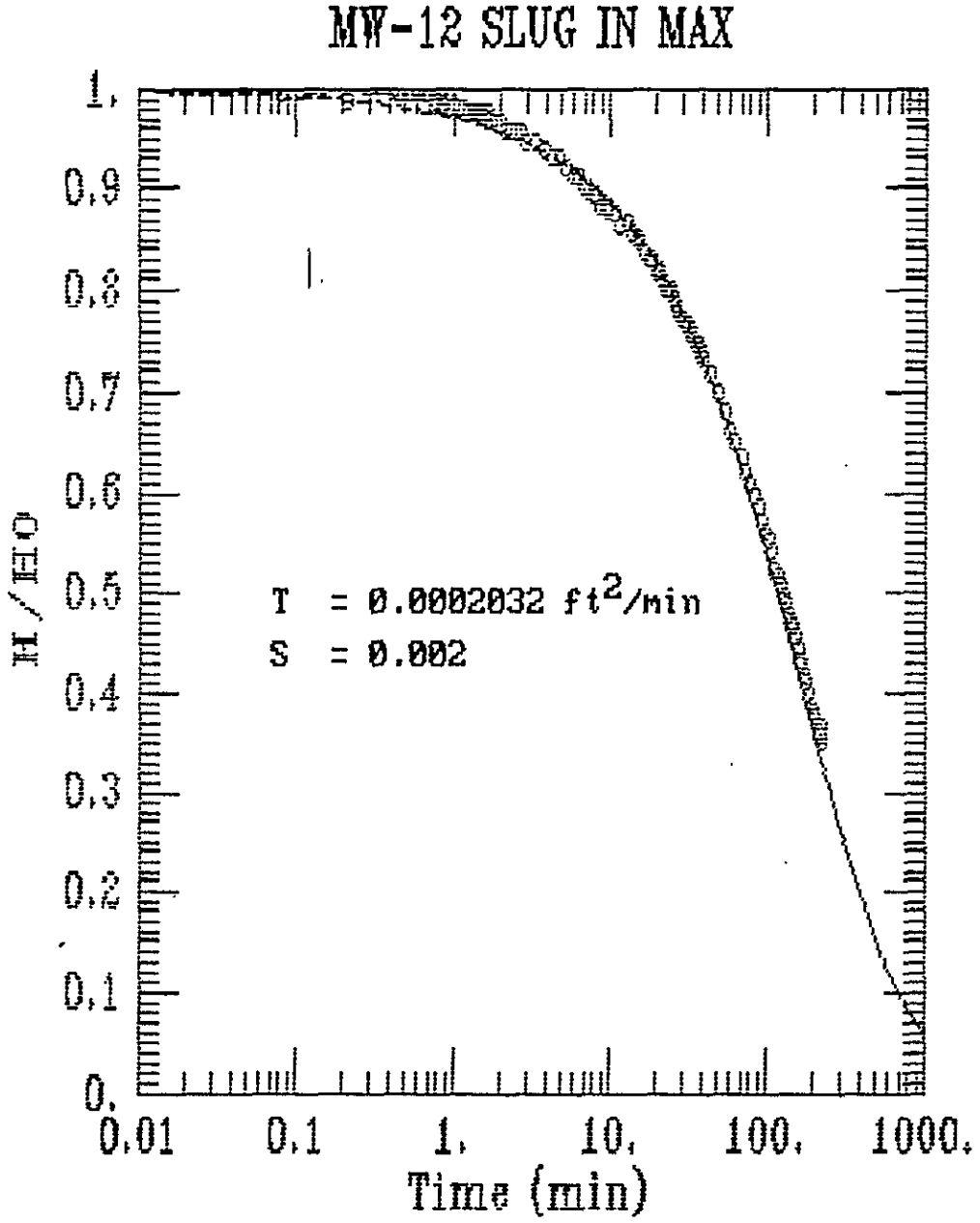

MW-6 SLUG OUT MAX
T = 0.00759 ft²/min
S = 0.003
H/HO
1.
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.
0.01
0.1
1.
10.
100.
Time (min)

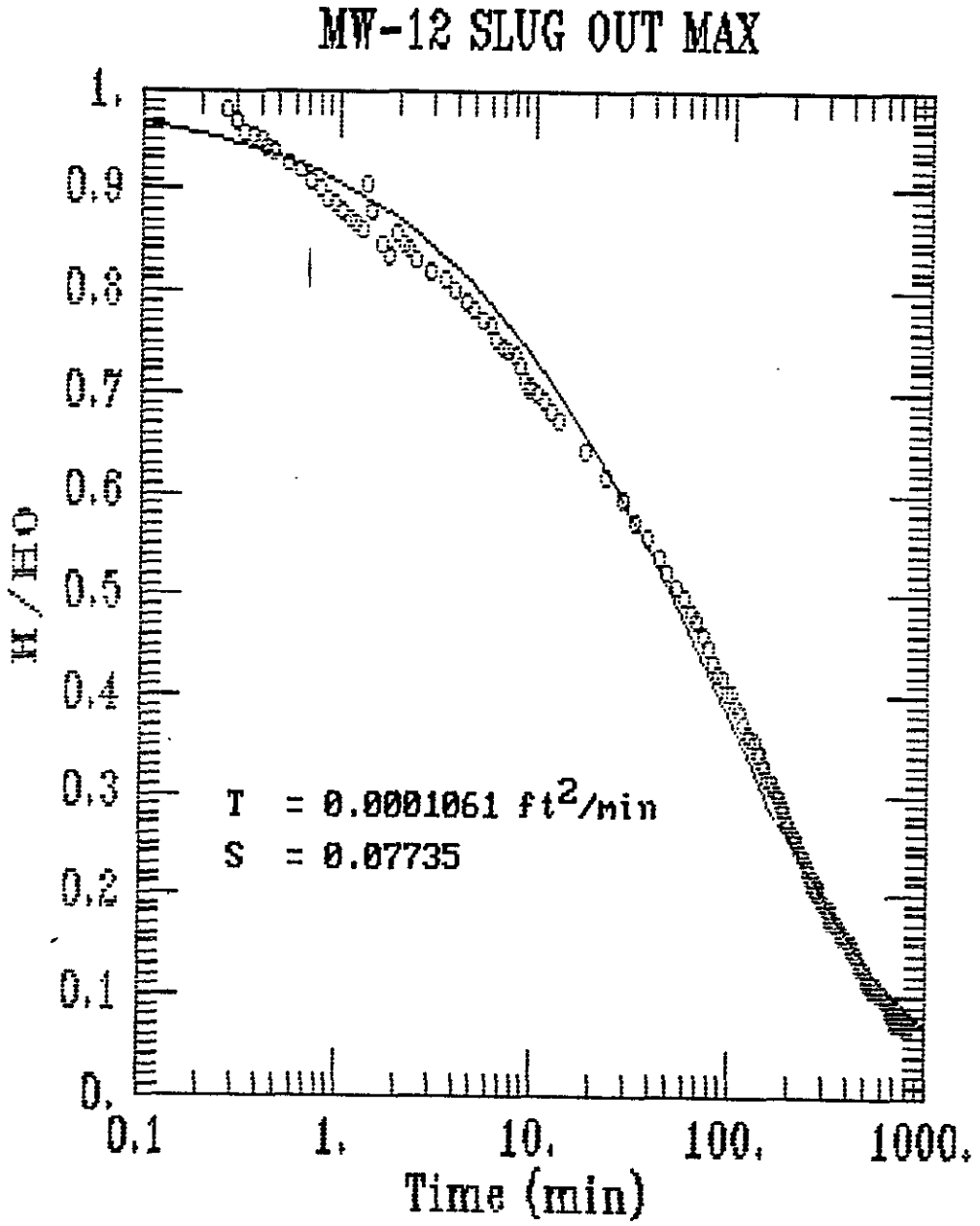

MW-10 SLUG IN MAX
T = 0.004503 ft²/min
S = 0.01541
H / H0
1.
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.
0.1
1.
10.
100.
Time (min)


MW-10 SLUG OUT MAX
T = 0.005325 ft²/min
S = 0.0279
H / H0
1.
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.
0.01
0.1
1.
10.
100.
Time (min)


MW-11 SLUG IN
H/HO
1.
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.
0.01
0.1
1.
10.
100.
Time (min)
T = 0.01009 ft²/min
S = 0.0005854


MW-11 SLUG OUT MAX
T = 0.0104 ft²/min
S = 0.05
H/HO
1.
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.
0.01
0.1
1.
10.
100.
Time (min)


MW-12 SLUG IN MAX
1.
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.
H/H0
T = 0.0002032 ft2/min
S = 0.002
0.01
0.1
1.
10.
100.
1000.
Time (min)


MW-12 SLUG OUT MAX
1.
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.
H / Ho
T = 0.0001061 ft²/min
S = 0.07735
0.1
1.
10.
100.
1000.
Time (min)