THE PHASE III SUBSURFACE INVESTIGATION NEAR THE METRO RAIL A-130 CORRIDOR LOS ANGELES, CALIFORNIA

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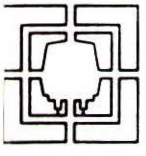

METRO RAIL TRANSIT CONSULTANTS
DMJM/PBQD/KE/HWA

A1581

THE PHASE III SUBSURFACE INVESTIGATION NEAR THE METRO RAIL A-130 CORRIDOR LOS ANGELES, CALIFORNIA

Prepared by

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Prepared for

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24 April 1987

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1.0 INTRODUCTION

This report documents the Phase III subsurface investigation that was conducted by The Earth Technology Corporation from late November through December 1986 in the vicinity of the Metro Rail A-130 corridor. This investigation entailed drilling 6 boreholes to depths ranging from 30 to 60 ft in the vicinity of the Denny's Restaurant and west of the Vignes Street off-ramp from the Santa Ana (101) Freeway, and collecting soil and groundwater samples from each borehole. Ten soil and 7 groundwater samples were analyzed for total petroleum hydrocarbons, organic priority pollutants, sulfides, and pH. The area of investigation includes the south portion of parcel A1-024 plus parcels A1-031 and A1-032 (Refer to Figure 5 for parcel locations).

1.1 SITE BACKGROUND

The subsurface investigation area is bordered by the Santa Ana Freeway (Route 101) and by Ramirez, Howard, and Lyon Streets in the City of Los Angeles (T1S, R13W, Sec. 27), California. Land use in the vicinity consists of industrial plants, a City technical center, an Amtrak station, and a Denny's Restaurant. Figure 1 shows the general location of the study area relative to the industrialized Los Angeles area. Figure 2 is an areal geologic map.

Only limited land use information is available for the vicinity of the investigation area prior to 1870. Scattered data suggest that, from 1870 to 1941, the Southern California Gas Company and a predecessor, the Los Angeles Gas and Electric Company used a portion of the land on Aliso Street for coal/oil gas generation. In 1943, the Southern California Gas Company ceased the gas generation operation and converted the plant into a butadiene production facility. Butadiene gas was produced through a thermal "cracking" process. This process consisted of mixing oil distillates with steam and heating the mixture in gas generators. Liquid from the condensed gas was piped to the Shell Chemical Company in Torrance for purification. The Southern California Gas Company ceased production of the butadiene gas around 1946. Southern California Gas Company sold the property about 30 years ago, and there is no available data on the use of the buildings or land after 1946.

SOURCE: USGS (1972)

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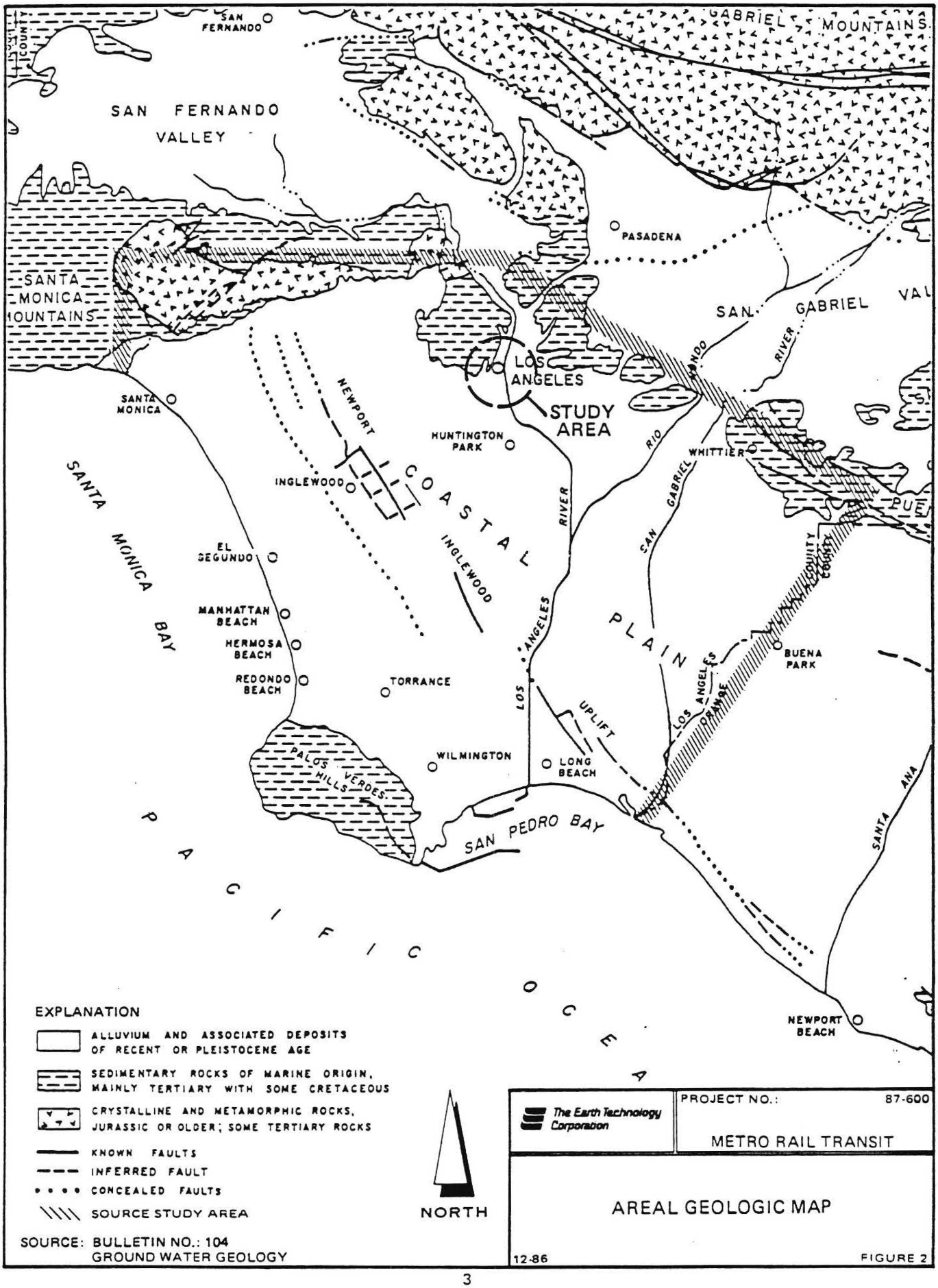
METRO RAIL

GENERAL LOCATION MAP
METRO RAIL INVESTIGATION SITE
LOS ANGELES, CA

9-86

FIGURE 1


SAN FERNANDO
SAN FERNANDO VALLEY
GABRIEL MOUNTAINS
SANTA MONICA MOUNTAINS
PASADENA
SAN GABRIEL VAL
RIVER
LOS ANGELES
STUDY AREA
SANTA MONICA
NEWPORT
HUNTINGTON PARK
INGLEWOOD
COASTAL
INGLEWOOD
RIO HONDO
WHITTIER
SAN GABRIEL RIVER
SANTA MONICA BAY
EL SEGUNDO
MANHATTAN BEACH
HERMOSA BEACH
REDONDO BEACH
TORRANCE
LOS ANGELES PLAIN
BUENA PARK
UPLIFT
LOS ANGELES ORANGE
WILMINGTON
LONG BEACH
PALOS VERDES HILLS
SAN PEDRO BAY
SANTA ANA
PACIFIC OCEAN
NEWPORT BEACH
EXPLANATION
ALLUVIUM AND ASSOCIATED DEPOSITS OF RECENT OR PLEISTOCENE AGE
SEDIMENTARY ROCKS OF MARINE ORIGIN, MAINLY TERTIARY WITH SOME CRETACEOUS
CRYSTALLINE AND METAMORPHIC ROCKS, JURASSIC OR OLDER; SOME TERTIARY ROCKS
KNOWN FAULTS
INFERRED FAULT
CONCEALED FAULTS
SOURCE STUDY AREA
NORTH
SOURCE: BULLETIN NO.: 104
GROUND WATER GEOLOGY
The Earth Technology Corporation
PROJECT NO.: 87-600
METRO RAIL TRANSIT
AREAL GEOLOGIC MAP
12-86
FIGURE 2

These gas facilities extended onto parts of parcel A1-024. However, parcels A1-031 and A1-032 are located west and south of gas production facilities that have been identified (Refer to Figure 5 for parcel locations).

1.2 PURPOSE AND SCOPE OF INVESTIGATION

The investigation was undertaken to estimate the nature and extent of potentially hazardous materials in the subsurface and groundwater at the site.

The scope of work consisted of numerous tasks. These tasks were described in the Work Plan, which was prepared by Earth Technology, and are summarized below:

- Obtain necessary permits for drilling activities.
- Prepare and implement a site specific Health and Safety Plan.
- Prepare and implement an on site decontamination program for drilling activities.
- Set up procedures for storing drums containing soil and waste water on site and for transporting the drums to an acceptable disposal site.
- Conduct a geophysical investigation to assist in finding locations where drilling may be possible.
- Conduct a Cone Penetrometer (CPT) probing investigation to assist in finding locations where drilling may be possible.
- Conduct a subsurface soil and groundwater sampling program.
- Conduct an Organic Vapor Analyzer (OVA) and hydrogen sulfide gas detection program.

- Submit soil and groundwater samples for chemical analysis to an approved laboratory.
- Evaluate data developed during the site investigation.
- Prepare and submit a report documenting the findings, assessments, and conclusions resulting from the investigation.

2.0 GEOLOGY AND HYDROLOGY

2.1 SITE GEOLOGY

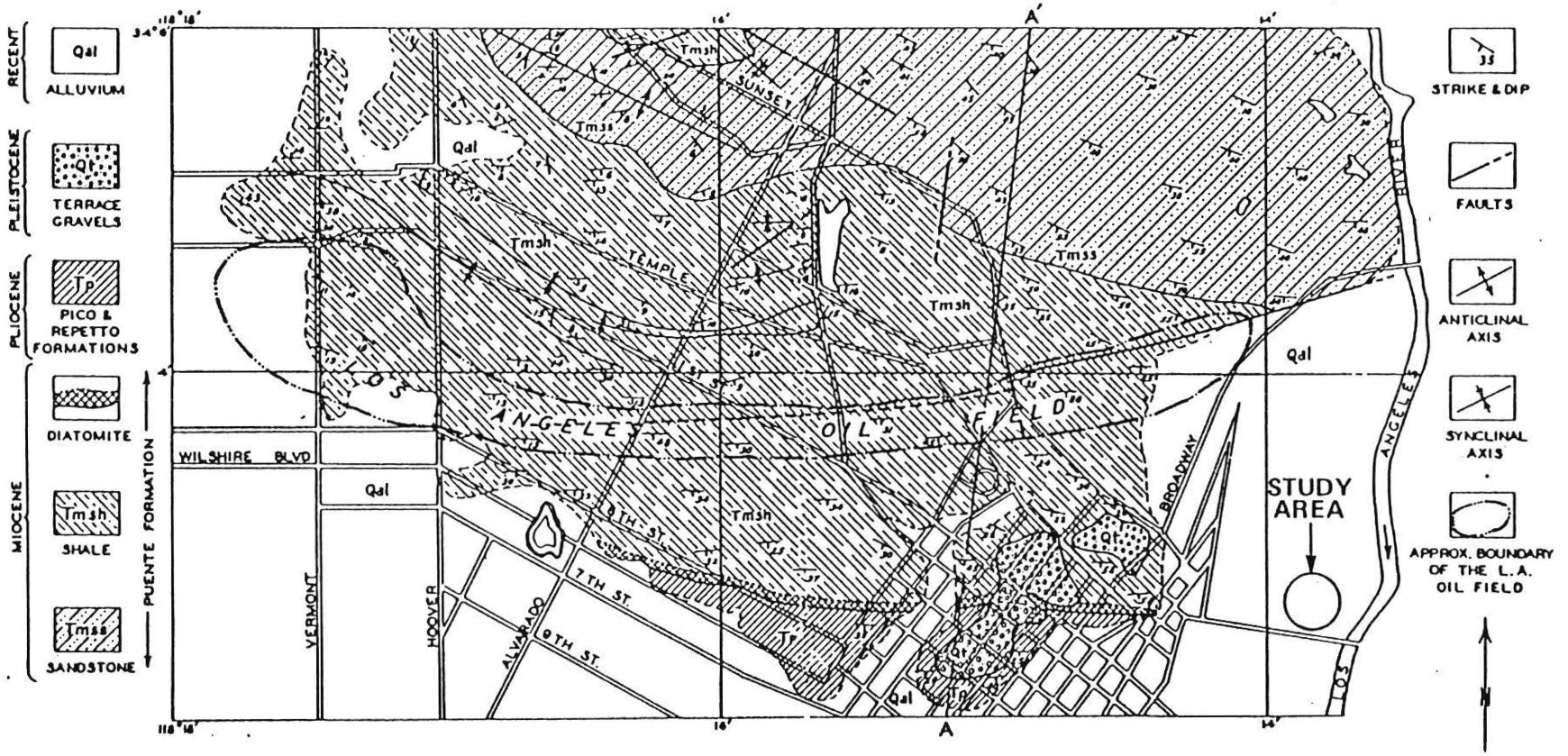
REGIONAL GEOLOGY

The investigation area is located within an alluviated lowland known as the Los Angeles Basin. The basin is underlain by a structural depression composed primarily of marine and non-marine clastic sedimentary rock. Features specific to the basin area are:

- The Newport-Inglewood and Whittier fault zones, which separate the basin into northwestern, southwestern, northeastern, and central blocks
- The N70W Los Angeles anticline, a major geologic influence to the central block
- A narrow fault and folding zone of the south limb of the Elysian Park anticline.

The site is within the boundaries of major Newport-Inglewood, Whittier, and Santa Monica fault zones in the central block. There are no known active or potentially active faults identified within the study area.

The Los Angeles City oil field is another feature specific to the study area. The field is in the east-central part of the metropolitan area and is located along the south side of the narrow fault and folding zone on the south limb of the Elysian Park Anticline. It consists of three distinct production areas - eastern, central, and western. Figure 3 shows the location of the oil field in relation to the site.



NOT TO SCALE

SOURCE: BULLETIN NO. 118, CALIFORNIA DIVISION OF MINES

The Earth Technology Corporation

PROJECT NO.: 87-600

METRO RAIL TRANSIT

LOS ANGELES CITY OIL FIELD
IN RELATION TO SITE

12 86

FIGURE 3

SITE GEOLOGY

The Basin bedrock is exposed in Elysian Park, about 2 miles north of the site. The bedrock is composed of about two thousand feet of sandy siltstone and interbedded conglomerate of the Fernando Formation; and oil-bearing sandstone, shale, and siliceous shale of the Puente Formation. Borehole records from a previous study show the Puente Formation to be approximately 100 ft below the surface within the corridor area. Visual identification of soil samples by Earth Technology's geologist shows that subsurface soils are composed primarily of:

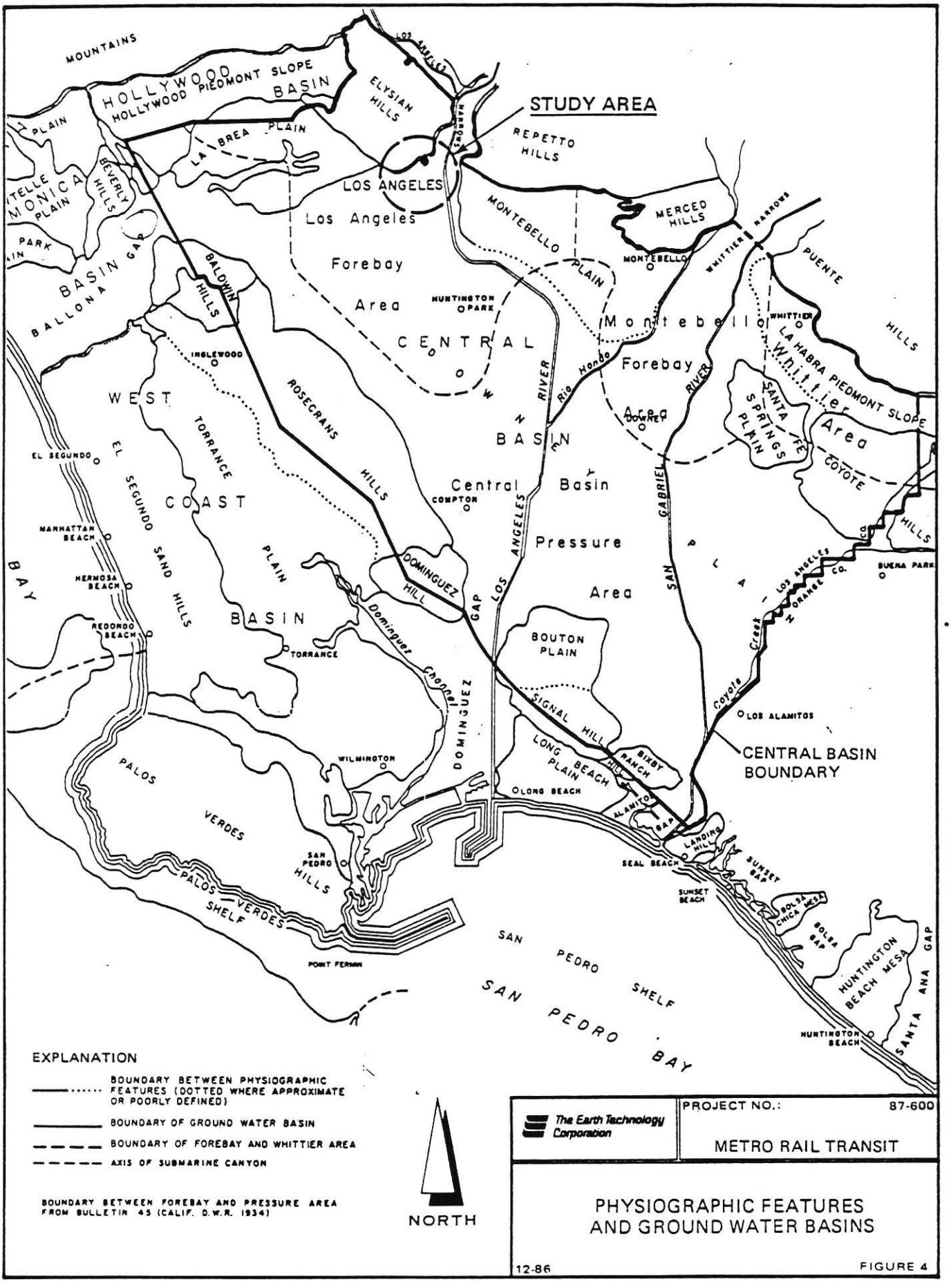
- An upper fill consisting of silty sand to a depth of approximately 5 ft below the surface
- An upper unit of silty sand and clayey sand that grades to sand
- A middle unit of gravelly sands and cobbles
- A lower unit of sand that grades to gravelly sands and cobbles.

2.2 SITE HYDROLOGY

The site is located in the Los Angeles Forebay area. Figure 4 shows the boundary of the forebay area. A semiperched aquifer consisting of coarse sands and gravels is common near the surface in the Forebay area. Thickness of the aquifer is 0 to 60 feet, and occurs as irregular patches.

The Gaspur and Exposition aquifers exist west and south of the Los Angeles River and in the vicinity of the study area (Department of Water Resources, Bulletin No. 104). These aquifers are from 10 ft to greater than 100 ft in thickness and consist mainly of sand and gravel with clay and silt lenses. The aquifers are not differentiated from each other and are overlain by alluvium. Historically, wells were installed in the Gaspur aquifer. These existing well yields are high.

Based on visual observation and site borehole logs, it appears that the site geology consists of mixed alluvium, bedrock, and river gravel and cobble depo-


STUDY AREA
HOLLYWOOD
HOLLYWOOD PIEDMONT SLOPE
BASIN
ELYSIAN HILLS
LA BREA PLAIN
REPETTO HILLS
LOS ANGELES
Los Angeles Forebay Area
CENTRAL BASIN
MONTEBELLO PLAIN
MERCED HILLS
MONTEBELLO
WHITTIER NARROWS
PUENTE HILLS
WHITTIER
LA HABRA PIEDMONT SLOPE
Whittier Area
SANTA FE SPRINGS PLAIN
COYOTE HILLS
BUENA PARK
Montebello Forebay Area
DOWNEY
HUNTINGTON PARK
BALDWIN HILLS
INGLEWOOD
BASIN GAP
BALLONA
PARK
ITELLE MONICA PLAIN
BEVERLY HILLS
ROSECRANS HILLS
TORRANCE
WEST COAST BASIN
EL SEGUNDO
EL SEGUNDO SAND HILLS
MANHATTAN BEACH
HERMOSA BEACH
REDONDO BEACH
TORRANCE
PLAIN
BAY
Central Basin Pressure Area
COMPTON
DOMINGUEZ HILL
DOMINGUEZ GAP
LOS ANGELES RIVER
SAN GABRIEL RIVER
Rio Hondo
Dominguez Channel
DOMINGUEZ
BOUTON PLAIN
SIGNAL HILL
LONG BEACH PLAIN
LONG BEACH
ALAMITOS GAP
BIXBY RANCH
LOS ALAMITOS
Coyote Creek
LOS ANGELES - ORANGE CO.
CENTRAL BASIN BOUNDARY
WILMINGTON
PALOS VERDES HILLS
PALOS VERDES SHELF
POINT FERMIN
SAN PEDRO HILLS
LANDING HILL
SEAL BEACH
SUNSET GAP
SUNSET BEACH
BOLSA CHICA MESA
BOLSA GAP
HUNTINGTON BEACH MESA
SANTA ANA GAP
HUNTINGTON BEACH
SAN PEDRO SHELF
SAN PEDRO BAY
EXPLANATION
BOUNDARY BETWEEN PHYSIOGRAPHIC FEATURES (DOTTED WHERE APPROXIMATE OR POORLY DEFINED)
BOUNDARY OF GROUND WATER BASIN
BOUNDARY OF FOREBAY AND WHITTIER AREA
AXIS OF SUBMARINE CANYON
BOUNDARY BETWEEN FOREBAY AND PRESSURE AREA FROM BULLETIN 45 (CALIF. D.W.R. 1934)
NORTH
The Earth Technology Corporation
PROJECT NO.: 87-600
METRO RAIL TRANSIT
PHYSIOGRAPHIC FEATURES AND GROUND WATER BASINS
12-86
FIGURE 4

sits. Groundwater was encountered at approximately 30 ft below the surface. Water-bearing material consists of coarse sands and gravelly sands with occasional lenses of clay. The water-bearing zones appear to have an upper and lower unit separated by gravel and cobble.

Based on regional groundwater data from the Los Angeles County Flood Control District, the 1975 static groundwater table is 50 to 100 ft below the bedrock surface in the vicinity of Union Station, which is adjacent to the study site. This indicates regional perched conditions.

3.0 SITE INVESTIGATION

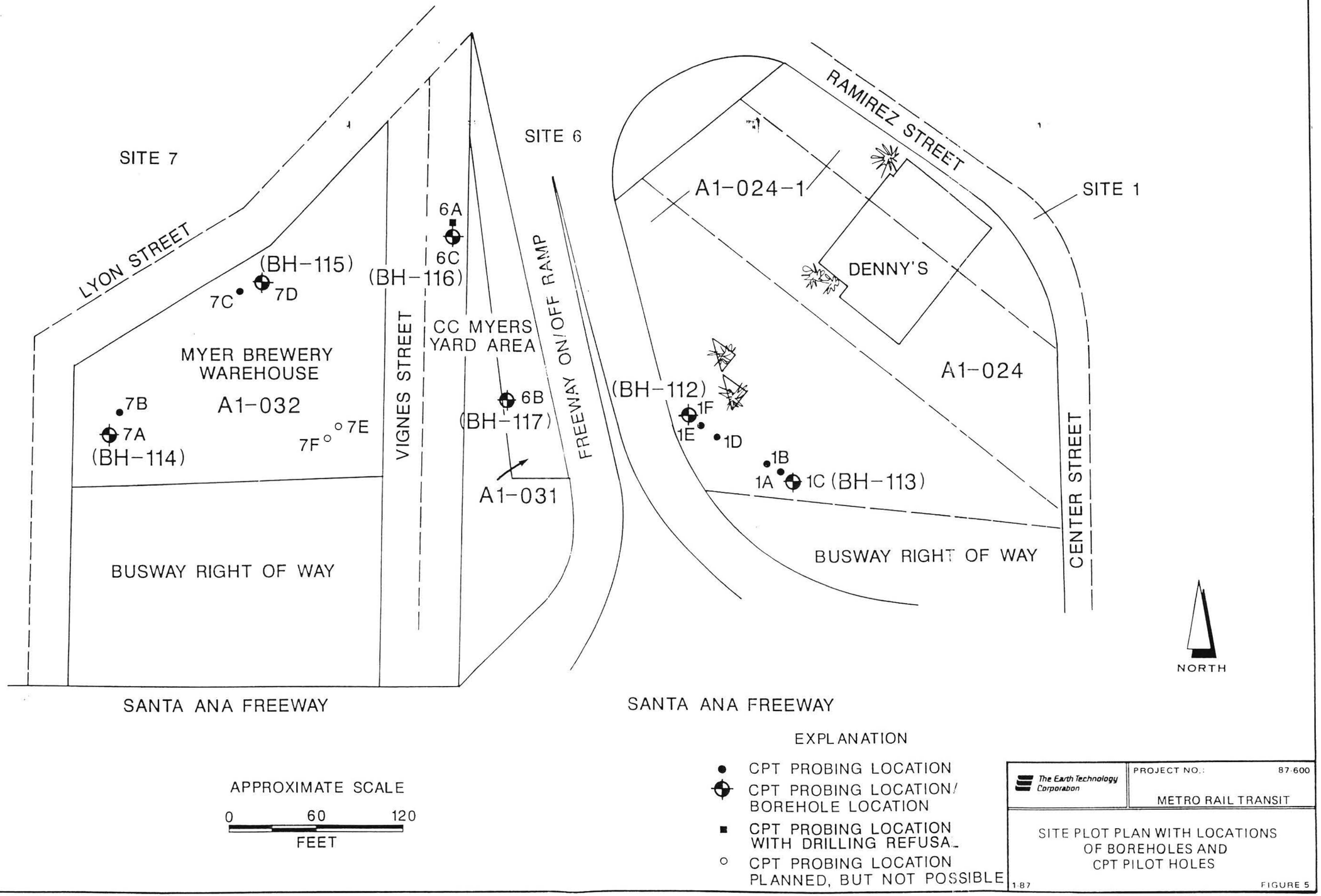
3.1 DRILLING AND SOIL SAMPLING

Six boreholes were drilled to a maximum depth of 60 ft using a Mobile B-53 drill rig with 6-in and 8-in outer diameter hollow stem augers. Borehole locations are presented in Figure 5. Fifty soil samples were collected from the 6 boreholes. Site daily activity records are presented in Appendix A.

Samples were collected at five-foot intervals using a split spoon sampler containing brass liners. The sampler was opened as soon as it was removed from the borehole. Two of the three brass liners were removed and sealed with polycarbonate caps, labelled, placed in airtight sample containers, and placed on ice in preparation for delivery to the analytical laboratory. All samples were accompanied by chain-of-custody forms (Appendix B). The third sample was extruded from its brass liner into a sealed, labeled, plastic sampling bag for subsequent headspace analysis. Headspace samples were set aside in a warm location for a minimum of 25 minutes to allow the volatiles to reach equilibrium within the headspace. The headspace samples were then analyzed using the Century Foxboro Model 128 Organic Vapor Analyzer (OVA). Headspace readings were compared with background levels to obtain an indication of the level of contamination at that depth.

After each sampling event, the sampler was cleaned with an Alconox wash, followed by two water rinses and a distilled water rinse. Downhole sampling equipment and tools, including augers, were decontaminated and the work area of the drill rig was cleaned between each borehole and after the last borehole using a steam cleaner. Boreholes were grouted with cement to the surface. Spoils were stored in a central area on site in Class 17-H 55-gallon drums and identified by borehole. Spoils have been disposed of by a qualified disposal company following laboratory analysis of soil samples.

Borehole logs are presented in Appendix C. Boreholes were logged by The Earth Technology geologist. Observations of the soil were made visually for color, grain size, and texture. Soils were identified using the Unified Soil Classification System.



APPROXIMATE SCALE

0 60 120

FEET

EXPLANATION

- ● CPT PROBING LOCATION
- ⊕ CPT PROBING LOCATION/ BOREHOLE LOCATION
- ■ CPT PROBING LOCATION WITH DRILLING REFUSAL
- ○ CPT PROBING LOCATION PLANNED, BUT NOT POSSIBLE

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METRO RAIL TRANSIT

SITE PLOT PLAN WITH LOCATIONS OF BOREHOLES AND CPT PILOT HOLES

1-87

FIGURE 5

Asphalt or cement paving covered the surface at all but BH-114. Fill material consisting of dark brown silty sand was encountered below that paving to a depth of approximately 5 feet. A moderately-to well-sorted sand with occasional brick fragments was found to about 15 feet deep. It was impossible to discern whether or not this soil was fill material.

Below 15 feet, the soil consists primarily of medium to coarse sand, sandy gravel, and cobbles with little or no fine material. Large cobbles and layers of gravelly cobbles which often resulted in sample refusal were encountered at depths of about 18 to 23 feet and 38 to 51 feet.

3.2 LABORATORY ANALYSES

Ten soil samples were selected for laboratory analysis (Table 1). Sample selection was based on visual observations, headspace OVA readings, and the soil material encountered. At least one sample per borehole was chosen. Soil samples were analyzed for organic priority pollutants (EPA Methods 8240 and 8270), total petroleum hydrocarbons (EPA Method 418.1), and pH (EPA Method 150.1)(see Table 2).

One groundwater sample was collected from each of the 6 boreholes. Groundwater samples were analyzed for organic priority pollutants (EPA Methods 624 and 625), total petroleum hydrocarbons (EPA Method 418.1), pH (EPA Method 150.1), and sulfides (EPA Method 9030)(see Table 3).

Laboratory quality assurance/quality control (QA/QC) included, in addition to reagent blanks and standards, 10 percent duplicates and 10 percent spikes (surrogates). A duplicate groundwater sample was collected from BH-116 and was labelled with a non-existing borehole identification (BH-118) to check the integrity of the laboratory procedure. The duplicate and recovery data are within the acceptable ranges of reproducibility and accuracy described by the California Department of Health Services. Soil sample recovery was minimal to nil (sample refusal); therefore, no duplicate soil samples were available for analysis. Soil sample integrity has been implied since duplicate soil samples from the Phase I Metro Rail study, which were taken 4 days prior to the first

Phase III samples, were within acceptable limits. In addition, all samples were analyzed by the same laboratory and were sent to the laboratory without interruption between Phase I and Phase III.

Refer to Appendix B for laboratory reports of soil and groundwater analyses.

TABLE 1. SOIL AND GROUNDWATER SAMPLES COLLECTED NEAR METRORAIL CORRIDOR A130

Date	Borehole	Completion Depth(ft)	Water Depth(ft)	Number of Soil Samples	Number of Water Samples
11/25/86	BH-112	45	30	9	1
11/25/86	BH-113	40	30	7	1
11/26/86	BH-114	55	30	9	1
12/01/86	BH-115	60.5	30	10	1
12/02/86	BH-116	30	30	6	2(1)
12/02/86	BH-117	60	30	9	1

(1) Duplicate water sample was taken at BH-116 and labelled BH-118.

TABLE 2. SUMMARY OF LABORATORY ANALYSIS OF SOIL[1] NEAR METRO RAIL CORRIDOR A130

Constituent	BH-112 (45')	BH-113 (40')	BH-114 (40')	BH-115 (30')	BH-115 (50')	BH-116 (20')	BH-116 (30')	BH-117 (40')	BH-117 (55')	BH-117 (60')
pH, unit	8.14	7.45	7.57	7.10	7.59	4.02	6.18	9.29	8.30	8.85
Total Petroleum Hydrocarbons (mg/kg)	5	6	3	5	11	3	26	4	2	6
Acenaphthylene (mg/kg)	*	*	0.3	*	*	*	*	*	*	*

* Samples contain <0.2 mg/kg

(1) Samples taken from depths indicated in parentheses.

TABLE 3. SUMMARY OF LABORATORY ANALYSIS OF GROUNDWATER[1] NEAR METRO RAIL CORRIDOR A130

Constituent	BH-112 (45')	BH-113 (40')	BH-114 (55')	BH-115 (60')	BH-116[2] (30')	BH-117 (60')
pH, unit	7.05	6.74	7.74	7.00	6.29	7.05
Total Petroleum Hydrocarbons (mg/l)	6	4	28	12	7	3
Sulfide (mg/l)	3.6	0.41	0.64	0.38	0.81	0.33

(1) Samples taken from depths indicated in parentheses.

(2) Average of duplicate samples (duplicate was labeled BH-118).

4.0 ADDITIONAL INVESTIGATIONS

4.1 UNDERGROUND PIPE AND CABLE INVESTIGATION

Each designated borehole location was surveyed for underground pipes and cables. Two to three areas in the vicinity of the planned boreholes were cleared for drilling by a subcontractor using geophysical equipment. The subcontractor used equipment with a sensor that detects subsurface metallic pipes and cables. The equipment has limited capabilities: it cannot detect wiring or piping located beneath reinforced concrete and it is limited to about the top 7 feet from the surface. Six cleared borehole locations were successfully drilled.

4.2 CPT INVESTIGATION

On November 17 to 19, Earth Technology conducted field probing using an electronic cone penetrometer (CPT). The objective of this investigation was to locate seven borehole sites by probing with the CPT. Using the hydraulics of the CPT, Earth Technology personnel pushed 1 1/4-inch diameter rods fitted with a "dummy" tip into the soil in specific areas in which borehole locations were required. This method proved efficient in finding borehole locations that a drill rig equipped with hollow stem augers could penetrate.

The target depth of probing for the CPT was 20 ft. It was evaluated that if the CPT were able to attain a depth of 20 ft, there should be no deeper artificial obstructions to impede drilling. The hydraulic pressure was monitored while pushing the rod. Refusal was noted when pressures on the rod in excess of 1,800 to 2,000 psi were necessary.

To locate the seven borehole locations, Earth Technology personnel attempted a total of 13 CPT probings (see Table 4 and Figure 5). The CPT method was successful in finding six locations suitable for drilling. One location was not possible due to a concrete foundation at that location.

TABLE 4. SUMMARY OF CPT PROBINGS NEAR METRO RAIL CORRIDOR 130

CPT Location	CPT Site	CPT ID	Completion Depth (ft)	Remarks	Borehole Number
Parking lot in back of Parcel A1-024-1	No. 1	1A	8.46	Refusal	--
		1B	15.35	Refusal	--
		1C	32.00	Refusal	BH-113
		1D	13.60	Refusal	--
		1E	12.20	Refusal	--
		1F	20.10	Refusal	BH-112
CC Myers Yard (parcel A1-031)	No. 6	6A	18.60	Refusal	--
		6B	22.60	Refusal	BH-117
		6C	27.93	"crunching" at 13, 17.5, and 18-19 ft	BH-116
Near Brewery Warehouse (Parcel A1-032)	No. 7	7A	34.99	Refusal	BH-114
		7B	25.61	Refusal	--
		7C	16.00	Refusal	--
		7D	25.34	Refusal	BH-115
		7E	---	Not penetrable	--
		7F	---	Not penetrable	--

All CPT rods were decontaminated by steam cleaning between each probing. If a probehole depth of 25 feet or greater was attained, the CPT rods were steam-cleaned as they passed through a washing device, which is affixed to the bottom of the CPT truck. Possibly contaminated wash water was then pumped from the washing device to a 55-gallon drum for storage. For probehole depths less than 25 feet, the rods were removed below the CPT truck and steam-cleaned prior to re-use. This was found to be a more time-efficient decontamination procedure; however, it was only used for the shallower holes that had not encountered ground water and therefore where hazardous substances were deemed to be at a minimum. At the end of the day, all wash water was transferred from 55-gallon drums to the 4,000-gallon-capacity Baker tank, which was designated for contaminated water generated at the site.

All probeholes 25 or more feet deep were backfilled to grade to reduce the possibility of the hole becoming a pathway for contaminants to enter the uppermost water-bearing zone. To ensure that grouting of the entire hole was accomplished, a bentonite slurry was pumped into the probehole through the rods as they were removed from the ground. Because of the small probehole diameter and the depth of the groundwater (about 30 feet), probeholes less than 25 feet total depth were not grouted. This backfilling method was deemed adequate to accomplish the intended result.

Field personnel worked in Level C personal protection equipment because of the possibility of contact with potentially hazardous contaminants. This level of protection was also used during grouting and decontamination procedures.

5.0 RESULTS AND DISCUSSION

5.1 SOIL CONTAMINATION

The depths of soil samples that were analyzed vary from 20 to 60 feet, but most were from depths of 40 ft or greater. Constituents for which samples were analyzed were below detection limits with the exception of total petroleum hydrocarbons and one sample (BH-114 at 40 ft depth) at which acenaphthylene was measured at 0.3 mg/kg, which is slightly above the detection limit of 0.2 mg/kg. The highest concentration of total petroleum hydrocarbons was 26 mg/kg (BH-116), with most of the samples containing concentrations between 2 and 6 mg/kg. Soil pH was slightly basic (in the 7.00 to 9.00 range) with one exception of acidic soils at BH-116 (pH of 4.02 and 6.18 at depths of 20 and 30 ft, respectively).

Phase I of the Metro Rail project was performed prior to this investigation and in an area overlapping and east of this site. Results of soil and groundwater analyses for the areas south and west of Dennys in Phase I can be found in the Phase I Metro Rail report (TETC, 1987).

5.2 GROUNDWATER CONTAMINATION

No detectable levels of organic priority pollutants were found in any of the water samples. Total petroleum hydrocarbons tended to be less than 10 mg/l, and did not exceed 28 mg/l. Sulfides were detected in all groundwater samples at levels less than 1 mg/l with one exception of 3.6 mg/l (BH-112).

6.0 CONCLUSIONS

Based on the results of the field investigation, the following conclusions can be drawn:

- Materials in the first 15 feet consist primarily of silty sand to sand, some areas of which are probably fill material (as evidenced by brick fragments).

- Materials below 15 feet consist primarily of sand and sandy gravel which contain large cobbles at depths of about 18 to 23 feet and 38 to 51 feet.

- There is evidence at all boreholes of light contamination with petroleum hydrocarbons and sulfides and at one borehole with acenaphthylene, a polynuclear aromatic. Concentrations were low. There is no evidence of soil or groundwater contamination by chlorinated solvents or other organic priority pollutants.

7.0 REFERENCES

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State of California, Department of Water Resources, 1961. Planned Utilization of the Ground Water Basins of the Coastal Plain of Los Angeles County, Bulletin No. 104, Appendix A, Ground Water Geology, June.

U.S. Geological Survey. Los Angeles Quadrangle - Los Angeles County, 7.5 Minute Series Topographic, U.S. Department of the Interior.

Woodward-Clyde Consultants, 1986. Hazardous Materials Investigation at the Construction Site of the Los Angeles Busway, Volumes 1 and 2, prepared for C. C. Meyers, Inc., Pico Rivera, California.

APPENDIX A

SITE DAILY ACTIVITY REPORTS

DAILY ACTIVITY REPORT

SITE Meteo Rail PROJECT NO. 87-600 DATE 11/10/86

~~DRILLING~~ CONTRACTOR Spectrum ~~DRILLER~~ Dana LeTourneau

HELPER

RIG USED CASING USED SAMPLERS USED

START TIME 12:00 END TIME 4:00

PROTECTION LEVEL B C (D)

MONITORING EQUIPMENT HNU 11.7 10.2 OVA RAD EXPL

DESCRIPTION OF WORK PERFORMED Larry Barker & Richard Thomasser (TETC) met w/ B. Ghadiali (MRTC) @ 12:00 noon to discuss parcels A1-024, A1-032, & A1-031. Walked over each parcel to investigate access to parcel for geophysical survey. (1:30 pm) Dana LeTourneau (Spectrum) arrived. Surveyed Borehole locations in the three parcels. Located 7 Borehole possibilities (with an alternate for each). Dana LeTourneau left site @ 3:45pm. Richard Thomasser mapped borehole locations + alternates for future reference. Left site at 4:00 pm.

DESCRIBE PROBLEMS/POTENTIAL PROBLEMS & ACTION

ATTACHMENTS : BOREHOLE LOCATION MAPS

1.	Boring Log(s)	y n	
	Gamma Log(s)	y n	
2.	Well Installation Details	y n	
3.	Water Level Observation	y n	
4.	Conversation Memo(s)	y n	

REPORT PREPARED BY Richard Thomasser DATE 11/10/86

Richard Thomasser

cc: B. Fortes
L. Barker

DAILY ACTIVITY REPORT

SITE METRO RAIL TRANSIT BOREHOLE SITES PROJECT NO. 87-600-0002 DATE 11/25/86

DRILLING CONTRACTOR DRILL-LINE DRILLER GREG DELUCA

HELPER JOHN HALE

RIG USED B-53 (8" augers & 7" drill bit) CASING USED 4" Sch. 40 PVC SAMPLERS USED Split Spoon

START TIME 8:00 END TIME 3:40

PROTECTION LEVEL B (C) D

MONITORING EQUIPMENT HNU 11.7 10.2 (OVA) RAD EXPL

DESCRIPTION OF WORK PERFORMED Completed BH-12 to a depth of 45'. Groundwater encountered at apx 30'. Tar like ~~and~~ odor (slight) from 25 to 45 feet. Lab. samples are BH-12-45 for water and soil. OVA measurement recorded at ≥ 4 at the 45' depth.

Completed BH-113 to a depth of 45'. Groundwater encountered at 30'. Elevated OVA readings >10 at 30'. Soil and H_2O laboratory samples are from 45'

DESCRIBE PROBLEMS/POTENTIAL PROBLEMS & ACTION 1) Drillers didn't have a drill bit. Drill line brought one out. Down time from 9:00 – 9:40 for the drillers. 2) OVA drifting. Values on 1x and 10x range are not consistent when you change scales. 3) PH Temp meter is not working (continued) meter will not stabilize

ATTACHMENTS

1. Boring Log(s)	(y)	n	
Gamma Log(s)	y	(n)	
2. Well Installation Details	y	(n)	
3. Water Level Observation	(y)	n	≤ 30'
4. Conversation Memo(s)	y	(n)	
5. Log Book	(y)	n	

REPORT PREPARED BY B. Fontes DATE 11/25/86

TIME	
	4) Temp meter is not working
12:00 - 1:00	Decon. of downhole equipment + augers
1:30	"Cookie Lees" at the site taking pictures. They were asked to stay beyon the Truck and barriers. There were four of them.

Signature _____ Date _____

DAILY ACTIVITY REPORT

SITE METRO RAIL TRANSIT BOREHOLE SITES PROJECT NO. 87-600-0022 DATE 11/26

DRILLING CONTRACTOR DRILL-LINE DRILLER GREG DELUCA

HELPER JOHN HALE

RIG USED B-53 (8" augers & 8" drill bit) CASING USED 4" Sch. 40 PVC SAMPLERS USED Split Spoon

START TIME 7:30 END TIME ≈ 4:15

PROTECTION LEVEL B (C) D

MONITORING EQUIPMENT HNU 11.7 10.2 (OVA) RAD EXPL

DESCRIPTION OF WORK PERFORMED Completed Borehole BH-114 located in area designated A1-032 (MRT map), adjacent to Myer Brewery warehouse, and the Santa Ana Freeway. BH-114 Completed to depth of 55 feet. Groundwater Encountered at approximately 30 feet.

DESCRIBE PROBLEMS/POTENTIAL PROBLEMS & ACTION started having heaving (sand) in the augers - stopped @ 55 feet. Drillers are getting careless about safety procedures. I talked to their supervisor, and he will emphasized the importance of safety before they come back out to the site

ATTACHMENTS

1. Boring Log(s)	(y)	n	
Gamma Log(s)	y	(n)	
2. Well Installation Details	y	(n)	
3. Water Level Observation	(y)	n	30 feet
4. Conversation Memo(s)	y	(n)	
5. Log Book	(y)	n	

REPORT PREPARED BY Barbara Foster DATE 11/26/86

DAILY ACTIVITY REPORT

SITE METRO RAIL TRANSIT BOREHOLE SITES PROJECT NO. 87-600-0002 DATE 12/1/86

DRILLING CONTRACTOR DRILL-LINE DRILLER GREG DELUCA

HELPER JOHN HALE

RIG USED B-53 (8" augers & 7" drill bit) CASING USED 4" Sch. 40 PVC SAMPLERS USED Split Spoon

START TIME 8:00 END TIME ≤ 2:00

PROTECTION LEVEL B C D

MONITORING EQUIPMENT HNU 11.7 10.2 (OVA) RAD EXPL

DESCRIPTION OF WORK PERFORMED Completed borehole BH-115 to a depth of 60 feet. borehole BH-115 is located in parcel A1-032 (MTR map), Myers Brewery Warehouse, Lyon Street & Vignes Street. Lab. Samples are BH-115-30 (Soil)

BH-115-50 (Soil)

BH-115-60 (water)

Water encountered at 30 feet

DESCRIBE PROBLEMS/POTENTIAL PROBLEMS & ACTION Tried to advance in borehole BH-116 located in CC Myers yard area (parcel A1-031). Augers penetrate approximately 9" of concrete. Moved about 10 feet North to second choice (CPT-"A") and found that we had broken a part to the drill bit. We called it a day's for repairs

ATTACHMENTS

1.	Boring Log(s)	(y)	n
	Gamma Log(s)	y	(n)
2.	Well Installation Details	y	(n)
3.	Water Level Observation	(y)	n ≤ 30 feet
4.	Conversation Memo(s)	y	(n)
5.	Log Book	(y)	n page 43

REPORT PREPARED BY Barbara Fontes DATE 12/1/86

DAILY ACTIVITY REPORT

SITE METRO RAIL TRANSIT BOREHOLE SITES PROJECT NO. 87-600-0002 DATE 12/2/86

DRILLING CONTRACTOR DRILL-LINE DRILLER GREG DELUCA

HELPER JOHN HALE

RIG USED B-53 (6" augers & 7" drill bit) CASING USED 4" Sch. 40 PVC SAMPLERS USED Split Spoon

START TIME 8:00 END TIME 4:50 pm

PROTECTION LEVEL B C D

MONITORING EQUIPMENT HNU 11.7 10.2 (OVA) RAD EXPL

DESCRIPTION OF WORK PERFORMED 1) Completed Borehole BH-117 to a depth of 60 feet. Encountered groundwater at 30 feet. Soils appeared clean. Elevated OVA reading of 9, 8, and 6.5 ppm were recorded at 40', 55' and 60'. 2) Completed borehole BH-116 to a depth of 30'. Encountered groundwater at 30 feet. Elevated OVA reading of 11 ppm were recorded at 20 feet. Background OVA readings were at 5.5 ppm for BH-117 and 2ppm for BH-116

Lab. Samples: BH-116-20 (soil), BH-116-30 (water), BH-118-60 (water) which is a quality assurance sample of BH-116-30.

~~DESCRIBE PROBLEMS/POTENTIAL PROBLEMS & ACTION~~ BH-117-40 (soil), BH-117-60 (soil) BH-117-55 (soil), BH-117-60 (water).

All equipment was decontaminated before leaving the site. A drum inventory was completed, and all drums were labelled for contents and borehole ID.

ATTACHMENTS

1. Boring Log(s)	(y)	n	
Gamma Log(s)	y	(n)	
2. Well Installation Details	y	(n)	
3. Water Level Observation	(y)	n	30 feet
4. Conversation Memo(s)	y	(n)	
5. Log Book	(y)	n	pg 44

REPORT PREPARED BY Barbara Fontes DATE 12/2/86

APPENDIX B

CHAIN OF CUSTODY FORMS

AND LABORATORY DATA SHEETS

CHEMICAL RESEARCH LABORATORIES, INC.

11631 SEABOARD CIRCLE, STANTON, CA 90680
TEL. NOS.: (714) 898-6370 (213) 598-0458

- ORANGE COUNTY
- VENTURA
- SANTA MARIA
- BAKERSFIELD
- L.A. COUNTY

CHAIN OF CUSTODY RECORD

Date 11/3... Page 1 of

CLIENT Earth Technology Corporation
ADDRESS 3777 Long Beach Blvd.
Long Beach CA 90807

PROJECT MANAGER Barbara Fontes
PHONE NUMBER (213) 595-6611

PROJECT NAME

SAMPLERS: (Signature)

SAMPLE NUMBER	LOCATION DESCRIPTION	DATE	TIME	SAMPLE TYPE WATER Comp.	WATER Grab.	AIR	SOLID	NO. OF CNTNRS	TESTS REQUIRED
BH-114-35	Lyons & Santa Ana Fwy	11/26/86	10:18				X	2 Brass	EPA 8240, 8270, 418.1, PH
BH-114-S5	Same	11/26/86	10:30		X			1 Gal	EPA 625, TPHC, 418.1, pH
BH-114-S5	Same	11/26/86	11:30		X			1 pint	Sulfides
BH-114-S5	Same	11/26/86	11:30		X			2 VOAs	EPA 624

Relinquished by: (Signature) Barbara Fontes 11/26/86	Received by: (Signature)	Date/Time
Relinquished by: (Signature)	Received by: (Signature)	Date/Time
Relinquished by: (Signature)	Received by Mobile Laboratory for field analysis: (Signature)	Date/Time
Dispatched by: (Signature) / Date/Time	Received for Laboratory by:	Date/Time 11/26/86 17:06
Method of Shipment:		

Special Instructions:

SOURCE: Adapted from U.S. EPA, 1985

CHEMICAL RESEARCH LABORATORIES, INC.

11631 SEABOARD CIRCLE, STANTON, CA 90680
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- L.A. COUNTY

CHAIN OF CUSTODY RECORD

Date 11/25/86 Page 1 of 2
11/25/86 07

CLIENT Earth Technology
ADDRESS 3777 Long Beach Blvd
Long Beach CA 90807

PROJECT MANAGER Barbara Fontes
PHONE NUMBER (213) 595-6611

PROJECT NAME
Metro Rail Transit 87-600-0022

SAMPLERS: (Signature)
Barbara Fontes

	SAMPLE NUMBER	LOCATION DESCRIPTION	DATE	TIME	SAMPLE TYPE WATER Comp.	WATER Grab.	AIR	SOLID	NO. OF CNTNRS	TESTS REQUIRED
(1)	BH112-45	Dennys Back Lot	11/25/86	10:51				X	2 Brass	EPA 8240, 8270, 418.1, pH
(2)	BH112-45	Dennys Back Lot	11/25/86	10:59		X			1 Gal	EPA 625, TPHC, 418.1, pH
	BH112-45	Dennys Back Lot	11/25/86	10:59		X			2 VOA	EPA 624
	BH112-45	Dennys Back Lot	11/25/86	10:59		X			1 Pint	Sulfides
(3)	BH-113-40	Dennys Back Lot	11/25/86	1:39		X			1 Gal	EPA 625, TPHC, 418.1, pH
	BH-113-40	Dennys Back Lot	11/25/86	1:39		X			2 VOA	EPA 624
	BH-113-40			1:39		X			1 PINT	Sulfides
(4)	BH-113-40	Dennys Back Lot	11/25/86	1:39				X	2 Brass	EPA 8240, 8270, 418.1, pH

Relinquished by: (Signature) Barbara Fontes	Received by: (Signature) R Bautista	Date/Time 11-26-86 10AM
Relinquished by: (Signature)	Received by: (Signature)	Date/Time
Relinquished by: (Signature)	Received by Mobile Laboratory for field analysis: (Signature)	Date/Time
Dispatched by: (Signature) / Date/Time	Received for Laboratory by:	Date/Time
Method of Shipment:		

Special Instructions:

SOURCE: Adapted from U.S. EPA, 1985

CHEMICAL RESEARCH LABORATORIES, INC.

11631 SEABOARD CIRCLE, STANTON, CA 90680
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CHAIN OF CUSTODY RECORD

Date 12/2/86 Page 1 of 3

CLIENT The Earth Technology Corporation
ADDRESS 3777 Long Beach Blvd.
Long Beach, CA 90807

PROJECT MANAGER
Barbara Fontes
PHONE NUMBER
(213) 595-6611

PROJECT NAME
METRO RAIL TRANSIT
87-600-0022

SAMPLERS: (Signature)
Allan T. Nelson

	SAMPLE NUMBER	LOCATION DESCRIPTION	DATE	TIME	SAMPLE TYPE WATER Comp.	WATER Grab.	AIR	SOLID	NO. OF CNTNRS	TESTS REQUIRED
(1.)	BH-115-30	Lyon & Vignes Street	12/1/86	9:35 am				2	Brass	EPA 8240, 8270, 418.1, pH
(2.)	BH-115-50		12/1/86	10:32am				1	Brass	EPA 8240, 8270, 418.1, pH
(3.)	BH-115-60		12/1/86	10:40am		2			VOA	EPA 624
	BH-115-60		12/1/86	10:40am		1			Pint	Sulfides
	BH-115-60		12/1/86	10:40am		1			Gallon	EPA 625, 8015(TPH), 418.1, pH
(4.)	BH-115-20		12/2/86	12:10				2	Brass	EPA 8240, 8270, 418.1, pH
(5.)	BH-115-30		12/2/86	12:25				1	Brass	EPA 8240, 8270, 418.1, pH

		Date/Time
Relinquished by: (Signature) Allan T. Nelson	Received by: (Signature) P Bartlett	12-3-86 | 12 Noon
Relinquished by: (Signature)	Received by: (Signature)	Date/Time
Relinquished by: (Signature)	Received by Mobile Laboratory for field analysis: (Signature)	Date/Time
Dispatched by: (Signature) / Date/Time	Received for Laboratory by:	Date/Time
Method of Shipment:		

Special Instructions:

SOURCE: Adapted from U.S. EPA, 1985

CHEMICAL RESEARCH LABORATORIES, INC.

11631 SEABOARD CIRCLE, STANTON, CA 90680
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- L.A. COUNTY

CHAIN OF CUSTODY RECORD

Date 12/2/86 Page 2 of 3

CLIENT The Earth Technology Corporation

ADDRESS 3777 Long Beach Blvd.
Long Beach, CA 90807

PROJECT MANAGER
Barbara Fontes

PHONE NUMBER
(213) 595-6611

PROJECT NAME
METRO RAIL TRANSIT
87-600-0022

SAMPLERS: (Signature)
Allison T. Urban

SAMPLE NUMBER	LOCATION DESCRIPTION	DATE	TIME	SAMPLE TYPE WATER Comp.	SAMPLE TYPE WATER Grab.	SAMPLE TYPE AIR	SOLID	NO. OF CNTNRS	TESTS REQUIRED
(6) BH-115-30	Lyon & Vignes Street	12/2/86	12:40		2			VOA	EPA 624
BH-115-30		12/2/86	12:40		1			Pint	Sulfides
BH-115-30		12/2/86	12:40		1			Gallon	EPA 625, 8015 (TPH), 418.1, pH
(7) BH-118-60		12/2/86	3:45pm		2			VOA	EPA 624
BH-118-60		12/2/86	3:45		1			Pint	Sulfides
BH-118-60		12/2/86	3:45		1			Gallon	EPA 625, 8015 (TPH), 418.1, pH
(8) BH-117-40		12/2/86	9:39am				1	Brass	EPA 8240, 8270, 418.1, pH

Relinquished by: (Signature) Allison T. Urban	Received by: (Signature) P Bautista	Date/Time 12-3-86 | 12 Noon
Relinquished by: (Signature)	Received by: (Signature)	Date/Time
Relinquished by: (Signature)	Received by Mobile Laboratory for field analysis: (Signature)	Date/Time
Dispatched by: (Signature) / Date/Time	Received for Laboratory by:	Date/Time
Method of Shipment:		

Special Instructions:

SOURCE: Adapted from U.S. EPA, 1985

CHEMICAL RESEARCH LABORATORIES, INC.

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CHAIN OF CUSTODY RECORD

Date 12/2/86 Page 3 of 3

CLIENT The Earth Technology Corporation

ADDRESS 3777 Long Beach Blvd
Long Beach, CA 90807

PROJECT MANAGER
Barbara Fontes

PHONE NUMBER
(213) 595-6611

PROJECT NAME
METRO RAIL TRANSIT
87-600-0022

SAMPLERS: (Signature)
Allison T. Urban

SAMPLE NUMBER	LOCATION DESCRIPTION	DATE	TIME	SAMPLE TYPE WATER Comp.	SAMPLE TYPE WATER Grab.	SAMPLE TYPE AIR	SOLID	NO. OF CNTNRS	TESTS REQUIRED
(9) BH-117-55	Lyon & Vignes Street	12/2/86	10:10am				1	Brass	EPA 8240, 8270, 418.1, pH
(10) BH-117-60		12/2/86	10:19				1	Brass	EPA 8240, 8270, 418.1, pH
(11) BH-117-60		12/2/86	10/40am		2			VOA	EPA 624
BH-117-60		12/2/86	10:40am		1			Pint	Sulfides
BH-117-60		12/2/86	10:40am		1			Gallon	EPA 625, 8015(TPH), 418.1, pH
	Travel Blank	?			2				EPA 624

Relinquished by: (Signature) Allison T. Urban	Received by: (Signature) P Bartlett	Date/Time 12-3-86 / 13 Hours
Relinquished by: (Signature)	Received by: (Signature)	Date/Time
Relinquished by: (Signature)	Received by Mobile Laboratory for field analysis: (Signature)	Date/Time
Dispatched by: (Signature) / Date/Time	Received for Laboratory by:	Date/Time
Method of Shipment:		

Special Instructions:

SOURCE: Adapted from U.S. EPA, 1985

CHEMICAL RESEARCH LABORATORIES

11631 SEABOARD CIRCLE (213) 598-0458
STANTON, CA 90680 (714) 898-6370

LABORATORY REPORT

FROM: The Earth Technology
3777 Long Beach Blvd.
Long Beach, CA 90807
ATTN: Barbara Fontes

NATURE OF SAMPLE: Metro Rail Transit 87-600-0022 - Dennys Back lot (liquid)

ANALYSIS NO.: 861126-128/129
SAMPLING DATE: 11/25/86
DATE SAMPLE REC'D: 11/26/86
INVOICE NO.: 18515

SAMPLE ID	SULFIDE in mg/l
BH-12-45 (BH-112-45)	3.6
BH-13-40 (BH-113-40)	0.41

LC
ANALYST

REVIEWED & APPROVED
CHEMICAL RESEARCH LABORATORIES
DATE 12/16/86

CHEMICAL RESEARCH LABORATORIES

11631 SEABOARD CIRCLE (213) 598-0458
STANTON, CA 90680 (714) 898-6370

LABORATORY REPORT

FROM: The Earth Technology
3777 Long Beach Blvd.
Long Beach, CA 90807
ATTN: Barbara Fontes

ANALYSIS NO.: 861126-127/130
SAMPLING DATE: 11/25/86
DATE SAMPLE REC'D: 11/26/86
INVOICE NO.: 18515

NATURE OF SAMPLE:

Metro Rail Transit 87-600-0022 - Dennys Back lot

SAMPLE ID		pH, in units
BH-12-45 (soil)	(BH-112-45)	8.14
BH-12-45 (liquid)	(BH-112-45)	7.05
BH-13-40 (liquid)	(BH-113-40)	6.74
BH-13-40 (soil)	(BH-113-40)	7.45

ANALYST

REVIEWED & APPROVED
CHEMICAL RESEARCH LABORATORIES
DATE 12/16

CHEMICAL RESEARCH LABORATORIES

11631 SEABOARD CIRCLE (213) 598-0458
STANTON, CA 90680 (714) 898-6370

LABORATORY REPORT

FROM: The Earth Technology
3777 Long Beach Blvd.
Long Beach, CA 90807
ATTN: Barbara Fontes

ANALYSIS NO.: 861126-127/130
SAMPLING DATE: 11/25/86
DATE SAMPLE REC'D: 11/26/86
INVOICE NO.: 18515

NATURE OF SAMPLE:

Metro Rail Transit 87-600-0022 - Dennys Back lot

RESULTS

SAMPLE IDENTIFICATION		TOTAL PETROLEUM HYDROCARBONS (EPA 418.1)
BH-12-45 (soil)	(BH-112-45)	5. mg/kg
BH-12-45 (liquid)	(BH-112-45)	6. mg/l
BH-13-40 (liquid)	(BH0113-40)	4. mg/l
BH-13-40 (soil)	(BH-113-40)	6. mg/kg

NOTE: Samples were received in a chilled state, intact and with chain of custody record attached.

JL
ANALYST

REVIEWED & APPROVED
CHEMICAL RESEARCH LABORATORIES

DATE 12/5/86

CHEMICAL RESEARCH LABORATORIES

11631 SEABOARD CIRCLE (213) 598-0458
STANTON, CA 90680 (714) 898-6370

LABORATORY REPORT

FROM: The Earth Technology
3777 Long Beach Blvd.
Long Beach, CA 90807
ATTN: Barbara Fontes

NATURE OF SAMPLE:

ANALYSIS NO.: 861126-128
SAMPLING DATE: 11/25/86
DATE SAMPLE REC'D: 11/26/86
INVOICE NO.: 18515

Metro Rail Transit 87-600-0022 - BH-12-45 Dennys Back lot (liquid)
BH-112-45

EPA METHODS 624/8240 VOLATILE POLLUTANTS DATA SHEET

	ug/l		ug/l
Chloromethane	<10	1,2-Dichloropropane	< 5
Bromomethane	<10	Trans-1,3-Dichloropropene	< 5
Vinyl Chloride	<10	Trichloroethene	< 5
Chloroethane	< 5	Dibromochloromethane	< 5
Methylene Chloride	7 *	1,1,2-Trichloroethane	< 5
Acetone	23 *	Benzene	< 5
Carbon Disulfide	< 5	cis-1,3-Dichloropropene	< 5
1,1-Dichloroethene	< 5	2-Chloroethylvinyl ether	<10
1,1-Dichloroethane	< 5	Bromoform	< 5
Trans-1,2-Dichloroethene	< 5	4-Methyl-2-Pentanone	<10
Chloroform	< 5	2-Hexanone	<10
1,2-Dichloroethane	< 5	Tetrachloroethene	< 5
2-Butanone	<10	1,1,2,2-Tetrachloroethane	< 5
1,1,1-Trichloroethane	< 5	Toluene	< 5
Carbon Tetrachloride	< 5	Chlorobenzene	< 5
Vinyl Acetate	<10	Ethylbenzene	< 5
Bromodichloromethane	< 5	Styrene	< 5
		Total Xylenes	< 5

* Also present in lab blank

< Denotes compound was not detected above the value indicated.

SLP
ANALYST

REVIEWED & APPROVED
CHEMICAL RESEARCH LABORATORIES
DATE 12/16

CHEMICAL RESEARCH LABORATORIES

11631 SEABOARD CIRCLE (213) 598-0458
STANTON, CA 90680 (714) 898-6370

LABORATORY REPORT

FROM: The Earth Technology
3777 Long Beach Blvd.
Long Beach, CA 90807
ATTN: Barbara Fontes

ANALYSIS NO.: 861126-128
SAMPLING DATE: 11/25/86
DATE SAMPLE REC'D: 11/26/86
INVOICE NO.: 18515

NATURE OF SAMPLE: BH-112-45

Metro Rail Transit 87-600-0022 - BH-12-45 Dennys Back lot (liquid)

EPA METHODS 625/8270 SEMI-VOLATILE POLLUTANTS DATA SHEET

	ug/l		ug/l
Phenol	<50	Acenaphthene	<50
bis(-2-Chloroethyl)Ether	<50	2,4-Dinitrophenol	<200
2-Chlorophenol	<50	4-Nitrophenol	<200
1,3-Dichlorobenzene	<50	Dibenzofuran	<50
1,4-Dichlorobenzene	<50	2,4-Dinitrotoluene	<50
Benzyl Alcohol	<50	2,6-Dinitrotoluene	<50
1,2-Dichlorobenzene	<50	Diethylphthalate	<50
2-Methylphenol	<50	4-Chlorophenyl-phenylether	<50
bis(2-chloroisopropy1)Ether	<50	Fluorene	<50
4-Methylphenol	<50	4-Nitroaniline	<200
N-Nitroso-Di-n-Propylamine	<50	4,6-Dinitro-2-Methylphenol	<200
Hexachloroethane	<50	N-Nitrosodiphenylamine (1)	<50
Nitrobenzene	<50	4-Bromophenyl-phenylether	<50
Isophorone	<50	Hexachlorobenzene	<50
2-Nitrophenol	<50	Pentachlorophenol	<200
2,4-Dimethylphenol	<50	Phenanthrene	<50
Benzoic Acid	<200	Anthracene	<50
bis(-2-Chloroethoxy)Methane	<50	Di-n-Butylphthalate	<50
2,4-Dichlorophenol	<50	Fluoranthene	<50
1,2,4-Trichlorobenzene	<50	Pyrene	<50
Naphthalene	<50	Butylbenzylphthatlate	<50
4-Chloroaniline	<50	3,3-Dichlorobenzidine	<100
Hexachlorobutadiene	<50	Benzo(a)Anthracene	<50
4-Chloro-3-Methylphenol	<50	bis(2-Ethylhexyl)Phthalate	<50
2-Methylnaphthalene	<50	Chrysene	<50
Hexachlorocyclopentadiene	<50	Di-n-Octyl Phthalate	<50
2,4,6-Trichlorophenol	<50	Benzo(b)Fluoranthene	<50
2,4,5-Trichlorophenol	<50	Benzo(k)Fluoranthene	<50
2-Chloronaphthalene	<50	Benzo(a)Pyrene	<50
2-Nitroaniline	<200	Indeno(1,2,3-cd)Pyrene	<50
Dimethyl Phthalate	<50	Dibenzo(a,h)Anthracene	<50
Acenaphthylene	<50	Benzo(g,h,i)Perylene	<50
3-Nitroaniline	<200		

<Denotes compound was not detected above the value indicated.

ANALYST

REVIEWED & APPROVED
CHEMICAL RESEARCH LABORATORIES

DATE 12/16

CHEMICAL RESEARCH LABORATORIES

11631 SEABOARD CIRCLE (213) 598-0458
STANTON, CA 90680 (714) 898-6370

LABORATORY REPORT

FROM: The Earth Technology
3777 Long Beach Blvd.
Long Beach, CA 90807
ATTN: Barbara Fontes

ANALYSIS NO.: 861126-127
SAMPLING DATE: 11/25/86
DATE SAMPLE REC'D: 11/26/86
INVOICE NO.: 18515

NATURE OF SAMPLE: BH-112-45
Metro Rail Transit 87-600-0022 - BH-12-45 Dennys Back lot (soil)

EPA METHODS 624/8240 VOLATILE POLLUTANTS DATA SHEET

	ug/kg		ug/kg
Chloromethane	<10	1,2-Dichloropropane	< 5
Bromomethane	<10	Trans-1,3-Dichloropropene	< 5
Vinyl Chloride	<10	Trichloroethene	< 5
Chloroethane	<10	Dibromochloromethane	< 5
Methylene Chloride	13 *	1,1,2-Trichloroethane	< 5
Acetone	66 *	Benzene	< 5
Carbon Disulfide	< 5	cis-1,3-Dichloropropene	< 5
1,1-Dichloroethene	< 5	2-Chloroethylvinyl ether	<10
1,1-Dichloroethane	< 5	Bromoform	< 5
Trans-1,2-Dichloroethene	< 5	4-Methyl-2-Pentanone	<10
Chloroform	< 5	2-Hexanone	<10
1,2-Dichloroethane	< 5	Tetrachloroethene	< 5
2-Butanone	<10	1,1,2,2-Tetrachloroethane	< 5
1,1,1-Trichloroethane	< 5	Toluene	< 5
Carbon Tetrachloride	< 5	Chlorobenzene	< 5
Vinyl Acetate	<10	Ethylbenzene	< 5
Bromodichloromethane	< 5	Styrene	< 5
		Total Xylenes	< 5

* Compound found in laboratory blanks.

< Denotes compound was not detected above the value indicated.

SP
ANALYST

REVIEWED & APPROVED
CHEMICAL RESEARCH LABORATORIES
DATE 12/16/86

CHEMICAL RESEARCH LABORATORIES

11631 SEABOARD CIRCLE (213) 598-0458
STANTON, CA 90680 (714) 898-6370

LABORATORY REPORT

FROM: The Earth Technology
3777 Long Beach Blvd.
Long Beach, CA 90807
ATTN: Barbara Fontes

ANALYSIS NO.: 861126-127
SAMPLING DATE: 11/25/86
DATE SAMPLE REC'D: 11/26/86
INVOICE NO.: 18515

NATURE OF SAMPLE: BH-112-45

Metro Rail Transit 87-600-0022 - BH-12-45 Dennys Back lot (soil)

EPA METHODS 625/8270 SEMI-VOLATILE POLLUTANTS DATA SHEET

	mg/kg		mg/kg
Phenol	<0.3	Acenaphthene	<0.3
bis(-2-Chloroethyl)Ether	<0.3	2,4-Dinitrophenol	<1
2-Chlorophenol	<0.3	4-Nitrophenol	<1
1,3-Dichlorobenzene	<0.3	Dibenzofuran	<0.3
1,4-Dichlorobenzene	<0.3	2,4-Dinitrotoluene	<0.3
Benzyl Alcohol	<0.3	2,6-Dinitrotoluene	<0.3
1,2-Dichlorobenzene	<0.3	Diethylphthalate	<0.3
2-Methylphenol	<0.3	4-Chlorophenyl-phenylether	<0.3
bis(2-chloroisopropy1)Ether	<0.3	Fluorene	<0.3
4-Methylphenol	<0.3	4-Nitroaniline	<1
N-Nitroso-Di-n-Propylamine	<0.3	4,6-Dinitro-2-Methylphenol	<1
Hexachloroethane	<0.3	N-Nitrosodiphenylamine (1)	<0.3
Nitrobenzene	<0.3	4-Bromophenyl-phenylether	<0.3
Isophorone	<0.3	Hexachlorobenzene	<0.3
2-Nitrophenol	<0.3	Pentachlorophenol	<1
2,4-Dimethylphenol	<0.3	Phenanthrene	<0.3
Benzoic Acid	<1	Anthracene	<0.3
bis(-2-Chloroethoxy)Methane	<0.3	Di-n-Butylphthalate	<0.3
2,4-Dichlorophenol	<0.3	Fluoranthene	<0.3
1,2,4-Trichlorobenzene	<0.3	Pyrene	<0.3
Naphthalene	<0.3	Butylbenzylphthatlate	<0.3
4-Chloroaniline	<0.3	3,3-Dichlorobenzidine	<0.6
Hexachlorobutadiene	<0.3	Benzo(a)Anthracene	<0.3
4-Chloro-3-Methylphenol	<0.3	bis(2-Ethylhexyl)Phthalate	<0.3
2-Methylnaphthalene	<0.3	Chrysene	<0.3
Hexachlorocyclopentadiene	<0.3	Di-n-Octyl Phthalate	<0.3
2,4,6-Trichlorophenol	<0.3	Benzo(b)Fluoranthene	<0.3
2,4,5-Trichlorophenol	<0.3	Benzo(k)Fluoranthene	<0.3
2-Chloronaphthalene	<0.3	Benzo(a)Pyrene	<0.3
2-Nitroaniline	<1	Indeno(1,2,3-cd)Pyrene	<0.3
Dimethyl Phthalate	<0.3	Dibenzo(a,h)Anthracene	<0.3
Acenaphthylene	<0.3	Benzo(g,h,i)Perylene	<0.3
3-Nitroaniline	<1		

<Denotes compound was not detected above the value indicated.

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DATE 12/16

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LABORATORY REPORT

FROM: The Earth Technology
3777 Long Beach Blvd.
Long Beach, CA 90807
ATTN: Barbara Fontes

ANALYSIS NO.: 861126-129
SAMPLING DATE: 11/25/86
DATE SAMPLE REC'D: 11/26/86
INVOICE NO.: 18515

NATURE OF SAMPLE: Metro Rail Transit 87-600-0022 - BH-13-40 Dennys Back lot (liquid)

BH-113-40

EPA METHODS 624/8240 VOLATILE POLLUTANTS DATA SHEET

	ug/l			ug/l
Chloromethane	<10		1,2-Dichloropropane	< 5
Bromomethane	<10		Trans-1,3-Dichloropropene	< 5
Vinyl Chloride	<10		Trichloroethene	< 5
Chloroethane	< 5		Dibromochloromethane	< 5
Methylene Chloride	9	*	1,1,2-Trichloroethane	< 5
Acetone	22	*	Benzene	< 5
Carbon Disulfide	< 5		cis-1,3-Dichloropropene	< 5
1,1-Dichloroethene	< 5		2-Chloroethylvinyl ether	<10
1,1-Dichloroethane	< 5		Bromoform	< 5
Trans-1,2-Dichloroethene	< 5		4-Methyl-2-Pentanone	<10
Chloroform	< 5		2-Hexanone	<10
1,2-Dichloroethane	< 5		Tetrachloroethene	< 5
2-Butanone	<10		1,1,2,2-Tetrachloroethane	< 5
1,1,1-Trichloroethane	< 5		Toluene	< 5
Carbon Tetrachloride	< 5		Chlorobenzene	< 5
Vinyl Acetate	<10		Ethylbenzene	< 5
Bromodichloromethane	< 5		Styrene	< 5
			Total Xylenes	< 5

* Also present in lab blank

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SLP
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DATE 12/10

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STANTON, CA 90680 (714) 898-6370

LABORATORY REPORT

FROM: The Earth Technology
3777 Long Beach Blvd.
Long Beach, CA 90807
ATTN: Barbara Fontes

ANALYSIS NO.: 861126-129
SAMPLING DATE: 11/25/86
DATE SAMPLE REC'D: 11/26/86
INVOICE NO.: 18515

NATURE OF SAMPLE:

Metro Rail Transit 87-600-0022 - BH-13-40 Dennys Back lot (liquid)
BH-113-40

EPA METHODS 625/8270 SEMI-VOLATILE POLLUTANTS DATA SHEET

	ug/l		ug/l
Phenol	<20	Acenaphthene	<20
bis(-2-Chloroethyl)Ether	<20	2,4-Dinitrophenol	<100
2-Chlorophenol	<20	4-Nitrophenol	<100
1,3-Dichlorobenzene	<20	Dibenzofuran	<20
1,4-Dichlorobenzene	<20	2,4-Dinitrotoluene	<20
Benzyl Alcohol	<20	2,6-Dinitrotoluene	<20
1,2-Dichlorobenzene	<20	Diethylphthalate	<20
2-Methylphenol	<20	4-Chlorophenyl-phenylether	<20
bis(2-chloroisopropy1)Ether	<20	Fluorene	<20
4-Methylphenol	<20	4-Nitroaniline	<100
N-Nitroso-Di-n-Propylamine	<20	4,6-Dinitro-2-Methylphenol	<100
Hexachloroethane	<20	N-Nitrosodiphenylamine (1)	<20
Nitrobenzene	<20	4-Bromophenyl-phenylether	<20
Isophorone	<20	Hexachlorobenzene	<20
2-Nitrophenol	<20	Pentachlorophenol	<100
2,4-Dimethylphenol	<20	Phenanthrene	<20
Benzoic Acid	<100	Anthracene	<20
bis(-2-Chloroethoxy)Methane	<20	Di-n-Butylphthalate	<20
2,4-Dichlorophenol	<20	Fluoranthene	<20
1,2,4-Trichlorobenzene	<20	Pyrene	<20
Naphthalene	<20	Butylbenzylphthatlate	<20
4-Chloroaniline	<20	3,3-Dichlorobenzidine	<40
Hexachlorobutadiene	<20	Benzo(a)Anthracene	<20
4-Chloro-3-Methylphenol	<20	bis(2-Ethylhexyl)Phthalate	<20
2-Methylnaphthalene	<20	Chrysene	<20
Hexachlorocyclopentadiene	<20	Di-n-Octyl Phthalate	<20
2,4,6-Trichlorophenol	<20	Benzo(b)Fluoranthene	<20
2,4,5-Trichlorophenol	<20	Benzo(k)Fluoranthene	<20
2-Chloronaphthalene	<20	Benzo(a)Pyrene	<20
2-Nitroaniline	<100	Indeno(1,2,3-cd)Pyrene	<20
Dimethyl Phthalate	<20	Dibenzo(a,h)Anthracene	<20
Acenaphthylene	<20	Benzo(g,h,i)Perylene	<20
3-Nitroaniline	<100		

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DATE 12/16

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11631 SEABOARD CIRCLE (213) 598-0458
STANTON, CA 90680 (714) 898-6370

LABORATORY REPORT

FROM: The Earth Technology
3777 Long Beach Blvd.
Long Beach, CA 90807
ATTN: Barbara Fontes

ANALYSIS NO.: 861126-130
SAMPLING DATE: 11/25/86
DATE SAMPLE REC'D: 11/26/86
INVOICE NO.: 18515

NATURE OF SAMPLE: Metro Rail Transit 87-600-0022 - BH-13-40 Dennys Back lot (soil)

BH-113-40

EPA METHODS 624/8240 VOLATILE POLLUTANTS DATA SHEET

	ug/kg		ug/kg
Chloromethane	<10	1,2-Dichloropropane	< 5
Bromomethane	<10	Trans-1,3-Dichloropropene	< 5
Vinyl Chloride	<10	Trichloroethene	< 5
Chloroethane	< 5	Dibromochloromethane	< 5
Methylene Chloride	11 *	1,1,2-Trichloroethane	< 5
Acetone	<10	Benzene	< 5
Carbon Disulfide	< 5	cis-1,3-Dichloropropene	< 5
1,1-Dichloroethene	< 5	2-Chloroethylvinyl ether	<10
1,1-Dichloroethane	< 5	Bromoform	< 5
Trans-1,2-Dichloroethene	< 5	4-Methyl-2-Pentanone	<10
Chloroform	< 5	2-Hexanone	<10
1,2-Dichloroethane	< 5	Tetrachloroethene	< 5
2-Butanone	<10	1,1,2,2-Tetrachloroethane	< 5
1,1,1-Trichloroethane	< 5	Toluene	< 5
Carbon Tetrachloride	< 5	Chlorobenzene	< 5
Vinyl Acetate	<10	Ethylbenzene	< 5
Bromodichloromethane	< 5	Styrene	< 5
		Total Xylenes	< 5

* Also in lab blank

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LABORATORY REPORT

FROM: The Earth Technology
3777 Long Beach Blvd.
Long Beach, CA 90807
ATTN: Barbara Fontes

ANALYSIS NO.: 861126-130
SAMPLING DATE: 11/25/86
DATE SAMPLE REC'D: 11/26/86
INVOICE NO.: 18515

NATURE OF SAMPLE: BH-13-40

Metro Rail Transit 87-600-0022 - BH-13-40 Dennys Back lot (soil)

EPA METHODS 625/8270 SEMI-VOLATILE POLLUTANTS DATA SHEET

	mg/kg		mg/kg
Phenol	<0.3	Acenaphthene	<0.3
bis(-2-Chloroethyl)Ether	<0.3	2,4-Dinitrophenol	<1
2-Chlorophenol	<0.3	4-Nitrophenol	<1
1,3-Dichlorobenzene	<0.3	Dibenzofuran	<0.3
1,4-Dichlorobenzene	<0.3	2,4-Dinitrotoluene	<0.3
Benzyl Alcohol	<0.3	2,6-Dinitrotoluene	<0.3
1,2-Dichlorobenzene	<0.3	Diethylphthalate	<0.3
2-Methylphenol	<0.3	4-Chlorophenyl-phenylether	<0.3
bis(2-chloroisopropyl)Ether	<0.3	Fluorene	<0.3
4-Methylphenol	<0.3	4-Nitroaniline	<1
N-Nitroso-Di-n-Propylamine	<0.3	4,6-Dinitro-2-Methylphenol	<1
Hexachloroethane	<0.3	N-Nitrosodiphenylamine (1)	<0.3
Nitrobenzene	<0.3	4-Bromophenyl-phenylether	<0.3
Isophorone	<0.3	Hexachlorobenzene	<0.3
2-Nitrophenol	<0.3	Pentachlorophenol	<1
2,4-Dimethylphenol	<0.3	Phenanthrene	<0.3
Benzoic Acid	<1	Anthracene	<0.3
bis(-2-Chloroethoxy)Methane	<0.3	Di-n-Butylphthalate	<0.3
2,4-Dichlorophenol	<0.3	Fluoranthene	<0.3
1,2,4-Trichlorobenzene	<0.3	Pyrene	<0.3
Naphthalene	<0.3	Butylbenzylphthatlate	<0.3
4-Chloroaniline	<0.3	3,3-Dichlorobenzidine	<0.6
Hexachlorobutadiene	<0.3	Benzo(a)Anthracene	<0.3
4-Chloro-3-Methylphenol	<0.3	bis(2-Ethylhexyl)Phthalate	<0.3
2-Methylnaphthalene	<0.3	Chrysene	<0.3
Hexachlorocyclopentadiene	<0.3	Di-n-Octyl Phthalate	<0.3
2,4,6-Trichlorophenol	<0.3	Benzo(b)Fluoranthene	<0.3
2,4,5-Trichlorophenol	<0.3	Benzo(k)Fluoranthene	<0.3
2-Chloronaphthalene	<0.3	Benzo(a)Pyrene	<0.3
2-Nitroaniline	<1	Indeno(1,2,3-cd)Pyrene	<0.3
Dimethyl Phthalate	<0.3	Dibenzo(a,h)Anthracene	<0.3
Acenaphthylene	<0.3	Benzo(g,h,i)Perylene	<0.3
3-Nitroaniline	<1		

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STANTON, CA 90680 (714) 898-6370

LABORATORY REPORT

FROM: The Earth Technology
3777 Long Beach Blvd.
Long Beach, CA 90807
ATTN: Barbara Fontes

ANALYSIS NO.: 861126-139
SAMPLING DATE: 11/26/86
DATE SAMPLE REC'D: 12/01/86
INVOICE NO.: 18510

NATURE OF SAMPLE:

Metro Rail Transit 87-600-0002 (liquid)

SAMPLE ID	SULFIDE in mg/l
BH-114-55	0.64

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STANTON, CA 90680 (714) 898-6370

LABORATORY REPORT

FROM: The Earth Technology
3777 Long Beach Blvd.
Long Beach, CA 90807
ATTN: Barbara Fontes

NATURE OF SAMPLE:

Metro Rail - Lyons & Santa Ana Fwy.

ANALYSIS NO.: 861126-138/139
SAMPLING DATE: 11/26/86
DATE SAMPLE REC'D: 12/01/86
INVOICE NO.: 18514

RESULTS

SAMPLE IDENTIFICATION	TOTAL PETROLEUM HYDROCARBONS (EPA 418.1)
BH-114-39 (soil)	3. mg/kg
BH-114-55 (liquid)	28. mg/l

NOTE: Samples were received in a chilled state, intact and with chain of custody record attached.

JFC
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STANTON, CA 90680 (714) 898-6370

LABORATORY REPORT

FROM: The Earth Technology
3777 Long Beach Blvd.
Long Beach, CA 90807
ATTN: Barbara Fontes

NATURE OF SAMPLE:
Metro Rail Transit 87-600-0002

ANALYSIS NO.: 861121-61/62
SAMPLING DATE: 11/20/86
DATE SAMPLE REC'D: 11/21/86
INVOICE NO.: 18510

SAMPLE ID	pH, in units
BH-114-39 (soil)	7.57
BH-114-55 (liquid)	7.74

ANALYST JR

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STANTON, CA 90680 (714) 898-6370

LABORATORY REPORT

FROM: The Earth Technology
3777 Long Beach Blvd.
Long Beach, CA 90807
ATTN: Barbara Fontes

NATURE OF SAMPLE:

ANALYSIS NO.: 861126-139
SAMPLING DATE: 11/26/86
DATE SAMPLE REC'D: 12/01/86
INVOICE NO.: 18514

Metro Rail - Lyons & Santa Ana Fwy. - BH-114-55 - (liquid)

EPA METHODS 625/8270 SEMI-VOLATILE POLLUTANTS DATA SHEET

	mg/l		mg/l
Phenol	<0.1	Acenaphthene	<0.1
bis(-2-Chloroethyl)Ether	<0.1	2,4-Dinitrophenol	<0.5
2-Chlorophenol	<0.1	4-Nitrophenol	<0.5
1,3-Dichlorobenzene	<0.1	Dibenzofuran	<0.1
1,4-Dichlorobenzene	<0.1	2,4-Dinitrotoluene	<0.1
Benzyl Alcohol	<0.1	2,6-Dinitrotoluene	<0.1
1,2-Dichlorobenzene	<0.1	Diethylphthalate	<0.1
2-Methylphenol	<0.1	4-Chlorophenyl-phenylether	<0.1
bis(2-chloroisopropy1)Ether	<0.1	Fluorene	<0.1
4-Methylphenol	<0.1	4-Nitroaniline	<0.5
N-Nitroso-Di-n-Propylamine	<0.1	4,6-Dinitro-2-Methylphenol	<0.5
Hexachloroethane	<0.1	N-Nitrosodiphenylamine (1)	<0.1
Nitrobenzene	<0.1	4-Bromophenyl-phenylether	<0.1
Isophorone	<0.1	Hexachlorobenzene	<0.1
2-Nitrophenol	<0.1	Pentachlorophenol	<0.5
2,4-Dimethylphenol	<0.1	Phenanthrene	<0.1
Benzoic Acid	<0.5	Anthracene	<0.1
bis(-2-Chloroethoxy)Methane	<0.1	Di-n-Butylphthalate	<0.1
2,4-Dichlorophenol	<0.1	Fluoranthene	<0.1
1,2,4-Trichlorobenzene	<0.1	Pyrene	<0.1
Naphthalene	<0.1	Butylbenzylphthatlate	<0.1
4-Chloroaniline	<0.1	3,3-Dichlorobenzidine	<0.2
Hexachlorobutadiene	<0.1	Benzo(a)Anthracene	<0.1
4-Chloro-3-Methylphenol	<0.1	bis(2-Ethylhexyl)Phthalate	<0.1
2-Methylnaphthalene	<0.1	Chrysene	<0.1
Hexachlorocyclopentadiene	<0.1	Di-n-Octyl Phthalate	<0.1
2,4,6-Trichlorophenol	<0.1	Benzo(b)Fluoranthene	<0.1
2,4,5-Trichlorophenol	<0.1	Benzo(k)Fluoranthene	<0.1
2-Chloronaphthalene	<0.1	Benzo(a)Pyrene	<0.1
2-Nitroaniline	<0.5	Indeno(1,2,3-cd)Pyrene	<0.1
Dimethyl Phthalate	<0.1	Dibenzo(a,h)Anthracene	<0.1
Acenaphthylene	<0.1	Benzo(g,h,i)Perylene	<0.1
3-Nitroaniline	<0.5		

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11631 SEABOARD CIRCLE (213) 598-0458
STANTON, CA 90680 (714) 898-6370

LABORATORY REPORT

FROM: The Earth Technology
3777 Long Beach Blvd.
Long Beach, CA 90807
ATTN: Barbara Fontes

NATURE OF SAMPLE: Metro Rail - Lyons & Santa Ana Fwy. - BH-114-55 - (liquid)

ANALYSIS NO.: 861126-139
SAMPLING DATE: 11/26/86
DATE SAMPLE REC'D: 12/01/86
INVOICE NO.: 18514

EPA METHODS 624/8240 VOLATILE POLLUTANTS DATA SHEET

	ug/l		ug/l
Chloromethane	<10	1,2-Dichloropropane	< 5
Bromomethane	<10	Trans-1,3-Dichloropropene	< 5
Vinyl Chloride	<10	Trichloroethene	< 5
Chloroethane	< 5	Dibromochloromethane	< 5
Methylene Chloride	17 *	1,1,2-Trichloroethane	< 5
Acetone	78 *	Benzene	< 5
Carbon Disulfide	< 5	cis-1,3-Dichloropropene	< 5
1,1-Dichloroethene	< 5	2-Chloroethylvinyl ether	<10
1,1-Dichloroethane	< 5	Bromoform	< 5
Trans-1,2-Dichloroethene	< 5	4-Methyl-2-Pentanone	<10
Chloroform	< 5	2-Hexanone	<10
1,2-Dichloroethane	< 5	Tetrachloroethene	< 5
2-Butanone	<10	1,1,2,2-Tetrachloroethane	< 5
1,1,1-Trichloroethane	< 5	Toluene	< 5
Carbon Tetrachloride	< 5	Chlorobenzene	< 5
Vinyl Acetate	<10	Ethylbenzene	< 5
Bromodichloromethane	< 5	Styrene	< 5
		Total Xylenes	< 5

* Also found in lab blanks

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LABORATORY REPORT

FROM: The Earth Technology
3777 Long Beach Blvd.
Long Beach, CA 90807
ATTN: Barbara Fontes

NATURE OF SAMPLE:

ANALYSIS NO.: 861126-138
SAMPLING DATE: 11/26/86
DATE SAMPLE REC'D: 12/01/86
INVOICE NO.: 18514

Metro Rail - Lyons & Santa Ana Fwy. - BH-114-39 - (soil)

EPA METHODS 625/8270 SEMI-VOLATILE POLLUTANTS DATA SHEET

	mg/kg		mg/kg
Phenol	<0.3	Acenaphthene	<0.3
bis(-2-Chloroethyl)Ether	<0.3	2,4-Dinitrophenol	<1
2-Chlorophenol	<0.3	4-Nitrophenol	<1
1,3-Dichlorobenzene	<0.3	Dibenzofuran	<0.3
1,4-Dichlorobenzene	<0.3	2,4-Dinitrotoluene	<0.3
Benzyl Alcohol	<0.3	2,6-Dinitrotoluene	<0.3
1,2-Dichlorobenzene	<0.3	Diethylphthalate	<0.3
2-Methylphenol	<0.3	4-Chlorophenyl-phenylether	<0.3
bis(2-chloroisopropyl)Ether	<0.3	Fluorene	<0.3
4-Methylphenol	<0.3	4-Nitroaniline	<1
N-Nitroso-Di-n-Propylamine	<0.3	4,6-Dinitro-2-Methylphenol	<1
Hexachloroethane	<0.3	N-Nitrosodiphenylamine (1)	<0.3
Nitrobenzene	<0.3	4-Bromophenyl-phenylether	<0.3
Isophorone	<0.3	Hexachlorobenzene	<0.3
2-Nitrophenol	<0.3	Pentachlorophenol	<1
2,4-Dimethylphenol	<0.3	Phenanthrene	<0.3
Benzoic Acid	<1	Anthracene	<0.3
bis(-2-Chloroethoxy)Methane	<0.3	Di-n-Butylphthalate	<0.3
2,4-Dichlorophenol	<0.3	Fluoranthene	<0.3
1,2,4-Trichlorobenzene	<0.3	Pyrene	<0.3
Naphthalene	<0.3	Butylbenzylphthatlate	<0.3
4-Chloroaniline	<0.3	3,3-Dichlorobenzidine	<0.6
Hexachlorobutadiene	<0.3	Benzo(a)Anthracene	<0.3
4-Chloro-3-Methylphenol	<0.3	bis(2-Ethylhexyl)Phthalate	<0.3
2-Methylnaphthalene	<0.3	Chrysene	<0.3
Hexachlorocyclopentadiene	<0.3	Di-n-Octyl Phthalate	<0.3
2,4,6-Trichlorophenol	<0.3	Benzo(b)Fluoranthene	<0.3
2,4,5-Trichlorophenol	<0.3	Benzo(k)Fluoranthene	<0.3
2-Chloronaphthalene	<0.3	Benzo(a)Pyrene	<0.3
2-Nitroaniline	<1	Indeno(1,2,3-cd)Pyrene	<0.3
Dimethyl Phthalate	<0.3	Dibenzo(a,h)Anthracene	<0.3
Acenaphthylene	0.3	Benzo(g,h,i)Perylene	<0.3
3-Nitroaniline	<1		

<Denotes compound was not detected above the value indicated

mh
ANALYST

REVIEWED & APPROVED
CHEMICAL RESEARCH LABORATORIES
DATE 12/17/86

CHEMICAL RESEARCH LABORATORIES

11631 SEABOARD CIRCLE (213) 598-0458
STANTON, CA 90680 (714) 898-6370

LABORATORY REPORT

FROM: The Earth Technology
3777 Long Beach Blvd.
Long Beach, CA 90807
ATTN: Barbara Fontes

NATURE OF SAMPLE:

ANALYSIS NO.: 861126-138
SAMPLING DATE: 11/26/86
DATE SAMPLE REC'D: 12/01/86
INVOICE NO.: 18514

Metro Rail - Lyons & Santa Ana Fwy. - BH-114-39 - (soil)

EPA METHODS 624/8240 VOLATILE POLLUTANTS DATA SHEET

	ug/kg		ug/kg
Chloromethane	<10	1,2-Dichloropropane	< 5
Bromomethane	<10	Trans-1,3-Dichloropropene	< 5
Vinyl Chloride	<10	Trichloroethene	< 5
Chloroethane	< 5	Dibromochloromethane	< 5
Methylene Chloride	14 *	1,1,2-Trichloroethane	< 5
Acetone	500	Benzene	< 5
Carbon Disulfide	< 5	cis-1,3-Dichloropropene	< 5
1,1-Dichloroethene	< 5	2-Chloroethylvinyl ether	<10
1,1-Dichloroethane	< 5	Bromoform	< 5
Trans-1,2-Dichloroethene	< 5	4-Methyl-2-Pentanone	<10
Chloroform	< 5	2-Hexanone	<10
1,2-Dichloroethane	< 5	Tetrachloroethene	< 5
2-Butanone	<10	1,1,2,2-Tetrachloroethane	< 5
1,1,1-Trichloroethane	< 5	Toluene	< 5
Carbon Tetrachloride	< 5	Chlorobenzene	< 5
Vinyl Acetate	<10	Ethylbenzene	< 5
Bromodichloromethane	< 5	Styrene	< 5
		Total Xylenes	< 5

* Also found in lab blanks

< Denotes compound was not detected above the value indicated.

SP
ANALYST

REVIEWED & APPROVED
CHEMICAL RESEARCH LABORATORIES
DATE 12/17/86

CHEMICAL RESEARCH LABORATORIES

11631 SEABOARD CIRCLE (213) 598-0458
STANTON, CA 90680 (714) 898-6370

LABORATORY REPORT

FROM: The Earth Technology
3777 Long Beach Blvd.
Long Beach, CA 90807
ATTN: Barbara Fontes

NATURE OF SAMPLE:
Metro Rail Transit 87-600-0022 Lyon & Vignes Street

ANALYSIS NO.: 861204-11/21
SAMPLING DATE: 12/1,2/86
DATE SAMPLE REC'D: 12/04/86
INVOICE NO.: 18695

RESULTS

SAMPLE IDENTIFICATION	pH (units)	Sulfides (mg/l)
BH - 115 - 30 soil	7.10	-----
BH - 115 - 50 soil	7.59	-----
BH - 115 - 60 water	7.00	0.38
BH - 115 - 20 soil	4.02	-----
BH - 116 - 30 soil	6.18	-----
BH - 116 - 30 water	6.20	0.18
BH - 118 - 60 water	6.37	0.11
BH - 117 - 40 soil	9.29	-----
BH - 117 - 55 soil	8.30	-----
BH - 117 - 60 soil	8.85	-----
BH - 117 - 60 water	7.05	0.33

* Not Detected (Below indicated limit of detection.)

NOTE: Samples were received in a chilled state, intact and with chain of custody recordy attached.

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DATE 12/30/86

CHEMICAL RESEARCH LABORATORIES

11631 SEABOARD CIRCLE (213) 598-0458
STANTON, CA 90680 (714) 898-6370

LABORATORY REPORT

FROM: The Earth Technology
3777 Long Beach Blvd.
Long Beach, CA 90807
ATTN: Barbara Fontes

NATURE OF SAMPLE:

ANALYSIS NO.: 861204-11/22
SAMPLING DATE: 12/1,2/86
DATE SAMPLE REC'D: 12/04/86
INVOICE NO.: 18695

Metro Rail Transit 87-600-0022 Lyon & Vignes Street

SAMPLE IDENTIFICATION	TOTAL PETROLEUM HYDROCARBONS (EPA 8015)	(EPA 418.1)
BH - 115 - 30	-----	5. mg/kg
BH - 115 - 50	-----	11. mg/kg
BH - 115 - 60	*ND(0.1) mg/L	12. mg/L
BH - 115 - 20	-----	3. mg/kg
BH - 116 - 30	-----	26. mg/kg
BH - 116 - 30	0.5 mg/L	4. mg/L
BH - 118 - 60	*ND(0.1) mg/L	9. mg/L
BH - 117 - 40	-----	4. mg/kg
BH - 117 - 55	-----	2. mg/kg
BH - 117 - 60	-----	6. mg/kg
BH - 117 - 60	*ND(0.1) mg/L	3. mg/L

*Not detected (Below indicated limit of detection.)

Note: Samples received in a chilled state, sealed and intact, and with chain of custody record attached.

JPC, CG
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CHEMICAL RESEARCH LABORATORIES
DATE 12/30/86

CHEMICAL RESEARCH LABORATORIES

11631 SEABOARD CIRCLE (213) 598-0458
STANTON, CA 90680 (714) 898-6370

LABORATORY REPORT

FROM: The Earth Technology
3777 Long Beach Blvd.
Long Beach, CA 90708
ATTN: Barbara Fontes

NATURE OF SAMPLE:

ANALYSIS NO.: 861204-11
SAMPLING DATE: 12/1,2/86
DATE SAMPLE REC'D: 12/04/86
INVOICE NO.: 18695

BH - 115 - 30 Metro Rail Transit 87-600-0022)

EPA METHODS 624/8240 VOLATILE POLLUTANTS DATA SHEET

	ug/kg		ug/kg
Chloromethane	<50	1,2-Dichloropropane	<20
Bromomethane	<50	Trans-1,3-Dichloropropene	<20
Vinyl Chloride	<50	Trichloroethene	<20
Chloroethane	<50	Dibromochloromethane	<20
Methylene Chloride	51*	1,1,2-Trichloroethane	<20
Acetone	184	Benzene	<20
Carbon Disulfide	<20	cis-1,3-Dichloropropene	<20
1,1-Dichloroethene	<20	2-Chloroethylvinylether	<50
1,1-Dichloroethane	<20	Bromoform	<20
Trans-1,2-Dichloroethene	<20	4-Methyl-2-Pentanone	<50
Chloroform	66*	2-Hexanone	<50
1,2-Dichloroethane	<20	Tetrachloroethene	<20
2-Butanone	<50	1,1,2,2-Tetrachloroethane	<20
1,1,1-Trichloroethane	<20	Toluene	<20
Carbon Tetrachloride	<20	Chlorobenzene	<20
Vinyl Acetate	<50	Ethylbenzene	<20
Bromodichloromethane	<20	Styrene	<20
		Total Xylenes	<20

* Also found in laboratory blank.

< Denotes compound was not detected above the value indicated.

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CHEMICAL RESEARCH LABORATORIES
DATE 12/30/86

CHEMICAL RESEARCH LABORATORIES

11631 SEABOARD CIRCLE (213) 598-0458
STANTON, CA 90680 (714) 898-6370

LABORATORY REPORT

FROM: The Earth Technology
3777 Long Beach Blvd.
Long Beach, CA 90807
ATTN: Barbara Fontes

NATURE OF SAMPLE:

ANALYSIS NO.: 861204-11
SAMPLING DATE: 12/1,2/86
DATE SAMPLE REC'D: 12/04/86
INVOICE NO.: 18695

BH - 115 - 30 (Metro Rail Transit 87-600-0022)

EPA METHODS 625/8270 SEMI-VOLATILE POLLUTANTS DATA SHEET

	mg/kg		mg/kg
Phenol	<0.3	Acenaphthene	<0.3
bis(-2-Chloroethyl)Ether	<0.3	2,4-Dinitrophenol	<1.
2-Chlorophenol	<0.3	4-Nitrophenol	<1.
1,3-Dichlorobenzene	<0.3	Dibenzofuran	<0.3
1,4-Dichlorobenzene	<0.3	2,4-Dinitrotoluene	<0.3
Benzyl Alcohol	<0.3	2,6-Dinitrotoluene	<0.3
1,2-Dichlorobenzene	<0.3	Diethylphthalate	<0.3
2-Methylphenol	<0.3	4-Chlorophenyl-phenylether	<0.3
bis(2-chloroisopropyl)Ether	<0.3	Fluorene	<0.3
4-Methylphenol	<0.3	4-Nitroaniline	<1.
N-Nitroso-Di-n-Propylamine	<0.3	4,6-Dinitro-2-Methylphenol	<1.
Hexachloroethane	<0.3	N-Nitrosodiphenylamine (1)	<0.3
Nitrobenzene	<0.3	4-Bromophenyl-phenylether	<0.3
Isophorone	<0.3	Hexachlorobenzene	<0.3
2-Nitrophenol	<0.3	Pentachlorophenol	<1.
2,4-Dimethylphenol	<0.3	Phenanthrene	<0.3
Benzoic Acid	<1.	Anthracene	<0.3
bis(-2-Chloroethoxy)Methane	<0.3	Di-n-Butylphthalate	<0.3
2,4-Dichlorophenol	<0.3	Fluoranthene	<0.3
1,2,4-Trichlorobenzene	<0.3	Pyrene	<0.3
Naphthalene	<0.3	Butylbenzylphthatlate	<0.3
4-Chloroaniline	<0.3	3,3-Dichlorobenzidine	<0.6
Hexachlorobutadiene	<0.3	Benzo(a)Anthracene	<0.3
4-Chloro-3-Methylphenol	<0.3	bis(2-Ethylhexyl)Phthalate	<0.3
2-Methylnaphthalene	<0.3	Chrysene	<0.3
Hexachlorocyclopentadiene	<0.3	Di-n-Octyl Phthalate	<0.3
2,4,6-Trichlorophenol	<0.3	Benzo(b)Fluoranthene	<0.3
2,4,5-Trichlorophenol	<0.3	Benzo(k)Fluoranthene	<0.3
2-Chloronaphthalene	<0.3	Benzo(a)Pyrene	<0.3
2-Nitroaniline	<1.	Indeno(1,2,3-cd)Pyrene	<0.3
Dimethyl Phthalate	<0.3	Dibenzo(a,h)Anthracene	<0.3
Acenaphthylene	<0.3	Benzo(g,h,i)Perylene	<0.3
3-Nitroaniline	<1.		

<Denotes compound was not detected above the value indicated

mt
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CHEMICAL RESEARCH LABORATORIES
DATE 12/30/86

CHEMICAL RESEARCH LABORATORIES

11631 SEABOARD CIRCLE (213) 598-0458
STANTON, CA 90680 (714) 898-6370

LABORATORY REPORT

FROM: The Earth Technology
3777 Long Beach Blvd.
Long Beach, CA 90708
ATTN: Barbara Fontes

ANALYSIS NO.: 861204-12
SAMPLING DATE: 12/1,2/86
DATE SAMPLE REC'D: 12/04/86
INVOICE NO.: 18695

NATURE OF SAMPLE:
BH - 115 - 50 (~~Maxxxx~~ Metro Rail Transit 87-600-0022)

EPA METHODS 624/8240 VOLATILE POLLUTANTS DATA SHEET

	ug/kg		ug/kg
Chloromethane	<50	1,2-Dichloropropane	<20
Bromomethane	<50	Trans-1,3-Dichloropropene	<20
Vinyl Chloride	<50	Trichloroethene	<20
Chloroethane	<50	Dibromochloromethane	<20
Methylene Chloride	<20	1,1,2-Trichloroethane	<20
Acetone	<50	Benzene	<20
Carbon Disulfide	<20	cis-1,3-Dichloropropene	<20
1,1-Dichloroethene	<20	2-Chloroethylvinylether	<50
1,1-Dichloroethane	<20	Bromoform	<20
Trans-1,2-Dichloroethene	<20	4-Methyl-2-Pentanone	<50
Chloroform	<20	2-Hexanone	<50
1,2-Dichloroethane	<20	Tetrachloroethene	<20
2-Butanone	<50	1,1,2,2-Tetrachloroethane	<20
1,1,1-Trichloroethane	<20	Toluene	<20
Carbon Tetrachloride	<20	Chlorobenzene	<20
Vinyl Acetate	<50	Ethylbenzene	<20
Bromodichloromethane	<20	Styrene	<20
		Total Xylenes	<20

< Denotes compound was not detected above the value indicated.

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CHEMICAL RESEARCH LABORATORIES
DATE 12/30/86

CHEMICAL RESEARCH LABORATORIES

11631 SEABOARD CIRCLE (213) 598-0458
STANTON, CA 90680 (714) 898-6370

LABORATORY REPORT

FROM: The Earth Technology
3777 Long Beach Blvd.
Long Beach, CA 90807
ATTN: Barbara Fontes

NATURE OF SAMPLE:

ANALYSIS NO.: 861204-12
SAMPLING DATE: 12/1,2/86
DATE SAMPLE REC'D: 12/04/86
INVOICE NO.: 18695

BH - 115 - 50 (Metro Rail Transit 87-600-0022)

EPA METHODS 625/8270 SEMI-VOLATILE POLLUTANTS DATA SHEET

	mg/kg		mg/kg
Phenol	<0.3	Acenaphthene	<0.3
bis(-2-Chloroethyl)Ether	<0.3	2,4-Dinitrophenol	<1.
2-Chlorophenol	<0.3	4-Nitrophenol	<1.
1,3-Dichlorobenzene	<0.3	Dibenzofuran	<0.3
1,4-Dichlorobenzene	<0.3	2,4-Dinitrotoluene	<0.3
Benzyl Alcohol	<0.3	2,6-Dinitrotoluene	<0.3
1,2-Dichlorobenzene	<0.3	Diethylphthalate	<0.3
2-Methylphenol	<0.3	4-Chlorophenyl-phenylether	<0.3
bis(2-chloroisopropy1)Ether	<0.3	Fluorene	<0.3
4-Methylphenol	<0.3	4-Nitroaniline	<1.
N-Nitroso-Di-n-Propylamine	<0.3	4,6-Dinitro-2-Methylphenol	<1.
Hexachloroethane	<0.3	N-Nitrosodiphenylamine (1)	<0.3
Nitrobenzene	<0.3	4-Bromophenyl-phenylether	<0.3
Isophorone	<0.3	Hexachlorobenzene	<0.3
2-Nitrophenol	<0.3	Pentachlorophenol	<1.
2,4-Dimethylphenol	<0.3	Phenanthrene	<0.3
Benzoic Acid	<1.	Anthracene	<0.3
bis(-2-Chloroethoxy)Methane	<0.3	Di-n-Butylphthalate	<0.3
2,4-Dichlorophenol	<0.3	Fluoranthene	<0.3
1,2,4-Trichlorobenzene	<0.3	Pyrene	<0.3
Naphthalene	<0.3	Butylbenzylphthatlate	<0.3
4-Chloroaniline	<0.3	3,3-Dichlorobenzidine	<0.6
Hexachlorobutadiene	<0.3	Benzo(a)Anthracene	<0.3
4-Chloro-3-Methylphenol	<0.3	bis(2-Ethylhexyl)Phthalate	<0.3
2-Methylnaphthalene	<0.3	Chrysene	<0.3
Hexachlorocyclopentadiene	<0.3	Di-n-Octyl Phthalate	<0.3
2,4,6-Trichlorophenol	<0.3	Benzo(b)Fluoranthene	<0.3
2,4,5-Trichlorophenol	<0.3	Benzo(k)Fluoranthene	<0.3
2-Chloronaphthalene	<0.3	Benzo(a)Pyrene	<0.3
2-Nitroaniline	<1.	Indeno(1,2,3-cd)Pyrene	<0.3
Dimethyl Phthalate	<0.3	Dibenzo(a,h)Anthracene	<0.3
Acenaphthylene	<0.3	Benzo(g,h,i)Perylene	<0.3
3-Nitroaniline	<1.		

<Denotes compound was not detected above the value indicated

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CHEMICAL RESEARCH LABORATORIES
DATE 12/30/86

CHEMICAL RESEARCH LABORATORIES

11631 SEABOARD CIRCLE (213) 598-0458
STANTON, CA 90680 (714) 898-6370

LABORATORY REPORT

FROM: The Earth Technology
3777 Long Beach Blvd.
Long Beach, CA 90708
ATTN: Barbara Fontes

NATURE OF SAMPLE:
BH - 115 - 60 (Metro Rail Transit 87-600-0022)

ANALYSIS NO.: 861204-13
SAMPLING DATE: 12/1,2/86
DATE SAMPLE REC'D: 12/04/86
INVOICE NO.: 18695

EPA METHODS 624/8240 VOLATILE POLLUTANTS DATA SHEET

	ug/l		ug/l
Chloromethane	<10	1,2-Dichloropropane	<5
Bromomethane	<10	Trans-1,3-Dichloropropene	<5
Vinyl Chloride	<10	Trichloroethene	<5
Chloroethane	<10	Dibromochloromethane	<5
Methylene Chloride	16*	1,1,2-Trichloroethane	<5
Acetone	87	Benzene	<5
Carbon Disulfide	<5	cis-1,3-Dichloropropene	<5
1,1-Dichloroethene	<5	2-Chloroethylvinylether	<10
1,1-Dichloroethane	<5	Bromoform	<5
Trans-1,2-Dichloroethene	<5	4-Methyl-2-Pentanone	<10
Chloroform	<5	2-Hexanone	<10
1,2-Dichloroethane	<5	Tetrachloroethene	<5
2-Butanone	<10	1,1,2,2-Tetrachloroethane	<5
1,1,1-Trichloroethane	<5	Toluene	<5
Carbon Tetrachloride	<5	Chlorobenzene	<5
Vinyl Acetate	<10	Ethylbenzene	<5
Bromodichloromethane	<5	Styrene	<5
		Total Xylenes	<5

* Also found in laboratory blank.

< Denotes compound was not detected above the value indicated.

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REVIEWED & APPROVED
CHEMICAL RESEARCH LABORATORIES
DATE 12/30/86

CHEMICAL RESEARCH LABORATORIES

11631 SEABOARD CIRCLE (213) 598-0458
STANTON, CA 90680 (714) 898-6370

LABORATORY REPORT

FROM: The Earth Technology
3777 Long Beach Blvd.
Long Beach, CA 90807
ATTN: Barbara Fontes

NATURE OF SAMPLE:

ANALYSIS NO.: 861204-13
SAMPLING DATE: 12/1,2/86
DATE SAMPLE REC'D: 12/04/86
INVOICE NO.: 18695

BH - 115 - 60 (Metro Rail Transit 87-600-0022)

EPA METHODS 625/8270 SEMI-VOLATILE POLLUTANTS DATA SHEET

	mg/L		mg/L
Phenol	<0.1	Acenaphthene	<0.1
bis(-2-Chloroethyl)Ether	<0.1	2,4-Dinitrophenol	<0.5
2-Chlorophenol	<0.1	4-Nitrophenol	<0.5
1,3-Dichlorobenzene	<0.1	Dibenzofuran	<0.1
1,4-Dichlorobenzene	<0.1	2,4-Dinitrotoluene	<0.1
Benzyl Alcohol	<0.1	2,6-Dinitrotoluene	<0.1
1,2-Dichlorobenzene	<0.1	Diethylphthalate	<0.1
2-Methylphenol	<0.1	4-Chlorophenyl-phenylether	<0.1
bis(2-chloroisopropyl)Ether	<0.1	Fluorene	<0.1
4-Methylphenol	<0.1	4-Nitroaniline	<0.5
N-Nitroso-Di-n-Propylamine	<0.1	4,6-Dinitro-2-Methylphenol	<0.5
Hexachloroethane	<0.1	N-Nitrosodiphenylamine (1)	<0.1
Nitrobenzene	<0.1	4-Bromophenyl-phenylether	<0.1
Isophorone	<0.1	Hexachlorobenzene	<0.1
2-Nitrophenol	<0.1	Pentachlorophenol	<0.5
2,4-Dimethylphenol	<0.1	Phenanthrene	<0.1
Benzoic Acid	<0.5	Anthracene	<0.1
bis(-2-Chloroethoxy)Methane	<0.1	Di-n-Butylphthalate	<0.1
2,4-Dichlorophenol	<0.1	Fluoranthene	<0.1
1,2,4-Trichlorobenzene	<0.1	Pyrene	<0.1
Naphthalene	<0.1	Butylbenzylphthatlate	<0.1
4-Chloroaniline	<0.1	3,3-Dichlorobenzidine	<0.2
Hexachlorobutadiene	<0.1	Benzo(a)Anthracene	<0.1
4-Chloro-3-Methylphenol	<0.1	bis(2-Ethylhexyl)Phthalate	<0.1
2-Methylnaphthalene	<0.1	Chrysene	<0.1
Hexachlorocyclopentadiene	<0.1	Di-n-Octyl Phthalate	<0.1
2,4,6-Trichlorophenol	<0.1	Benzo(b)Fluoranthene	<0.1
2,4,5-Trichlorophenol	<0.1	Benzo(k)Fluoranthene	<0.1
2-Chloronaphthalene	<0.1	Benzo(a)Pyrene	<0.1
2-Nitroaniline	<0.5	Indeno(1,2,3-cd)Pyrene	<0.1
Dimethyl Phthalate	<0.1	Dibenzo(a,h)Anthracene	<0.1
Acenaphthylene	<0.1	Benzo(g,h,i)Perylene	<0.1
3-Nitroaniline	<0.5		

<Denotes compound was not detected above the value indicated.

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DATE 12/30/86

CHEMICAL RESEARCH LABORATORIES

11631 SEABOARD CIRCLE (213) 598-0458
STANTON, CA 90680 (714) 898-6370

LABORATORY REPORT

FROM: The Earth Technology
8777 Long Beach Blvd.
Long Beach, CA 90708
ATTN: Barbara Fontes

NATURE OF SAMPLE:
Metro
BH - 115 - 20 (~~Xxxxxx~~ Rail Transit 87-600-0022)

ANALYSIS NO.: 861204-14
SAMPLING DATE: 12/1,2/86
DATE SAMPLE REC'D: 12/04/86
INVOICE NO.: 18695

EPA METHODS 624/8240 VOLATILE POLLUTANTS DATA SHEET

	mg/kg		mg/kg
Chloromethane	<0.05	1,2-Dichloropropane	<0.02
Bromomethane	<0.05	Trans-1,3-Dichloropropene	<0.02
Vinyl Chloride	<0.05	Trichloroethene	<0.02
Chloroethane	<0.05	Dibromochloromethane	<0.02
Methylene Chloride	<0.02	1,1,2-Trichloroethane	<0.02
Acetone	<0.05	Benzene	<0.02
Carbon Disulfide	<0.02	cis-1,3-Dichloropropene	<0.02
1,1-Dichloroethene	<0.02	2-Chloroethylvinylether	<0.05
1,1-Dichloroethane	<0.02	Bromoform	<0.02
Trans-1,2-Dichloroethene	<0.02	4-Methyl-2-Pentanone	<0.05
Chloroform	<0.02	2-Hexanone	<0.05
1,2-Dichloroethane	<0.02	Tetrachloroethene	<0.02
2-Butanone	<0.05	1,1,2,2-Tetrachloroethane	<0.02
1,1,1-Trichloroethane	<0.02	Toluene	<0.02
Carbon Tetrachloride	<0.02	Chlorobenzene	<0.02
Vinyl Acetate	<0.05	Ethylbenzene	<0.02
Bromodichloromethane	<0.02	Styrene	<0.02
		Total Xylenes	<0.02

< Denotes compound was not detected above the value indicated.

SP
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REVIEWED & APPROVED
CHEMICAL RESEARCH LABORATORIES
DATE 12/30/86

CHEMICAL RESEARCH LABORATORIES

11631 SEABOARD CIRCLE (213) 598-0458
STANTON, CA 90680 (714) 898-6370

LABORATORY REPORT

FROM: The Earth Technology
3777 Long Beach Blvd.
Long Beach, CA 90807
ATTN: Barbara Fontes

NATURE OF SAMPLE:

ANALYSIS NO.: 861204-14
SAMPLING DATE: 12/1,2/86
DATE SAMPLE REC'D: 12/04/86
INVOICE NO.: 18695

BH - 115 - 20 (Metro Rail Transit 87-600-0022)

EPA METHODS 625/8270 SEMI-VOLATILE POLLUTANTS DATA SHEET

	mg/kg		mg/kg
Phenol	<0.3	Acenaphthene	<0.3
bis(-2-Chloroethyl)Ether	<0.3	2,4-Dinitrophenol	<1.
2-Chlorophenol	<0.3	4-Nitrophenol	<1.
1,3-Dichlorobenzene	<0.3	Dibenzofuran	<0.3
1,4-Dichlorobenzene	<0.3	2,4-Dinitrotoluene	<0.3
Benzyl Alcohol	<0.3	2,6-Dinitrotoluene	<0.3
1,2-Dichlorobenzene	<0.3	Diethylphthalate	<0.3
2-Methylphenol	<0.3	4-Chlorophenyl-phenylether	<0.3
bis(2-chloroisopropyl)Ether	<0.3	Fluorene	<0.3
4-Methylphenol	<0.3	4-Nitroaniline	<1.
N-Nitroso-Di-n-Propylamine	<0.3	4,6-Dinitro-2-Methylphenol	<1.
Hexachloroethane	<0.3	N-Nitrosodiphenylamine (1)	<0.3
Nitrobenzene	<0.3	4-Bromophenyl-phenylether	<0.3
Isophorone	<0.3	Hexachlorobenzene	<0.3
2-Nitrophenol	<0.3	Pentachlorophenol	<1.
2,4-Dimethylphenol	<0.3	Phenanthrene	<0.3
Benzoic Acid	<1.	Anthracene	<0.3
bis(-2-Chloroethoxy)Methane	<0.3	Di-n-Butylphthalate	<0.3
2,4-Dichlorophenol	<0.3	Fluoranthene	<0.3
1,2,4-Trichlorobenzene	<0.3	Pyrene	<0.3
Naphthalene	<0.3	Butylbenzylphthatlate	<0.3
4-Chloroaniline	<0.3	3,3-Dichlorobenzidine	<0.6
Hexachlorobutadiene	<0.3	Benzo(a)Anthracene	<0.3
4-Chloro-3-Methylphenol	<0.3	bis(2-Ethylhexyl)Phthalate	<0.3
2-Methylnaphthalene	<0.3	Chrysene	<0.3
Hexachlorocyclopentadiene	<0.3	Di-n-Octyl Phthalate	<0.3
2,4,6-Trichlorophenol	<0.3	Benzo(b)Fluoranthene	<0.3
2,4,5-Trichlorophenol	<0.3	Benzo(k)Fluoranthene	<0.3
2-Chloronaphthalene	<0.3	Benzo(a)Pyrene	<0.3
2-Nitroaniline	<1.	Indeno(1,2,3-cd)Pyrene	<0.3
Dimethyl Phthalate	<0.3	Dibenzo(a,h)Anthracene	<0.3
Acenaphthylene	<0.3	Benzo(g,h,i)Perylene	<0.3
3-Nitroaniline	<1.		

<Denotes compound was not detected above the value indicated.

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REVIEWED & APPROVED
CHEMICAL RESEARCH LABORATORIES
DATE 12/30/86

CHEMICAL RESEARCH LABORATORIES

11631 SEABOARD CIRCLE (213) 598-0458
STANTON, CA 90680 (714) 898-6370

LABORATORY REPORT

FROM: The Earth Technology
3777 Long Beach Blvd.
Long Beach, CA 90708
ATTN: Barbara Fontes

ANALYSIS NO.: 861204-15
SAMPLING DATE: 12/1,2/86
DATE SAMPLE REC'D: 12/04/86
INVOICE NO.: 18695

NATURE OF SAMPLE:
BH - 116 - 30 (Metro Rail Transit 87-600-0022)

EPA METHODS 624/8240 VOLATILE POLLUTANTS DATA SHEET

	ug/kg		ug/kg
Chloromethane	<50	1,2-Dichloropropane	<20
Bromomethane	<50	Trans-1,3-Dichloropropene	<20
Vinyl Chloride	<50	Trichloroethene	<20
Chloroethane	<50	Dibromochloromethane	<20
Methylene Chloride	<20	1,1,2-Trichloroethane	<20
Acetone	<50	Benzene	<20
Carbon Disulfide	<20	cis-1,3-Dichloropropene	<20
1,1-Dichloroethene	<20	2-Chloroethylvinylether	<50
1,1-Dichloroethane	<20	Bromoform	<20
Trans-1,2-Dichloroethene	<20	4-Methyl-2-Pentanone	<50
Chloroform	<20	2-Hexanone	<50
1,2-Dichloroethane	<20	Tetrachloroethene	<20
2-Butanone	<50	1,1,2,2-Tetrachloroethane	<20
1,1,1-Trichloroethane	<20	Toluene	<20
Carbon Tetrachloride	<20	Chlorobenzene	<20
Vinyl Acetate	<50	Ethylbenzene	<20
Bromodichloromethane	<20	Styrene	<20
		Total Xylenes	<20

< Denotes compound was not detected above the value indicated.

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CHEMICAL RESEARCH LABORATORIES
DATE 12/30/86

CHEMICAL RESEARCH LABORATORIES

11631 SEABOARD CIRCLE (213) 598-0458
STANTON, CA 90680 (714) 898-6370

LABORATORY REPORT

FROM: The Earth Technology
3777 Long Beach Blvd.
Long Beach, CA 90807
ATTN: Barbara Fontes

NATURE OF SAMPLE:

ANALYSIS NO.: 861204-15
SAMPLING DATE: 12/1,2/86
DATE SAMPLE REC'D: 12/04/86
INVOICE NO.: 18695

BH - 116 - 30 (Metro Rail Transit 87-600-0022)

EPA METHODS 625/8270 SEMI-VOLATILE POLLUTANTS DATA SHEET

	mg/kg		mg/kg
Phenol	<0.3	Acenaphthene	<0.3
bis(-2-Chloroethyl)Ether	<0.3	2,4-Dinitrophenol	<1.
2-Chlorophenol	<0.3	4-Nitrophenol	<1.
1,3-Dichlorobenzene	<0.3	Dibenzofuran	<0.3
1,4-Dichlorobenzene	<0.3	2,4-Dinitrotoluene	<0.3
Benzyl Alcohol	<0.3	2,6-Dinitrotoluene	<0.3
1,2-Dichlorobenzene	<0.3	Diethylphthalate	<0.3
2-Methylphenol	<0.3	4-Chlorophenyl-phenylether	<0.3
bis(2-chloroisopropy1)Ether	<0.3	Fluorene	<0.3
.-Methylphenol	<0.3	4-Nitroaniline	<1.
N-Nitroso-Di-n-Propylamine	<0.3	4,6-Dinitro-2-Methylphenol	<1.
Hexachloroethane	<0.3	N-Nitrosodiphenylamine (1)	<0.3
Nitrobenzene	<0.3	4-Bromophenyl-phenylether	<0.3
Isophorone	<0.3	Hexachlorobenzene	<0.3
2-Nitrophenol	<0.3	Pentachlorophenol	<1.
2,4-Dimethylphenol	<0.3	Phenanthrene	<0.3
Benzoic Acid	<1.	Anthracene	<0.3
bis(-2-Chloroethoxy)Methane	<0.3	Di-n-Butylphthalate	<0.3
2,4-Dichlorophenol	<0.3	Fluoranthene	<0.3
1,2,4-Trichlorobenzene	<0.3	Pyrene	<0.3
Naphthalene	<0.3	Butylbenzylphthatlate	<0.3
4-Chloroaniline	<0.3	3,3-Dichlorobenzidine	<0.6
Hexachlorobutadiene	<0.3	Benzo(a)Anthracene	<0.3
4-Chloro-3-Methylphenol	<0.3	bis(2-Ethylhexyl)Phthalate	<0.3
2-Methylnaphthalene	<0.3	Chrysene	<0.3
Hexachlorocyclopentadiene	<0.3	Di-n-Octyl Phthalate	<0.3
2,4,6-Trichlorophenol	<0.3	Benzo(b)Fluoranthene	<0.3
2,4,5-Trichlorophenol	<0.3	Benzo(k)Fluoranthene	<0.3
2-Chloronaphthalene	<0.3	Benzo(a)Pyrene	<0.3
2-Nitroaniline	<1.	Indeno(1,2,3-cd)Pyrene	<0.3
Dimethyl Phthalate	<0.3	Dibenzo(a,h)Anthracene	<0.3
Acenaphthylene	<0.3	Benzo(g,h,i)Perylene	<0.3
3-Nitroaniline	<1.		

<Denotes compound was not detected above the value indicated.

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CHEMICAL RESEARCH LABORATORIES
DATE 12/30/86

CHEMICAL RESEARCH LABORATORIES

11631 SEABOARD CIRCLE (213) 598-0458
STANTON, CA 90680 (714) 898-6370

LABORATORY REPORT

FROM: The Earth Technology
3777 Long Beach Blvd.
Long Beach, CA 90708
ATTN: Barbara Fontes

ANALYSIS NO.: 861204-16
SAMPLING DATE: 12/1,2/86
DATE SAMPLE REC'D: 12/04/86
INVOICE NO.: 18695

NATURE OF SAMPLE:

BH - 116 - 30 (Metro Rail Transit 87-600-0022)

EPA METHODS 624/8240 VOLATILE POLLUTANTS DATA SHEET

	ug/l		ug/l
Chloromethane	<10	1,2-Dichloropropane	<5
Bromomethane	<10	Trans-1,3-Dichloropropene	<5
Vinyl Chloride	<10	Trichloroethene	<5
Chloroethane	<10	Dibromochloromethane	<5
Methylene Chloride	14*	1,1,2-Trichloroethane	<5
Acetone	74	Benzene	<5
Carbon Disulfide	<5	cis-1,3-Dichloropropene	<5
1,1-Dichloroethene	<5	2-Chloroethylvinylether	<10
1,1-Dichloroethane	<5	Bromoform	<5
Trans-1,2-Dichloroethene	<5	4-Methyl-2-Pentanone	<10
Chloroform	<5	2-Hexanone	<10
1,2-Dichloroethane	<5	Tetrachloroethene	<5
2-Butanone	<10	1,1,2,2-Tetrachloroethane	<5
1,1,1-Trichloroethane	<5	Toluene	<5
Carbon Tetrachloride	<5	Chlorobenzene	<5
Vinyl Acetate	<10	Ethylbenzene	<5
Bromodichloromethane	<5	Styrene	<5
		Total Xylenes	<5

* Also found in laboratory blank.

< Denotes compound was not detected above the value indicated.

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CHEMICAL RESEARCH LABORATORIES
DATE 12/30/86

CHEMICAL RESEARCH LABORATORIES

11631 SEABOARD CIRCLE (213) 598-0458
STANTON, CA 90680 (714) 898-6370

LABORATORY REPORT

FROM: The Earth Technology
3777 Long Beach Blvd.
Long Beach, CA 90807
ATTN: Barbara Fontes

NATURE OF SAMPLE:

ANALYSIS NO.: 861204-16
SAMPLING DATE: 12/1,2/86
DATE SAMPLE REC'D: 12/04/86
INVOICE NO.: 18695

BH - 116 - 30 (Metro Rail Transit 87-600-0022)

EPA METHODS 625/8270 SEMI-VOLATILE POLLUTANTS DATA SHEET

	mg/l		mg/l
Phenol	<0.2	Acenaphthene	<0.2
bis(-2-Chloroethyl)Ether	<0.2	2,4-Dinitrophenol	<1.
2-Chlorophenol	<0.2	4-Nitrophenol	<1.
1,3-Dichlorobenzene	<0.2	Dibenzofuran	<0.2
1,4-Dichlorobenzene	<0.2	2,4-Dinitrotoluene	<0.2
Benzyl Alcohol	<0.2	2,6-Dinitrotoluene	<0.2
1,2-Dichlorobenzene	<0.2	Diethylphthalate	<0.2
2-Methylphenol	<0.2	4-Chlorophenyl-phenylether	<0.2
bis(2-chloroisopropy1)Ether	<0.2	Fluorene	<0.2
4-Methylphenol	<0.2	4-Nitroaniline	<1.
N-Nitroso-Di-n-Propylamine	<0.2	4,6-Dinitro-2-Methylphenol	<1.
Hexachloroethane	<0.2	N-Nitrosodiphenylamine (1)	<0.2
Nitrobenzene	<0.2	4-Bromophenyl-phenylether	<0.2
Isophorone	<0.2	Hexachlorobenzene	<0.2
2-Nitrophenol	<0.2	Pentachlorophenol	<1.
2,4-Dimethylphenol	<0.2	Phenanthrene	<0.2
Benzoic Acid	<1.	Anthracene	<0.2
bis(-2-Chloroethoxy)Methane	<0.2	Di-n-Butylphthalate	<0.2
2,4-Dichlorophenol	<0.2	Fluoranthene	<0.2
1,2,4-Trichlorobenzene	<0.2	Pyrene	<0.2
Naphthalene	<0.2	Butylbenzylphthatlate	<0.2
4-Chloroaniline	<0.2	3,3-Dichlorobenzidine	<0.4
Hexachlorobutadiene	<0.2	Benzo(a)Anthracene	<0.2
4-Chloro-3-Methylphenol	<0.2	bis(2-Ethylhexyl)Phthalate	<0.2
2-Methylnaphthalene	<0.2	Chrysene	<0.2
Hexachlorocyclopentadiene	<0.2	Di-n-Octyl Phthalate	<0.2
2,4,6-Trichlorophenol	<0.2	Benzo(b)Fluoranthene	<0.2
2,4,5-Trichlorophenol	<0.2	Benzo(k)Fluoranthene	<0.2
2-Chloronaphthalene	<0.2	Benzo(a)Pyrene	<0.2
2-Nitroaniline	<1.	Indeno(1,2,3-cd)Pyrene	<0.2
Dimethyl Phthalate	<0.2	Dibenzo(a,h)Anthracene	<0.2
Acenaphthylene	<0.2	Benzo(g,h,i)Perylene	<0.2
3-Nitroaniline	<1.		

<Denotes compound was not detected above the value indicated.

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CHEMICAL RESEARCH LABORATORIES
DATE 12/30/86

CHEMICAL RESEARCH LABORATORIES

11631 SEABOARD CIRCLE (213) 598-0458
STANTON, CA 90680 (714) 898-6370

LABORATORY REPORT

FROM: The Earth Technology
3777 Long Beach Blvd.
Long Beach, CA 90708
ATTN: Barbara Fontes

NATURE OF SAMPLE:
BH - 118 - 60 (~~Marine~~ Metro Rail Transit 87-600-0022)

ANALYSIS NO.: 861204-17
SAMPLING DATE: 12/1,2/86
DATE SAMPLE REC'D: 12/04/86
INVOICE NO.: 18695

EPA METHODS 624/8240 VOLATILE POLLUTANTS DATA SHEET

	ug/l		ug/l
Chloromethane	<10	1,2-Dichloropropane	<5
Bromomethane	<10	Trans-1,3-Dichloropropene	<5
Vinyl Chloride	<10	Trichloroethene	<5
Chloroethane	<10	Dibromochloromethane	<5
Methylene Chloride	21*	1,1,2-Trichloroethane	<5
Acetone	75	Benzene	<5
Carbon Disulfide	<5	cis-1,3-Dichloropropene	<5
1,1-Dichloroethene	<5	2-Chloroethylvinylether	<10
1,1-Dichloroethane	<5	Bromoform	<5
Trans-1,2-Dichloroethene	<5	4-Methyl-2-Pentanone	<10
Chloroform	<5	2-Hexanone	<10
1,2-Dichloroethane	<5	Tetrachloroethene	<5
2-Butanone	<10	1,1,2,2-Tetrachloroethane	<5
1,1,1-Trichloroethane	<5	Toluene	<5
Carbon Tetrachloride	<5	Chlorobenzene	<5
Vinyl Acetate	<10	Ethylbenzene	<5
Bromodichloromethane	<5	Styrene	<5
		Total Xylenes	<5

* Also found in laboratory blank.

< Denotes compound was not detected above the value indicated.

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REVIEWED & APPROVED
CHEMICAL RESEARCH LABORATORIES
DATE 12/30/86

CHEMICAL RESEARCH LABORATORIES

11631 SEABOARD CIRCLE (213) 598-0458
STANTON, CA 90680 (714) 898-6370

LABORATORY REPORT

FROM: The Earth Technology
3777 Long Beach Blvd.
Long Beach, CA 90807
ATTN: Barbara Fontes

NATURE OF SAMPLE:

ANALYSIS NO.: 861204-17
SAMPLING DATE: 12/1,2/86
DATE SAMPLE REC'D: 12/04/86
INVOICE NO.: 18695

BH - 118 - 60 (Metro Rail Transit 87-600-0022)

EPA METHODS 625/8270 SEMI-VOLATILE POLLUTANTS DATA SHEET

	mg/l		mg/l
Phenol	<0.2	Acenaphthene	<0.2
bis(-2-Chloroethyl)Ether	<0.2	2,4-Dinitrophenol	<1.
2-Chlorophenol	<0.2	4-Nitrophenol	<1.
1,3-Dichlorobenzene	<0.2	Dibenzofuran	<0.2
1,4-Dichlorobenzene	<0.2	2,4-Dinitrotoluene	<0.2
Benzyl Alcohol	<0.2	2,6-Dinitrotoluene	<0.2
1,2-Dichlorobenzene	<0.2	Diethylphthalate	<0.2
2-Methylphenol	<0.2	4-Chlorophenyl-phenylether	<0.2
bis(2-chloroisopropyl)Ether	<0.2	Fluorene	<0.2
4-Methylphenol	<0.2	4-Nitroaniline	<1.
N-Nitroso-Di-n-Propylamine	<0.2	4,6-Dinitro-2-Methylphenol	<1.
Hexachloroethane	<0.2	N-Nitrosodiphenylamine (1)	<0.2
Nitrobenzene	<0.2	4-Bromophenyl-phenylether	<0.2
Isophorone	<0.2	Hexachlorobenzene	<0.2
2-Nitrophenol	<0.2	Pentachlorophenol	<1.
2,4-Dimethylphenol	<0.2	Phenanthrene	<0.2
Benzoic Acid	<1.	Anthracene	<0.2
bis(-2-Chloroethoxy)Methane	<0.2	Di-n-Butylphthalate	<0.2
2,4-Dichlorophenol	<0.2	Fluoranthene	<0.2
1,2,4-Trichlorobenzene	<0.2	Pyrene	<0.2
Naphthalene	<0.2	Butylbenzylphthatlate	<0.2
4-Chloroaniline	<0.2	3,3-Dichlorobenzidine	<0.4
Hexachlorobutadiene	<0.2	Benzo(a)Anthracene	<0.2
4-Chloro-3-Methylphenol	<0.2	bis(2-Ethylhexyl)Phthalate	<0.2
2-Methylnaphthalene	<0.2	Chrysene	<0.2
Hexachlorocyclopentadiene	<0.2	Di-n-Octyl Phthalate	<0.2
2,4,6-Trichlorophenol	<0.2	Benzo(b)Fluoranthene	<0.2
2,4,5-Trichlorophenol	<0.2	Benzo(k)Fluoranthene	<0.2
2-Chloronaphthalene	<0.2	Benzo(a)Pyrene	<0.2
2-Nitroaniline	<1.	Indeno(1,2,3-cd)Pyrene	<0.2
Dimethyl Phthalate	<0.2	Dibenzo(a,h)Anthracene	<0.2
Acenaphthylene	<0.2	Benzo(g,h,i)Perylene	<0.2
3-Nitroaniline	<1.		

<Denotes compound was not detected above the value indicated.

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REVIEWED & APPROVED
CHEMICAL RESEARCH LABORATORIES
DATE 12/30/86

CHEMICAL RESEARCH LABORATORIES

11631 SEABOARD CIRCLE (213) 598-0458
STANTON, CA 90680 (714) 898-6370

LABORATORY REPORT

FROM: The Earth Technology
3777 Long Beach Blvd.
Long Beach, CA 90708
ATTN: Barbara Fontes

NATURE OF SAMPLE:
Metro
BH - 117 - 40 (Red Line Rail Transit 87-600-0022)

ANALYSIS NO.: 861204-18
SAMPLING DATE: 12/1,2/86
DATE SAMPLE REC'D: 12/04/86
INVOICE NO.: 18695

EPA METHODS 624/8240 VOLATILE POLLUTANTS DATA SHEET

	ug/kg		ug/kg
Chloromethane	<50	1,2-Dichloropropane	<20
Bromomethane	<50	Trans-1,3-Dichloropropene	<20
Vinyl Chloride	<50	Trichloroethene	<20
Chloroethane	<50	Dibromochloromethane	<20
Methylene Chloride	<20	1,1,2-Trichloroethane	<20
Acetone	<50	Benzene	<20
Carbon Disulfide	<20	cis-1,3-Dichloropropene	<20
1,1-Dichloroethene	<20	2-Chloroethylvinylether	<50
1,1-Dichloroethane	<20	Bromoform	<20
Trans-1,2-Dichloroethene	<20	4-Methyl-2-Pentanone	<50
Chloroform	<20	2-Hexanone	<50
1,2-Dichloroethane	<20	Tetrachloroethene	<20
2-Butanone	<50	1,1,2,2-Tetrachloroethane	<20
1,1,1-Trichloroethane	<20	Toluene	<20
Carbon Tetrachloride	<20	Chlorobenzene	<20
Vinyl Acetate	<50	Ethylbenzene	<20
Bromodichloromethane	<20	Styrene	<20
		Total Xylenes	<20

< Denotes compound was not detected above the value indicated.

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REVIEWED & APPROVED
CHEMICAL RESEARCH LABORATORIES
DATE 12/30/86

CHEMICAL RESEARCH LABORATORIES

11631 SEABOARD CIRCLE (213) 598-0458
STANTON, CA 90680 (714) 898-6370

LABORATORY REPORT

FROM: The Earth Technology
3777 Long Beach Blvd.
Long Beach, CA 90807
ATTN: Barbara Fontes

NATURE OF SAMPLE:

ANALYSIS NO.: 86:204-18
SAMPLING DATE: 12/1,2/86
DATE SAMPLE REC'D: 12/04/86
INVOICE NO.: 18695

BH - 117 - 40 (Metro Rail Transit 87-600-0022)

EPA METHODS 625/8270 SEMI-VOLATILE POLLUTANTS DATA SHEET

	mg/kg		mg/kg
Phenol	<0.3	Acenaphthene	<0.3
bis(-2-Chloroethyl)Ether	<0.3	2,4-Dinitrophenol	<1.
2-Chlorophenol	<0.3	4-Nitrophenol	<1.
1,3-Dichlorobenzene	<0.3	Dibenzofuran	<0.3
1,4-Dichlorobenzene	<0.3	2,4-Dinitrotoluene	<0.3
Benzyl Alcohol	<0.3	2,6-Dinitrotoluene	<0.3
1,2-Dichlorobenzene	<0.3	Diethylphthalate	<0.3
2-Methylphenol	<0.3	4-Chlorophenyl-phenylether	<0.3
bis(2-chloroisopropyl)Ether	<0.3	Fluorene	<0.3
-Methylphenol	<0.3	4-Nitroaniline	<1.
N-Nitroso-Di-n-Propylamine	<0.3	4,6-Dinitro-2-Methylphenol	<1.
Hexachloroethane	<0.3	N-Nitrosodiphenylamine (1)	<0.3
Nitrobenzene	<0.3	4-Bromophenyl-phenylether	<0.3
Isophorone	<0.3	Hexachlorobenzene	<0.3
2-Nitrophenol	<0.3	Pentachlorophenol	<1.
2,4-Dimethylphenol	<0.3	Phenanthrene	<0.3
Benzoic Acid	<1.	Anthracene	<0.3
bis(-2-Chloroethoxy)Methane	<0.3	Di-n-Butylphthalate	<0.3
2,4-Dichlorophenol	<0.3	Fluoranthene	<0.3
1,2,4-Trichlorobenzene	<0.3	Pyrene	<0.3
Naphthalene	<0.3	Butylbenzylphthatlate	<0.3
4-Chloroaniline	<0.3	3,3-Dichlorobenzidine	<0.6
Hexachlorobutadiene	<0.3	Benzo(a)Anthracene	<0.3
4-Chloro-3-Methylphenol	<0.3	bis(2-Ethylhexyl)Phthalate	<0.3
2-Methylnaphthalene	<0.3	Chrysene	<0.3
Hexachlorocyclopentadiene	<0.3	Di-n-Octyl Phthalate	<0.3
2,4,6-Trichlorophenol	<0.3	Benzo(b)Fluoranthene	<0.3
2,4,5-Trichlorophenol	<0.3	Benzo(k)Fluoranthene	<0.3
2-Chloronaphthalene	<0.3	Benzo(a)Pyrene	<0.3
2-Nitroaniline	<1.	Indeno(1,2,3-cd)Pyrene	<0.3
Dimethyl Phthalate	<0.3	Dibenzo(a,h)Anthracene	<0.3
Acenaphthylene	<0.3	Benzo(g,h,i)Perylene	<0.3
3-Nitroaniline	<1.		

<Denotes compound was not detected above the value indicated.

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CHEMICAL RESEARCH LABORATORIES
DATE 12/30/86

CHEMICAL RESEARCH LABORATORIES

11631 SEABOARD CIRCLE (213) 598-0458
STANTON, CA 90680 (714) 898-6370

LABORATORY REPORT

FROM: The Earth Technology
3777 Long Beach Blvd.
Long Beach, CA 90708
ATTN: Barbara Fontes

ANALYSIS NO.: 861204-19
SAMPLING DATE: 12/1,2/86
DATE SAMPLE REC'D: 12/04/86
INVOICE NO.: 18695

NATURE OF SAMPLE:
BH - 117 - 55 (Metro Rail Transit 87-600-0022)

EPA METHODS 624/8240 VOLATILE POLLUTANTS DATA SHEET

	ug/kg		ug/kg
Chloromethane	<50	1,2-Dichloropropane	<20
Bromomethane	<50	Trans-1,3-Dichloropropene	<20
Vinyl Chloride	<50	Trichloroethene	<20
Chloroethane	<50	Dibromochloromethane	<20
Methylene Chloride	<20	1,1,2-Trichloroethane	<20
Acetone	<50	Benzene	<20
Carbon Disulfide	<20	cis-1,3-Dichloropropene	<20
1,1-Dichloroethene	<20	2-Chloroethylvinylether	<50
1,1-Dichloroethane	<20	Bromoform	<20
Trans-1,2-Dichloroethene	<20	4-Methyl-2-Pentanone	<50
Chloroform	<20	2-Hexanone	<50
1,2-Dichloroethane	<20	Tetrachloroethene	<20
2-Butanone	<50	1,1,2,2-Tetrachloroethane	<20
1,1,1-Trichloroethane	<20	Toluene	<20
Carbon Tetrachloride	<20	Chlorobenzene	<20
Vinyl Acetate	<50	Ethylbenzene	<20
Bromodichloromethane	<20	Styrene	<20
		Total Xylenes	<20

< Denotes compound was not detected above the value indicated.

ANALYST GP

REVIEWED & APPROVED
CHEMICAL RESEARCH LABORATORIES
DATE 12/30/86

CHEMICAL RESEARCH LABORATORIES

11631 SEABOARD CIRCLE (213) 598-0458
STANTON, CA 90680 (714) 898-6370

LABORATORY REPORT

FROM: The Earth Technology
3777 Long Beach Blvd.
Long Beach, CA 90807
ATTN: Barbara Fontes

NATURE OF SAMPLE:

ANALYSIS NO.: 861204-19
SAMPLING DATE: 12/1,2/86
DATE SAMPLE REC'D: 12/04/86
INVOICE NO.: 18695

BH - 117 - 55 (Metro Rail Transit 87-600-0022)

EPA METHODS 625/8270 SEMI-VOLATILE POLLUTANTS DATA SHEET

	mg/kg		mg/kg
Phenol	<0.3	Acenaphthene	<0.3
bis(-2-Chloroethyl)Ether	<0.3	2,4-Dinitrophenol	<1.
2-Chlorophenol	<0.3	4-Nitrophenol	<1.
1,3-Dichlorobenzene	<0.3	Dibenzofuran	<0.3
1,4-Dichlorobenzene	<0.3	2,4-Dinitrotoluene	<0.3
Benzyl Alcohol	<0.3	2,6-Dinitrotoluene	<0.3
1,2-Dichlorobenzene	<0.3	Diethylphthalate	<0.3
2-Methylphenol	<0.3	4-Chlorophenyl-phenylether	<0.3
bis(2-chloroisopropyl)Ether	<0.3	Fluorene	<0.3
4-Methylphenol	<0.3	4-Nitroaniline	<1.
N-Nitroso-Di-n-Propylamine	<0.3	4,6-Dinitro-2-Methylphenol	<1.
Hexachloroethane	<0.3	N-Nitrosodiphenylamine (1)	<0.3
Nitrobenzene	<0.3	4-Bromophenyl-phenylether	<0.3
Isophorone	<0.3	Hexachlorobenzene	<0.3
2-Nitrophenol	<0.3	Pentachlorophenol	<1.
2,4-Dimethylphenol	<0.3	Phenanthrene	<0.3
Benzoic Acid	<1.	Anthracene	<0.3
bis(-2-Chloroethoxy)Methane	<0.3	Di-n-Butylphthalate	<0.3
2,4-Dichlorophenol	<0.3	Fluoranthene	<0.3
1,2,4-Trichlorobenzene	<0.3	Pyrene	<0.3
Naphthalene	<0.3	Butylbenzylphthatlate	<0.3
4-Chloroaniline	<0.3	3,3-Dichlorobenzidine	<0.6
Hexachlorobutadiene	<0.3	Benzo(a)Anthracene	<0.3
4-Chloro-3-Methylphenol	<0.3	bis(2-Ethylhexyl)Phthalate	<0.3
2-Methylnaphthalene	<0.3	Chrysene	<0.3
Hexachlorocyclopentadiene	<0.3	Di-n-Octyl Phthalate	<0.3
2,4,6-Trichlorophenol	<0.3	Benzo(b)Fluoranthene	<0.3
2,4,5-Trichlorophenol	<0.3	Benzo(k)Fluoranthene	<0.3
2-Chloronaphthalene	<0.3	Benzo(a)Pyrene	<0.3
2-Nitroaniline	<1.	Indeno(1,2,3-cd)Pyrene	<0.3
Dimethyl Phthalate	<0.3	Dibenzo(a,h)Anthracene	<0.3
Acenaphthylene	<0.3	Benzo(g,h,i)Perylene	<0.3
3-Nitroaniline	<1.		

<Denotes compound was not detected above the value indicated.

ANALYST

REVIEWED & APPROVED
CHEMICAL RESEARCH LABORATORIES
DATE 12/30/86

CHEMICAL RESEARCH LABORATORIES

11631 SEABOARD CIRCLE (213) 598-0458
STANTON, CA 90680 (714) 898-6370

LABORATORY REPORT

FROM: The Earth Technology
3777 Long Beach Blvd.
Long Beach, CA 90708
ATTN: Barbara Fontes

NATURE OF SAMPLE:
BH - 117 - 60 (Metro Rail Transit 87-600-0022)

ANALYSIS NO.: 861204-20
SAMPLING DATE: 12/1,2/86
DATE SAMPLE REC'D: 12/04/86
INVOICE NO.: 18695

EPA METHODS 624/8240 VOLATILE POLLUTANTS DATA SHEET

	ug/kg		ug/kg
Chloromethane	<50	1,2-Dichloropropane	<20
Bromomethane	<50	Trans-1,3-Dichloropropene	<20
Vinyl Chloride	<50	Trichloroethene	<20
Chloroethane	<50	Dibromochloromethane	<20
Methylene Chloride	<20	1,1,2-Trichloroethane	<20
Acetone	<50	Benzene	<20
Carbon Disulfide	<20	cis-1,3-Dichloropropene	<20
1,1-Dichloroethene	<20	2-Chloroethylvinylether	<50
1,1-Dichloroethane	<20	Bromoform	<20
Trans-1,2-Dichloroethene	<20	4-Methyl-2-Pentanone	<50
Chloroform	<20	2-Hexanone	<50
1,2-Dichloroethane	<20	Tetrachloroethene	<20
2-Butanone	<50	1,1,2,2-Tetrachloroethane	<20
1,1,1-Trichloroethane	<20	Toluene	<20
Carbon Tetrachloride	<20	Chlorobenzene	<20
Vinyl Acetate	<50	Ethylbenzene	<20
Bromodichloromethane	<20	Styrene	<20
		Total Xylenes	<20

< Denotes compound was not detected above the value indicated.

ANALYST

REVIEWED & APPROVED
CHEMICAL RESEARCH LABORATORIES
DATE 12/30/86

CHEMICAL RESEARCH LABORATORIES

11631 SEABOARD CIRCLE (213) 598-0458
STANTON, CA 90680 (714) 898-6370

LABORATORY REPORT

FROM: The Earth Technology
3777 Long Beach Blvd.
Long Beach, CA 90807
ATTN: Barbara Fontes

NATURE OF SAMPLE:

ANALYSIS NO.: 861204-20
SAMPLING DATE: 12/1,2/86
DATE SAMPLE REC'D: 12/04/86
INVOICE NO.: 18695

BH - 117 - 60 (Metro Rail Transit 87-600-0022)

EPA METHODS 625/8270 SEMI-VOLATILE POLLUTANTS DATA SHEET

	mg/kg		mg/kg
Phenol	<0.3	Acenaphthene	<0.3
bis(-2-Chloroethyl)Ether	<0.3	2,4-Dinitrophenol	<1.
2-Chlorophenol	<0.3	4-Nitrophenol	<1.
1,3-Dichlorobenzene	<0.3	Dibenzofuran	<0.3
1,4-Dichlorobenzene	<0.3	2,4-Dinitrotoluene	<0.3
Benzyl Alcohol	<0.3	2,6-Dinitrotoluene	<0.3
1,2-Dichlorobenzene	<0.3	Diethylphthalate	<0.3
2-Methylphenol	<0.3	4-Chlorophenyl-phenylether	<0.3
bis(2-chloroisopropy1)Ether	<0.3	Fluorene	<0.3
4-Methylphenol	<0.3	4-Nitroaniline	<1.
N-Nitroso-Di-n-Propylamine	<0.3	4,6-Dinitro-2-Methylphenol	<1.
Hexachloroethane	<0.3	N-Nitrosodiphenylamine (1)	<0.3
Nitrobenzene	<0.3	4-Bromophenyl-phenylether	<0.3
Isophorone	<0.3	Hexachlorobenzene	<0.3
2-Nitrophenol	<0.3	Pentachlorophenol	<1.
2,4-Dimethylphenol	<0.3	Phenanthrene	<0.3
Benzoic Acid	<1.	Anthracene	<0.3
bis(-2-Chloroethoxy)Methane	<0.3	Di-n-Butylphthalate	<0.3
2,4-Dichlorophenol	<0.3	Fluoranthene	<0.3
1,2,4-Trichlorobenzene	<0.3	Pyrene	<0.3
Naphthalene	<0.3	Butylbenzylphthatlate	<0.3
4-Chloroaniline	<0.3	3,3-Dichlorobenzidine	<0.6
Hexachlorobutadiene	<0.3	Benzo(a)Anthracene	<0.3
4-Chloro-3-Methylphenol	<0.3	bis(2-Ethylhexyl)Phthalate	<0.3
2-Methylnaphthalene	<0.3	Chrysene	<0.3
Hexachlorocyclopentadiene	<0.3	Di-n-Octyl Phthalate	<0.3
2,4,6-Trichlorophenol	<0.3	Benzo(b)Fluoranthene	<0.3
2,4,5-Trichlorophenol	<0.3	Benzo(k)Fluoranthene	<0.3
2-Chloronaphthalene	<0.3	Benzo(a)Pyrene	<0.3
2-Nitroaniline	<1.	Indeno(1,2,3-cd)Pyrene	<0.3
Dimethyl Phthalate	<0.3	Dibenzo(a,h)Anthracene	<0.3
Acenaphthylene	<0.3	Benzo(g,h,i)Perylene	<0.3
3-Nitroaniline	<1.		

<Denotes compound was not detected above the value indicated.

MH
ANALYST

REVIEWED & APPROVED
CHEMICAL RESEARCH LABORATORIES
DATE 12/30/86

CHEMICAL RESEARCH LABORATORIES

11631 SEABOARD CIRCLE (213) 598-0458
STANTON, CA 90680 (714) 898-6370

LABORATORY REPORT

The Earth Technology
FROM: 3777 Long Beach Blvd.
Long Beach, CA 90708
ATTN: Barbara Fontes

ANALYSIS NO.: 861204-21
SAMPLING DATE: 12/1,2/86
DATE SAMPLE REC'D: 12/04/86
INVOICE NO.: 18695

NATURE OF SAMPLE:
BH - 117 - 60 (Metro Rail Transit 87-600-0022)

EPA METHODS 624/8240 VOLATILE POLLUTANTS DATA SHEET

	ug/l		ug/l
Chloromethane	<10	1,2-Dichloropropane	<5
Bromomethane	<10	Trans-1,3-Dichloropropene	<5
Vinyl Chloride	<10	Trichloroethene	<5
Chloroethane	<10	Dibromochloromethane	<5
Methylene Chloride	17*	1,1,2-Trichloroethane	<5
Acetone	88	Benzene	<5
arbon Disulfide	<5	cis-1,3-Dichloropropene	<5
1,1-Dichloroethene	<5	2-Chloroethylvinylether	<10
1,1-Dichloroethane	<5	Bromoform	<5
Trans-1,2-Dichloroethene	<5	4-Methyl-2-Pentanone	<10
Chloroform	<5	2-Hexanone	<10
1,2-Dichloroethane	<5	Tetrachloroethene	<5
2-Butanone	<10	1,1,2,2-Tetrachloroethane	<5
1,1,1-Trichloroethane	<5	Toluene	<5
Carbon Tetrachloride	<5	Chlorobenzene	<5
Vinyl Acetate	<10	Ethylbenzene	<5
Bromodichloromethane	<5	Styrene	<5
		Total Xylenes	<5

* Also found in laboratory blank.

< Denotes compound was not detected above the value indicated.

ANALYST

REVIEWED & APPROVED
CHEMICAL RESEARCH LABORATORIES
DATE 12/3/86

CHEMICAL RESEARCH LABORATORIES

11631 SEABOARD CIRCLE (213) 598-0458
STANTON, CA 90680 (714) 898-6370

LABORATORY REPORT

FROM: The Earth Technology
3777 Long Beach Blvd.
Long Beach, CA 90807
ATTN: Barbara Fontes

NATURE OF SAMPLE:

ANALYSIS NO.: 861204-21
SAMPLING DATE: 12/1,2/86
DATE SAMPLE REC'D: 12/04/86
INVOICE NO.: 18695

BH - 117 - 60 (Metro Rail Transit 87-600-0022)

EPA METHODS 625/8270 SEMI-VOLATILE POLLUTANTS DATA SHEET

	mg/l		mg/l
Phenol	<0.2	Acenaphthene	<0.2
bis(-2-Chloroethyl)Ether	<0.2	2,4-Dinitrophenol	<1.
2-Chlorophenol	<0.2	4-Nitrophenol	<1.
1,3-Dichlorobenzene	<0.2	Dibenzofuran	<0.2
1,4-Dichlorobenzene	<0.2	2,4-Dinitrotoluene	<0.2
Benzyl Alcohol	<0.2	2,6-Dinitrotoluene	<0.2
1,2-Dichlorobenzene	<0.2	Diethylphthalate	<0.2
2-Methylphenol	<0.2	4-Chlorophenyl-phenylether	<0.2
bis(2-chloroisopropy1)Ether	<0.2	Fluorene	<0.2
4-Methylphenol	<0.2	4-Nitroaniline	<1.
N-Nitroso-Di-n-Propylamine	<0.2	4,6-Dinitro-2-Methylphenol	<1.
Hexachloroethane	<0.2	N-Nitrosodiphenylamine (1)	<0.2
Nitrobenzene	<0.2	4-Bromophenyl-phenylether	<0.2
Isophorone	<0.2	Hexachlorobenzene	<0.2
2-Nitrophenol	<0.2	Pentachlorophenol	<1.
2,4-Dimethylphenol	<0.2	Phenanthrene	<0.2
Benzoic Acid	<1.	Anthracene	<0.2
bis(-2-Chloroethoxy)Methane	<0.2	Di-n-Butylphthalate	<0.2
2,4-Dichlorophenol	<0.2	Fluoranthene	<0.2
1,2,4-Trichlorobenzene	<0.2	Pyrene	<0.2
Naphthalene	<0.2	Butylbenzylphthatlate	<0.2
4-Chloroaniline	<0.2	3,3-Dichlorobenzidine	<0.4
Hexachlorobutadiene	<0.2	Benzo(a)Anthracene	<0.2
4-Chloro-3-Methylphenol	<0.2	bis(2-Ethylhexyl)Phthalate	<0.2
2-Methylnaphthalene	<0.2	Chrysene	<0.2
Hexachlorocyclopentadiene	<0.2	Di-n-Octyl Phthalate	<0.2
2,4,6-Trichlorophenol	<0.2	Benzo(b)Fluoranthene	<0.2
2,4,5-Trichlorophenol	<0.2	Benzo(k)Fluoranthene	<0.2
2-Chloronaphthalene	<0.2	Benzo(a)Pyrene	<0.2
2-Nitroaniline	<1.	Indeno(1,2,3-cd)Pyrene	<0.2
Dimethyl Phthalate	<0.2	Dibenzo(a,h)Anthracene	<0.2
Acenaphthylene	<0.2	Benzo(g,h,i)Perylene	<0.2
3-Nitroaniline	<1.		

<Denotes compound was not detected above the value indicated.

ANALYST

REVIEWED & APPROVED
CHEMICAL RESEARCH LABORATORIES
DATE 12/30/86

CHEMICAL RESEARCH LABORATORIES

11631 SEABOARD CIRCLE (213) 598-0458
STANTON, CA 90680 (714) 898-6370

LABORATORY REPORT

FROM: The Earth Technology
3777 Long Beach Blvd.
Long Beach, CA 90708
ATTN: Barbara Fontes

NATURE OF SAMPLE:
Travel Blank (Metro Rail Transit 87-600-0022)

ANALYSIS NO.: 861204-22
SAMPLING DATE: 12/1,2/86
DATE SAMPLE REC'D: 12/04/86
INVOICE NO.: 18695

EPA METHODS 624/8240 VOLATILE POLLUTANTS DATA SHEET

	ug/l		ug/l
Chloromethane	<10	1,2-Dichloropropane	<5
Bromomethane	<10	Trans-1,3-Dichloropropene	<5
Vinyl Chloride	<10	Trichloroethene	<5
Chloroethane	<10	Dibromochloromethane	<5
Methylene Chloride	12*	1,1,2-Trichloroethane	<5
Acetone	17	Benzene	<5
Carbon Disulfide	<5	cis-1,3-Dichloropropene	<5
1,1-Dichloroethene	<5	2-Chloroethylvinylether	<10
1,1-Dichloroethane	<5	Bromoform	<5
Trans-1,2-Dichloroethene	<5	4-Methyl-2-Pentanone	<10
Chloroform	<5	2-Hexanone	<10
1,2-Dichloroethane	<5	Tetrachloroethene	<5
2-Butanone	<10	1,1,2,2-Tetrachloroethane	<5
1,1,1-Trichloroethane	<5	Toluene	<5
Carbon Tetrachloride	<5	Chlorobenzene	<5
Vinyl Acetate	<10	Ethylbenzene	<5
Bromodichloromethane	<5	Styrene	<5
		Total Xylenes	<5

* Also found in laboratory blank.

< Denotes compound was not detected above the value indicated.

ANALYST

REVIEWED & APPROVED
CHEMICAL RESEARCH LABORATORIES
DATE 12/30/86

APPENDIX C

SITE BORING LOGS

The Earth Technology Corporation

BORING LOG

Project Name: Metro Rail Transit

Project Number: 87-600-0022 Field Log of Boring Number: BH-112 Sheet 1 of 2

Boring Location: Back portion of Denny's parking lot			Elevation and Datum: 277		
Drilling Agency: Drill Line	Driller: G. Deluca, J. Hale		Data Started: 11/25/86	Data Finished: 11/25/86	
Drilling Equipment: B-53			Completion: Depth (feet) 45.5	Rock Depth: (feet)	
Method of Drilling: Hollow Stem Auger Dia. 8"			Number of Samples: 10 / Dist.:	Undist.: 9	Core:
Borehole Size:			Water Depth (ft): 30 / First:	Compl.:	24 hrs.
Type of Perforation Backfill: #3 Monterey Sand Pack			Logged By: Allison Urbon	Checked by: Barbara Fontes	
Type of Seal: 5% bentonite cement grout					

Depth (feet)	Description	Graphic Log: Lithology	Graphic Log: OVA (ppm)	Samples: Number	Samples: Type	Samples: Blow Count	Samples: Drilling Rate/Time	Remarks
	0-0.5' Asphalt	AS						
	0.5' Dry, brown, silty sand, well sorted	SP					9:40	OVA Background (BG) reading = 4ppm
	4.0-5.0' Same as above	SP		1		10/9/8	9:42	
5	5.0-5.5' Dry, light brown, fine-medium grain size sand w/some silt, well sorted							
	9.0-10.5' Dry, light brown, medium-coarse sand w/gravel, poorly sorted, qtz sand	SP	BG	2		20/13/7	9:45	
10								
	14.0-15.5' Dry, light brown, medium-coarse sand w/gravel and cobbles	SP/SC	BG	3		50/50	9:52	OVA @ BG downhole Thin clay layer @ 14.5'
15								
	19.0-20.5' Dry, light brown, fine-medium sand, well sorted	SP	BG	4		28/48/50	9:56	OVA @ BG
20								
	24.0-24'9" Damp, light brown, fine-medium sand, well sorted	SP	BG	5		25/50	10:03	Tar-like odor detected
25	24'9" Change in color to gray and coarser sand							
	29.0-30.5' Wet, gray, medium-coarse sand, well sorted, qtz sand	SP	BG	6				BG OVA @ 5ppm OVA @ BG in air and near drill hole - water @ 30ft
30								

The Earth Technology Corporation

BORING LOG

Project name: Metro Rail Transit

Project Number: 87-600-0022 Field Log of Boring Number: BH-112 Sheet 2 of 2

Depth (feet)	Description	Graphic Log: Lithology	Graphic Log: OVA (ppm)	Samples: Number	Samples: Type	Samples: Blow Count	Samples: Drilling Rate/Time	Remarks
35	34.0-35.5' Same as above	SP	>4	7				
	37' Cobble gravel							
40	39.0-40.5' Wet, gray, medium sand w/coarse sand, gravel, & cobbles, poorly sorted	SW	>4	8		20/34/50	10:35	OVA @ 7ppm downhole 10:46am BG OVA @ 8ppm
45	44.0-45.5' Wet, gray, medium sand w/coarse sand, well sorted End Hole	SP	≫4	9		9/21/23	10:51	11:05am BG OVA @ 9ppm
50							11:10	Water sample taken at 45' depth 11:17am BG OVA @ 7ppm
55								
60								TEMP. = X pH = X σ = 1530 μmhos
65								
70								

The Earth Technology Corporation

BORING LOG

Project Name: Metro Rail Transit

Project Number: 87-600-0022 Field Log of Boring Number: BH-113 Sheet 1 of 2

Boring Location: Howard street & Denny's back lot			Elevation and Datum: 276		
Drilling Agency: Drill Line	Driller: G. Deluca, J. Hale		Data Started: 11/25/86	Data Finished: 11/25/86	
Drilling Equipment: B-53			Completion: Depth (feet) 40.5	Rock Depth: (feet)	
Method of Drilling: Hollow Stem Auger Dia 8"			Number of Samples: 7 / Dist.:	Undist.: 7	Core:
Borehole Size:			Water Depth (ft): 30 / First:	Compl.:	24 hrs.
Type of Perforation Backfill: #3 Monterey Sand Pack			Logged By: B. Fontes	Checked by: A. Urbon	
Type of Seal: 5% bentonite cement grout					

Depth (feet)	Description	Graphic Log: Lithology	Graphic Log: OVA (ppm)	Samples: Number	Samples: Type	Samples: Blow Count	Samples: Drilling Rate/Time	Remarks
	0-0.5' Black asphalt	AS					1:00	OVA Background (BG) reading = 4ppm
	0.5' Dry, dark brown, silty fine-medium sand, well sorted	SP						
5	4.0-5.5' Dry, brown, silty fine-medium sand, well sorted	SP		1				
	9.0-10.5' Thin layers of sandy clay	SC		2				
15	14.0-15.5' Brown, silty, fine-medium sand, well sorted	SP		3				End of augers is wet
	18.0' Gravel/cobble	GP						
20	19.0-20.5' Moist, brown, fine-medium sand, well sorted	SP		4			1:18	
25	24.0-25.5' Same as above	SP		5				
30	29.0-30.5' Wet, gray, medium-coarse sand, well sorted	SP		6			1:26	Water @ ~30' depth OVA >10ppm

The Earth Technology Corporation

BORING LOG

Project name: Metro Rail Transit

Project Number: 87-600-0022 Field Log of Boring Number: BH-113 Sheet 2 of 2

Depth (feet)	Description	Graphic Log: Lithology	Graphic Log: OVA (ppm)	Samples: Number	Samples: Type	Samples: Blow Count	Samples: Drilling Rate/Time	Remarks
							1:32	OVA @ 10ppm
35	34.0-35.5' No recovery							
		SP/GP						
	38-39' Gravel/cobble							
40	39-40.5' Wet, gray, medium-coarse sand			7		23/36/50	1:39	Water sample taken at 40'
	End Hole							
							2:10	Complete
45								
50								
55								
60								TEMP. = X pH = X σ = 1550 μmhos
65								
70								

The Earth Technology Corporation

BORING LOG

Project Name: Metro Rail Transit

Project Number: 87-600-0022 Field Log of Boring Number: BH-114 Sheet 1 of 2

Boring Location: BH-114		Elevation and Datum: 278	
Drilling Agency: Drill Line	Driller: G. Deluca, J. Hale	Data Started: 11/26/86	Data Finished: 11/26/86
Drilling Equipment: B-53		Completion: Depth (feet) 55.5	Rock Depth: (feet)
Method of Drilling: Hollow Stem Auger Dia. 8"		Number of Samples: 10 / Dist.:	Undist.: 9 / Core:
Borehole Size:		Water Depth (ft): 30 / First:	Compl.: / 24 hrs.
Type of Perforation Backfill: #3 Monterey Sand Pack		Logged By:	Checked by:
Type of Seal: 5% bentonite cement grout		A. Urbon	B. Fontes

Depth (feet)	Description	Graphic Log: Lithology	Graphic Log: OVA (ppm)	Samples: Number	Samples: Type	Samples: Blow Count	Samples: Drilling Rate/Time	Remarks
0	0-4.0' Dry, brown, fine-medium grain size silty sand w/gravel and large cobble. Fill material	AF					9:35	OVA Background (BG) reading = 4ppm
5	4.0-5.0' Dry, dark brown, fine-medium grain size silty sand w/gravel	AF						Fill material, no sample taken
10	9.0-10.5' Dry, brown, fine-medium grain size silty sand w/gravel	SP	BD	1		2/2/2	9:42	
15	14.0-15.5' Dry, dark brown, fine-medium grain size silty sand w/gravel-size brick fragments	SP	0.2	2		6/7/7	9:50	
20	18.0-22.0' Cobble/gravel							No sample taken due to cobble/gravel
25	24.0-25.5' Damp, brown, fine-medium grain size sand, well sorted	SP	0.1	3		22/49/44	9:58	OVA @ BG in hole
30	29.0-30.5' Wet, gray, fine-medium grain size sand, very well sorted qtz sand	SP		4		22/32/50	10:04	Water @ 30 feet BD - below detection limits

The Earth Technology Corporation

BORING LOG

Project name: Metro Rail Transit

Project Number: 87-600-0022 Field Log of Boring Number: BH-114 Sheet 2 of 2

Depth (feet)	Description	Graphic Log: Lithology	Graphic Log: OVA (ppm)	Samples: Number	Samples: Type	Samples: Blow Count	Samples: Drilling Rate/Time	Remarks
35	34.0-35.5' Wet, gray fine-medium sand, very well sorted, quartz sand. To - dark gray, very fine - fine sand, well sorted	SP	0.4	5	/	5/7/8	10:10	OVA @ BG in hole
40	39.0-40.5' Wet, gray fine-coarse sand w/some pea gravel, well sorted, qtz sand	SP	2.5	6	/	12/14/29	10:18	OVA @ BG in hole
	41.0-43.0' Gravel/cobble							
45	44.0-45.5' Wet, gray, fine-medium grain size sand w/silt, well sorted, qtz sand	SP/GW	BD	7	/	32/50	10:35	
	46.5'48' Gravel/Cobble							
50	49.0-50.5' Wet, gray, fine-medium grain size sand w/some silt, well sorted	SP/GW	1.5	8	/	48/27	10:49	OVA sample only recovered
	51.0-53.0' Gravel/Cobble							OVA @ BG in hole and in drum
55	54.0-55.5' Wet, gray, fine-medium grain size silty sand, poorly sorted End Hole	SW	1.1	9	/		11:05	Water sample taken at 55' depth due to heaving sands
60								
65								σ = 1300 μmhos
70								

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BORING LOG

Project Name: Metro Rail Transit

Project Number: 87-600-0022 Field Log of Boring Number: BH-115 Sheet 1 of 2

Boring Location: Triangle at Vignes & Lyons Streets		Elevation and Datum: 278	
Drilling Agency: Drill Line	Driller: G. Deluca, J. Hale	Data Started: 12/1/86	Data Finished: 12/1/86
Drilling Equipment: B-53		Completion: Depth (feet) 60.5	Rock Depth: (feet)
Method of Drilling: Hollow Stem Auger Dia. 8"		Number of Samples: 11 Dist.:	Undist.: 10 Core:
Borehole Size:		Water Depth (ft): 30 First:	Compl.: 24 hrs.
Type of Perforation Backfill: #3 Monterey Sand Pack		Logged By: A. Urbon	Checked by: B. Fontes
Type of Seal: 5% bentonite cement grout			

Depth (feet)	Description	Graphic Log: Lithology	Graphic Log: OVA (ppm)	Samples: Number	Samples: Type	Samples: Blow Count	Samples: Drilling Rate/Time	Remarks
	0-0.5' Asphalt	AF						OVA Background (BG) reading = 4ppm
	0.5' Dry, dark brown, silty, fine-medium grain size sand w/small gravel	SP						
5	4.0-5.5' Dry, brown, fine-medium grain size sand, well sorted	SP	0.2	1		6/6/16	9:02	
	9.0-10.0' Dry, dark brown silty clay	CL	0.1	2		4/4/11	9:07	OVA @ BG in air and in hole
10	10.0-10.5' Dry, light brown to red, medium grain size sand, very well sorted	SP						
15	14.0-15.5' Dry, brown, fine-coarse sand w/gravel, well graded	SW	BD	3		20/30/45	9:15	
20	19.0-20.5' Dry, brown, fine-coarse grain size sand w/gravel and cobble, well graded, thin clay layers	SW	BD	4		10/17/24	9:22	OVA @ BG in air and in hole
25	24.0-25.5' Same above	SW	0.1	5		50/	9:28	
	29.0-30.5' Wet, gray, medium-coarse grain size sand w/gravel	SP	3.3	6		14/50	9:35	Water @ 30'
30								

BD - below detection limits

The Earth Technology Corporation

BORING LOG

Project name: Metro Rail Transit

Project Number: 87-600-0022 Field Log of Boring Number: BH-115 Sheet 2 of 2

Depth (feet)	Description	Graphic Log: Lithology	Graphic Log: OVA (ppm)	Samples: Number	Samples: Type	Samples: Blow Count	Samples: Drilling Rate/Time	Remarks
	32.0' Hit cobble							
35	34.0-35.5' Wet, gray, very fine to coarse grain size silty sand w/pea size gravel and cobbles	SW	BD	7		33/49/50	9:44	Cobble continuous from 32 feet to 51 feet
	Cobble (ctd)							
40	39.0-40.5' Wet, gray, fine-medium grain size sand, well sorted, qtz sand	SP	0.7	8		8/5/12	10:03	OVA @ BG in air and in hole
	Cobble (ctd)							
45	44.0-45.5' Wet, gray, fine-coarse grain size sand w/silt and some pea-size gravel, qtz sand	SW	2.4	9		5/5/16	10:17	
	49.0-50.5' Wet, gray, fine-medium grain size sand, well sorted, qtz sand	SP	4.3	10		45/50	10:32	OVA @ BG
50	51.0' Cobble ends - End Hole							
55	57.0' Cobble							No sample taken @ 55' interval
60	59.0-60.5' No recovery - End Hole							No recovery @ 60' interval Water sample taken at 60'
65								σ = 1300 μmhos
70								

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BORING LOG

Project Name: Metro Rail Transit

Project Number: 87-600-0022 Field Log of Boring Number: BH-116 Sheet 1 of 2

Boring Location: North portion CC Myers Strip		Elevation and Datum: 278	
Drilling Agency: Drill Line	Driller: G. Deluca, J. Hale	Data Started: 12/2/86	Data Finished: 12/2/86
Drilling Equipment: B-53		Completion: Depth (feet) 30.5	Rock Depth: (feet)
Method of Drilling: Hollow Stem Auger Dia. 6"		Number of Samples: 7 / Dist.: / Undist.: 6	Core:
Borehole Size:		Water Depth (ft): 30 / First:	Compl.: / 24 hrs.
Type of Perforation Backfill: #3 Monterey Sand Pack		Logged By: A. Urbon	Checked by: B. Fontes
Type of Seal: 5% bentonite cement grout			

Depth (feet)	Description	Graphic Log: Lithology	Graphic Log: OVA (ppm)	Samples: Number	Samples: Type	Samples: Blow Count	Samples: Drilling Rate/Time	Remarks
	0.0.5' Asphalt 0.5-1.0' Cement 1.0' Dry, dark brown, silty, fine sand	AF						OVA Background (BG) reading = 2ppm
5	4.0-5.5' Dry, brown, silty fine sand, well sorted	SP	1.2	1	/	3/5/7	11:57	OVA @ BG
10	9.0-10.5' Dry, light brown, fine-medium sand w/coarse sand, well sorted	SP	BG	2	/	6/7/7	12:00	
15	14.0-15.5' Dry, light brown, fine-coarse sand w/large gravel, poorly sorted	SW	0.1	3	/	28/37/45	12:05	OVA @ BG in hole & in air
20	19.0-20.5' Dry, brown, fine-coarse sand w/ silt and gravel, poorly sorted 21.0-23' Gravel/cobble	SW	11	4	/	25/48/32	12:10	
25	24.0-25.5' Damp, gray, fine sand to gravel, very poorly sorted, qtz sand	SW	1.4	5	/	50	12:17	OVA sample only recovered OVA @ BG in hole and in air
30	29.0-30.5' Wet, gray, fine-medium sand, well sorted, qtz sand End Hole	SP	BG	6	/	35/50	12:25	Water @ 30'

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BORING LOG

Project name: Metro Rail Transit

Project Number: 87-600-0002 Field Log of Boring Number: BH-116 Sheet 2 of 2

Depth (feet)	Description	Graphic Log: Lithology	Graphic Log: OVA (ppm)	Samples: Number	Samples: Type	Samples: Blow Count	Samples: Drilling Rate/Time	Remarks
35							12:40	Water sample taken @ 30'
40								
45								
50								
55								
60								TEMP. = X pH = X σ = 1250 μmhos
65								
70								

The Earth Technology Corporation

BORING LOG

Project Name: Metro Rail Transit

Project Number: 87-600-0022 Field Log of Boring Number: BH-117 Sheet 1 of 2

Boring Location: Central portion CC Myers Strip		Elevation and Datum: 278	
Drilling Agency: Drill Line	Driller: G. Deluca, J. Hale	Data Started: 12/2/86	Data Finished: 12/2/86
Drilling Equipment: B-53		Completion: Depth (feet) 60.5	Rock Depth: (feet)
Method of Drilling: Hollow Stem Auger Dia. 6"		Number of Samples: 10 / Dist.:	Undist.: 9 / Core:
Borehole Size:		Water Depth (ft): 30 / First:	Compl.: / 24 hrs.
Type of Perforation Backfill: #3 Monterey Sand Pack		Logged By: A. Urbon	Checked by: B. Fontes
Type of Seal: 5% bentonite cement grout			

Depth (feet)	Description	Graphic Log: Lithology	Graphic Log: OVA (ppm)	Samples: Number	Samples: Type	Samples: Blow Count	Samples: Drilling Rate/Time	Remarks
	0-0.5' Concrete	AF						OVA Background (BG) reading = 5.5ppm
	0.5' Dry, dark brown, silty sand							
5	4.0-5.5' Dry, light brown, silty sand, well sorted	SP	1.4	1	/	5/5/7	8:58	OVA @ BG
10	9.0-10.0' Same as above	SP/SC	0.2	2	/	5/7/8	9:01	
	10.0-10.5' Dry, dark brown, silty, sandy, clay							
15	14.0-14.5' Dry, dark brown, silty, sandy, clay, slightly plastic. Thin layer yellowish, fine-medium sand well sorted	SW	BG	3	/	9/10/13	9:04	OVA @ BG
	14.5-15.5' Dry, brown, fine-coarse sand w/gravel							Encountered cobble at 19'
20	19.0-20.5' Dry, brown, fine-medium sand w/some coarse sand (5%), well sorted	SP	0.6	4	/	50	9:08	OVA sample recovery only (bounding off rocks)
25	24.0-25.5' Dry, brown, fine - coarse sand w/gravel & cobble	SW	0.1	5	/	50	9:15	OVA sample recovery only - bouncing off rocks
	26' Cobble ends							
30	29.0-30.5' Wet, gray v. fine-coarse sand w/silt and large gravel, poorly sorted, (ctd)	SW	0.8	6	/	11/48/50	9:20	Water @ 30'

The Earth Technology Corporation

BORING LOG

Project name: Metro Rail Transit

Project Number: 87-600-0022 Field Log of Boring Number: BH-117 Sheet 2 of 2

Depth (feet)	Description	Graphic Log: Lithology	Graphic Log: OVA (ppm)	Samples: Number	Samples: Type	Samples: Blow Count	Samples: Drilling Rate/Time	Remarks
	w/thin layer of wet, dark brown, silty clay w/some sand @ 29.5'							
35	34.0-35.5' No recovery					23/50	9:29	
	38' Gravel/cobble							
40	39.0-40.5' Wet, gray, find sand w/some silt, well sorted	SP	10	7		7/12/45	9:39	OVA @ BG in and around hole Only one soil sample recovered
	Gravel/cobble (ctd)							
45	44.0-45.5' No recovery					13/50	9:54	Still in cobble
50	51.0' End of gravel cobble							No sample attempted @ 50' due to cobble
55	54.0-55.5' Wet, gray, v. fine to medium sand w/some silt, large sand, and gravel, moderately well sorted	SP	9	8		9/10/15	10:10	
60	59.0-60.5' Same as above w/o large sand or gravel End Hole	SP	7.3	9		38/50	10:19	TEMP. = X pH = X σ = 1400 μmhos Water sample taken at 10:40 am
65								
70								