

03/17/91 10:30 AM

**ADDITIONAL
SITE CHARACTERIZATION
1461 PARK AVENUE
EMERYVILLE, CALIFORNIA**

Prepared for:

**Union Bank
445 SOUTH FIGUEROA STREET
LOS ANGELES, CALIFORNIA 90071**

Prepared by:

**REMEDIAL ACTION CORPORATION
505 NORTH TUSTIN AVENUE, SUITE 160
SANTA ANA, CALIFORNIA 92705**

Project #050-03B
December 16, 1991

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1.0 INTRODUCTION

Soil and ground water with elevated concentrations of petroleum hydrocarbons were detected at 1461 Park Avenue, in Emeryville, California, following the removal of two underground fuel storage tanks in 1989. The site is located on the southwest corner of the intersection of Park Avenue and Horton Street. The position of the site is shown relative to geographic, topographic and man-made features in Figure 1.

Subsequent to a review of the report of the removal of the tanks prepared by PCC, Incorporated, Remedial Action Corporation (RAC) proposed that an additional investigation be performed to assess the petroleum hydrocarbon migration prior to site remediation.

In May, 1991, an initial site assessment was performed and 6 hand auger borings were drilled to ground water at plan locations between 5 and 10 feet from the former tank area. Locations of the borings were outside the perimeter of the anticipated remedial excavation, based on the information in the reports prepared by PCC Incorporated, for the tank removal project. The report of this investigation dated August 2, 1991 was submitted to Union Bank, Trust Department and concluded that all soil samples collected from the borings contained elevated concentrations of VOCs, and that additional borings were needed to define the lateral extent of petroleum hydrocarbon in the soil.

On August 9, 1991, a proposal was submitted to Union Bank, Trust Department for an additional site investigation to define the lateral extent of petroleum hydrocarbons in the soil. It was proposed that 6 hand auger borings be drilled approximately 10 to 15 feet from the previous borings drilled by Remedial Action Corporation and further from the former tank excavation. Where the hand auger borings detected elevated concentrations of total petroleum hydrocarbons (TPH) step out borings were to be drilled to define the lateral extent of the TPH. This report presents the results of the investigation.

2.0 OBJECTIVE

The objective of the additional site investigation is to define the lateral extent of petroleum hydrocarbon migration in the soil.

3.0 SCOPE OF WORK

The scope of work included the following:

- Preparation of a Work Plan
- Drilling six hand auger borings in areas adjacent to the former underground storage tanks (USTs).
- Analysis of the soil samples for TPH and Benzene, Toluene, Xylene, and Ethylbenzene (BTXE).
- Drilling of 17 step out borings to define the lateral extent of TPH migration.
- Prepare this report for submittal to Alameda County Department of Health Services.

In order to proceed with a continuous step out program, determination of whether elevated VOCs could be present was made in the field based on headspace concentrations. Where headspace concentrations from samples at depths of 2 feet were 50 ppm by volume or greater the borings were considered to have elevated concentrations of VOCs, and the location was abandoned and step out borings drilled. Where elevated concentrations were not detected at depths of two feet the borings were advanced to depths of about six feet and another sample obtained. If the headspace detected 50 ppm by volume VOCs then the boring was considered to have elevated concentrations and step out borings were drilled.

4.0 SITE SETTING

4.1 LAND USE

The property is situated, approximately a quarter of a mile east of the San Francisco Bay, in a commercial area of the city of Emeryville, California at about 122° 17' 30" west longitude and 37° 69' north latitude. The dominant industries in the area are warehousing and manufacturing.

The property was occupied from 1968 to 1973 by Pic-a-Tune, reportedly a music or record distributor. From 1973 to 1986 it was leased by Stuart Western, Stuart Radiator and Stuart Auto Parts. The Stuart companies were involved in rebuilding brakeshoes and/or warehousing and distributing auto parts. In 1986, Stuart Western was purchased by Modine Southwest Company. This company owns Western Brake Company, which is presently located on the site and warehouses and distributes vehicle brake parts and radiators.

4.2 PREVIOUS INVESTIGATION

In March 1990, two underground storage tanks (USTs) were removed by PCC, Incorporated. A tank closure report was filed with the Alameda County Health Care Agency (ACHCA) in July 1990. A 3000-gallon tank containing gasoline was found in good condition. A 500-gallon tank, thought to contain diesel, showed evidence of leakage due to failure at the welds. The required reports of contamination were filed with the RWQCB and with the ACHCA. The results of the analysis of the soil samples obtained from the tank excavation and the analysis of subsequent soil and water samples obtained from borings and monitoring wells is summarized in the Remedial Action Corporation report dated August 2, 1991.

On May 15 and 16, 1991, Remedial Action Corporation hand augered 6 borings to depths of from 4.5 to 9.5 feet below the ground surface in the former tank area. One soil boring was drilled within the backfilled excavation of the former tanks. Five of the borings were located outside the perimeter of the remedial excavation proposed by PCC, Inc. in areas anticipated to be clean. Analysis of the soil samples from these five borings detected elevated concentrations of TPH and BTXE in excess of the proposed clean up criteria (Figure 2). Based on the results of this initial investigation this subsequent investigation was proposed to define the lateral extent of petroleum hydrocarbons in the soil.

In the investigation by PCC, Inc., three monitoring wells were installed on the site. Subsequent sampling and analysis of groundwater samples from MW1, MW2 and MW3 detected dissolved phase petroleum hydrocarbons. From water level measurements in the monitoring wells, the direction of ground water movement was determined to be in a northwestern direction in May 1991.

4.3 SURFACE CONDITIONS

The former underground storage tanks were located immediately adjacent to the northeastern corner of the building, in what would be a sidewalk, at the intersection of Park Avenue and Horton Street, as shown in Figure 3. Several truck doors are located on the side of the building where the tanks were formerly located, and in this area there is loading and unloading of materials. The land surface covering the area of the former USTs, which is approximately 30 feet by 15 feet in plan dimensions, is unpaved and covered with vegetation. The surrounding land surfaces not occupied by buildings are paved streets and sidewalks. The site gently slopes toward the west with surface drainage being mostly in the form of sheetwash.



4.4 GEOLOGY AND HYDROLOGY

The site is situated approximately 12 feet above mean sea level about a quarter of a mile east of the San Francisco Bay. The property lies on recent Alluvial Bay Muds that are the youngest geological unit in the San Francisco Bay area. These deposits are underlain by sandstones of the Merrit Formation that in turn overlie the Alameda Formation that primarily consists of silty clays and associated layers of sand and fine gravels (Kaldveer and Associates, 1980).

The Alluvial Bay Muds contain a series of confined aquifers separated by relatively impermeable clay layers. Machine auger borings, conducted on the property as part of a previous investigation, detected confined ground water at a depth of between 6.5 and 8 feet below the ground surface. The groundwater was observed to stabilize at about a depth of four feet below the ground surface in the monitoring wells.

Relatively permeable, thin, interbedded layers of sands, silts and clays are reportedly dominant from ground surface to an approximate depth of 25 feet. At a depth of 25 feet a relatively impermeable unit of silty clay restricts the downward migration of ground water. Reportedly, above this aquiclude, ground water is regionally moving toward San Francisco Bay, in a west to southwesterly direction, at a rate of 0.2 - 2.0 feet/day (Kleinfelder & Associates, 1982). Based on groundwater measurements by Remedial Action Corporation in May 1991, groundwater was observed to be flowing beneath the site in a northwesterly direction, Figure 3. The groundwater gradient was approximately 2.2 feet vertical per 1,000 feet horizontal (RAC, 1991).

Ground water pumping wells in the area reportedly utilize water from a depth of 250 feet below ground surface. (RWQCB, 1991)

5.0 FIELD INVESTIGATION

Between September 30, 1991, and October 2, 1991, 23 hand auger borings were drilled to a depth of from 2 to 9 feet below ground surface at the locations shown in Figure 3. Eight hand auger borings were drilled in Park Avenue, 10 were drilled in Horton Street and 5 were drilled within the building.



At each boring location, an eight inch core was cut in the surface asphalt or concrete. Borings were drilled using hand augers and samples were collected, using a drive hammer, generally at two and six feet below ground surface. The procedures for hand auger boring and soil sampling are described in Appendix A.

A portable organic vapor analyzer (OVA) was used in the field to measure the volatile organic chemicals (VOCs) in the headspace present above the soil samples sealed in heated mason jars. The method of sampling the headspace is described in Appendix A.

It was originally proposed to drill 6 hand auger borings at the locations 201, 202, 203, 204, 205, and 206. Field headspace analysis conducted on soil samples collected from these initial boring locations, however, detected elevated VOC concentrations in excess of 50 ppm. Consequently, two step-out hand auger borings were drilled 10 and 15 feet and approximately 90 degrees apart and 10 to 20 feet from each of the original boring locations. Where elevated VOC concentrations were detected in the step out borings additional step out borings were drilled using the same procedures as for the initial step outs. The final pattern of step out borings is shown in Figure 3.

The results of OVA headspace analysis and a description of the soil stratigraphy are shown on the boring logs in Appendix B. The Unified Soil Classification System used to log the borings is described in the fold out on the last page in Appendix B.

Two 55 gallon drums of soil was generated from hand auger drilling conducted during this investigation. The drums were labeled and stored at the site prior to disposal at an appropriate facility.

6.0 LABORATORY ANALYSIS

Laboratory analysis for TPH and BTXE was conducted on 17 selected soil samples from hand auger borings 201 to 224 to assess the lateral extent of petroleum hydrocarbons in the soil. NET a state certified hazardous waste laboratory performed the analysis. Samples were chosen for analysis based on field OVA analysis and spacial distribution around the former UST area. The method of performing the analysis are as follows:

- TPH as gasoline EPA Method 8015 Modified.
- Benzene, Toluene, Xylenes, Ethylbenzene (BTXE) EPA Method 8020.



The field headspace results and summary of the results of laboratory analyses performed on samples from the soil borings is presented in Table 1. The results of TPH laboratory analysis are presented together with the results of field headspace OVA analysis on the Boring Logs in Appendix B. The laboratory reports are provided in Appendix C.

7.0 DISCUSSION

7.1 SUBSURFACE CONDITIONS

The site is situated approximately 12 feet above MSL 1/4 mile east of the San Francisco Bay. The site is underlain by Alluvial Bay Muds to the maximum depth, 20 feet, explored during this investigation and the previous investigations by Remedial Action Corporation and PCC, Inc. From the hand auger borings conducted during this investigation dark black plastic clay deposits were observed to a depth of between 4 and 6 feet below ground surface. Below a depth of about six feet the soils were generally a grey to light-grey silty clay or clayey silt to the maximum depth explored which is 9 feet.

Ground water was encountered in borings 207 and 208 at 7 and 9 feet below ground surface, respectively. In the two borings ground water was observed to rise by approximately one foot in one hour. In other borings, where ground water was not encountered, a wet zone, considered to be the capillary zone, was identified above the water bearing zone.

7.2 DISTRIBUTION OF CHEMICALS IN THE SOIL

At all soil borings a relatively thin layer of unsaturated soil is present from the ground surface to a depth of about six feet, as shown on the boring logs. Field screening of soil samples detected elevated concentrations of petroleum hydrocarbons above 50 ppm in 13 borings. The 50 ppm criteria was used as an indicator of elevated petroleum hydrocarbons above the remediation criteria established in the previous investigation (RAC, 1991). Where elevated concentrations of VOCs were detected in the field and samples were collected and analyzed in the laboratory the correlation was good. All six of the samples with VOC concentrations above 50 ppm as measured in the field and subsequently analyzed in the laboratory, exceeded one or more of the remediation criteria. Only three of the six, however, exceeded the criteria for TPH. Of the seven samples that did not exceed the 50 ppm field screening criteria two samples had concentrations of benzene greater than the remediation criteria of 10 $\mu\text{g}/\text{Kg}$. Field screening alone therefore, cannot detect the limits



of either the BTXE or the TPH plumes but can be used to reduce the number of samples needed to be analyzed to define the limits of the plumes.

Based on the borings and laboratory analysis performed for this and previous investigations the approximate extent of petroleum hydrocarbon migration in the soil above the remediation criteria are shown in Figure 4. The limits as defined separately by TPH and the combined TPH and BTXE criteria are shown on the figure. The limits of the migration are reasonably well defined in Horton Street and with less confidence in Park Avenue. The limits within the building to the northwest have not been defined by the investigations. All soil samples collected from borings 205, 206, 207, 208 and 209 drilled within the building detected elevated concentrations of VOCs. Further investigation inside the building would be require at a later date to assess the extent of petroleum migration to the northwest.

The extent of site remediation based on TPH remediation criteria, only, as shown in Figure 4, is much smaller than the extent of site remediation based on all criteria which is mostly defined by the benzene criteria of 10 $\mu\text{g}/\text{Kg}$. Relaxing the benzene criteria to about 100 $\mu\text{g}/\text{Kg}$ in the soil would reduce the limits of the remediation to about the limits defined by TPH.

7.3 CRITERIA FOR SITE REMEDIATION

The criteria for remediation of petroleum hydrocarbon soil contamination are presented in the Work Plan for additional site investigation and remediation dated March, 1991. The criteria for soil remediation identified in the Work Plan are TPH at 10 mg/Kg and BTXE at 10, 50, 50, 50, $\mu\text{g}/\text{Kg}$ respectively.

8.0 CONCLUSIONS AND RECOMMENDATIONS

The lateral extent of absorbed phase petroleum hydrocarbon soil contamination in Horton Street and to a lesser certainty in Park Avenue has been defined. The extent of absorbed phase petroleum hydrocarbon soil contamination beneath the building, at 1461 Park Avenue, has not been defined and additional investigation at a later date would be necessary to asses the extent of the migration.

Remediation of the soil outside the building could proceed at this time using a mobil laboratory in the field to verify the horizontal limits of the excavation. The vertical extent would be to a depth of about 6 feet or just above the confined ground water aquifer.



The extent of petroleum migration in the soil is shown on Figure 4. The approximate area and volumes of soil within the TPH and combined TPH and BTXE remediation criteria limits are as follows:

**AREA AND VOLUME OF SOILS
EXCEEDING REMEDIATION CRITERIA**

CRITERIA	AREA			
	TOTAL		OUTSIDE BUILDING	
	AREA (SQ. FT.)	VOLUME (CUBIC YD.)	AREA (SQ. FT.)	VOLUME (CUBIC YD.)
TPH	6,312	1,403	3,438	764
TPH AND BTXE	12,724	2,827	8,030	1,784

9.0 REMEDIAL ALTERNATIVES

Remedial alternative for soil with elevated concentrations of petroleum hydrocarbons include excavation and on site aeration, excavation and on site bioremediation, or "do nothing." Due to limited space on site, aeration and on site bioremediation are not feasible alternatives. Concentrations of petroleum hydrocarbons in the soil exceed the site remediation criteria and therefore "doing nothing" is not feasible. As proposed in the work plan excavation and disposal of the soil is the most feasible alternative.



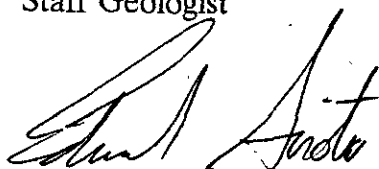
Based on the laboratory analysis, the soil is non hazardous. Disposal of the soil in local landfills is not feasible due to concentrations of benzene. Gibson Oil and Refining Inc., in Bakersfield however, will treat and recycle the soil. Ogden, Inc. has a thermal treatment facility in Stockton, California which may also be an alternative for treatment of the waste. Currently, however, the facility is closed awaiting permits.

Very truly yours,

REMEDIAL ACTION CORPORATION



James Farrow
Staff Geologist



Edward B. Sirota
Project Manager



REFERENCES

Kaldveer and Associates, 1980. "Geotechnical Engineering Services for Gasoline Location Study Berths 4 & 5 Container Yard Outer Harbor Terminal Port of Oakland, Oakland, California"

Kleinfelder and Associates, J.H., "Preliminary Report for Investigation, Electro-Coatings Facility, Emeryville, California"

PCC, Inc., 1990, "Closure Report 1461 Park Avenue, California, April 1990"

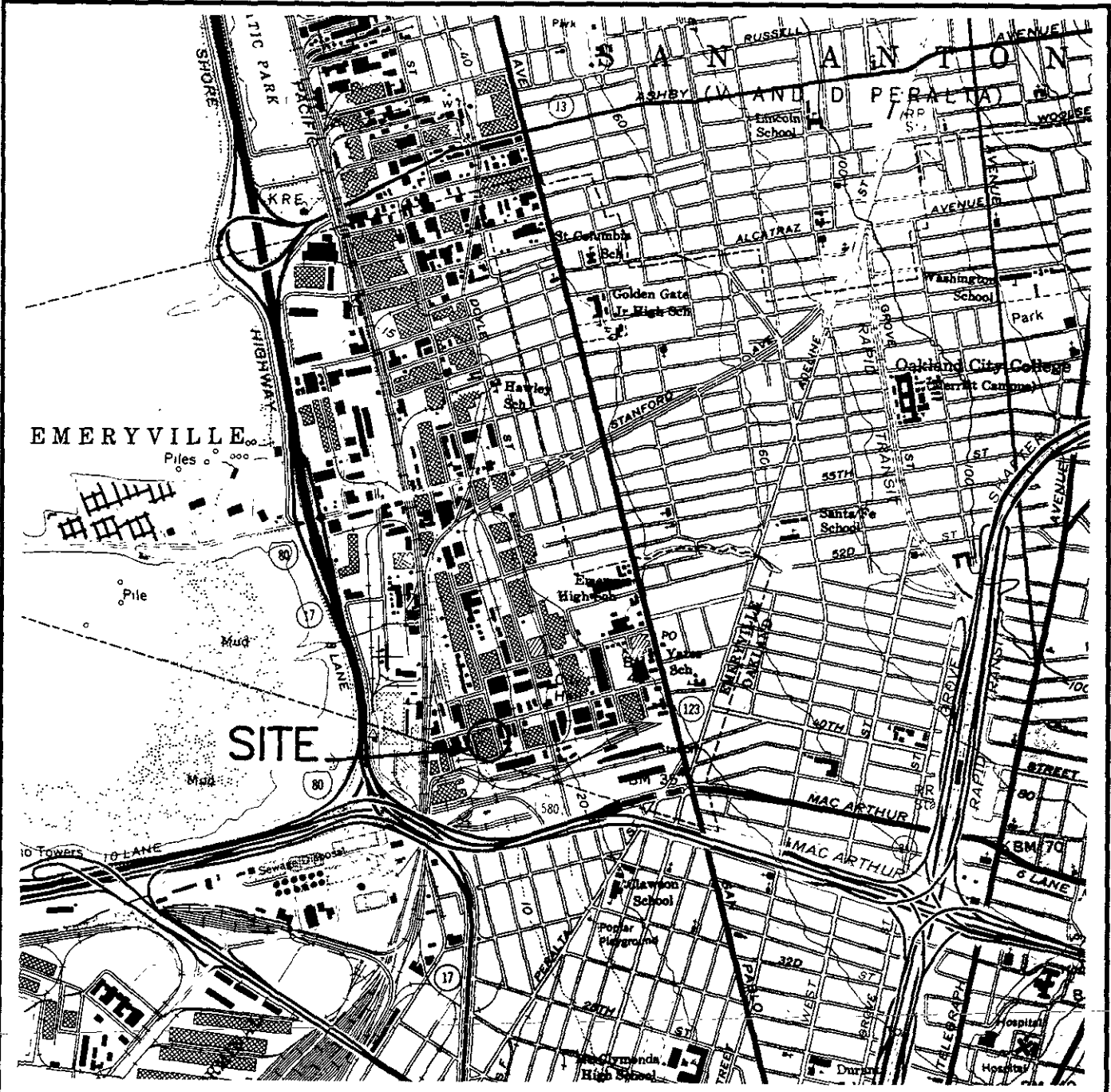
RAC, 1991, "Site Characterization 1461 Park Avenue, California, August 2, 1991"



TABLE 1
SUMMARY OF LABORATORY ANALYSES

Sample Number	Boring Number	Depth (ft.)	TPH EPA 8015 Modified (mg/Kg)	Benzene EPA 8020 (µg/Kg)	Ethylbenzene EPA 8020 (µg/Kg)	Toluene EPA 8020 (µg/Kg)	Xylenes EPA 8020 (µg/Kg)	VOCS Field Screen (ppm)
B2031A	215	2	<1	<2.5	<2.5	<2.5	<2.5	0
B2032A	215	6	<1	<2.5	<2.5	<2.5	<2.5	NA
B2051A	207	2	<1	<2.5	<2.5	<2.5	<2.5	0
B207-6	207	6	3.8	150	300	210	650	100
B208-6	208	6	3400	13000	53000	80000	260000	>1000
B209-2	209	2	1.8	99	47	3.1	13	175
B209-6	209	6	1900	10000	31000	50000	130000	>1000
B213-6	213	6	<1	<2.5	<2.5	<2.5	<2.5	0
B214-6	214	6	<1	<2.5	<2.5	<2.5	<2.5	NA
B217-2	217	2	<1	<2.5	<2.5	<2.5	<2.5	47
B217-6	217	6	<1	<2.5	<2.5	<2.5	<2.5	1
B219-6	219	6	<1	<2.5	<2.5	<2.5	<2.5	2
B220-2	220	2	10	210	<2.5	<2.5	56	>1000
B221-2	221	2	1.3	79	82	<2.5	14	80
B221-6	221	6	<1	83	16	<2.5	37	6
B222-2	222	2	<1	41	2.2	5.2	17	15
B224-6	224	6	<1	<2.5	<2.5	<2.5	<2.5	20

Notes: 1. For sample locations see Figure 2.
 2. < Indicates that concentrations were less than the detection level as indicated.

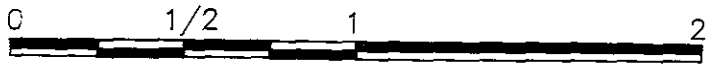


NOTES:

- 1) BASE MAP FROM USGS 7.5 MINUTE OAKLAND WEST TOPOGRAPHIC QUADRANGLE, 1959, (PHOTOREVISED 1988).
- 2) ALL LOCATIONS ARE APPROXIMATE.



NORTH



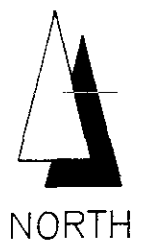
(SCALE IN MILES)

RAC		
REMEDIAL ACTION CORPORATION		
SITE VICINITY MAP		
CLIENT	UNION BANK	PROJ. NO 050-03B
DRAWN BY	BP	DATE 11/20/91
CHECKED BY	Ch	DATE 12/15/91
APPROVED BY	Lz	DATE 12/16/91
		DWG. NO. 050-03B
		FIGURE 1

LEGEND

- ⊙ EXISTING MONITORING WELL
- ⊙ EXISTING MONITORING WELL LOCATION (PCC 1990)
- HAND AUGER BORING MAY 1991
- POTENTIOMETRIC GROUND WATER ELEVATION ABOVE MEAN SEA LEVEL (ft)
- ➔ PROBABLE DIRECTION OF GROUND WATER MOVEMENT

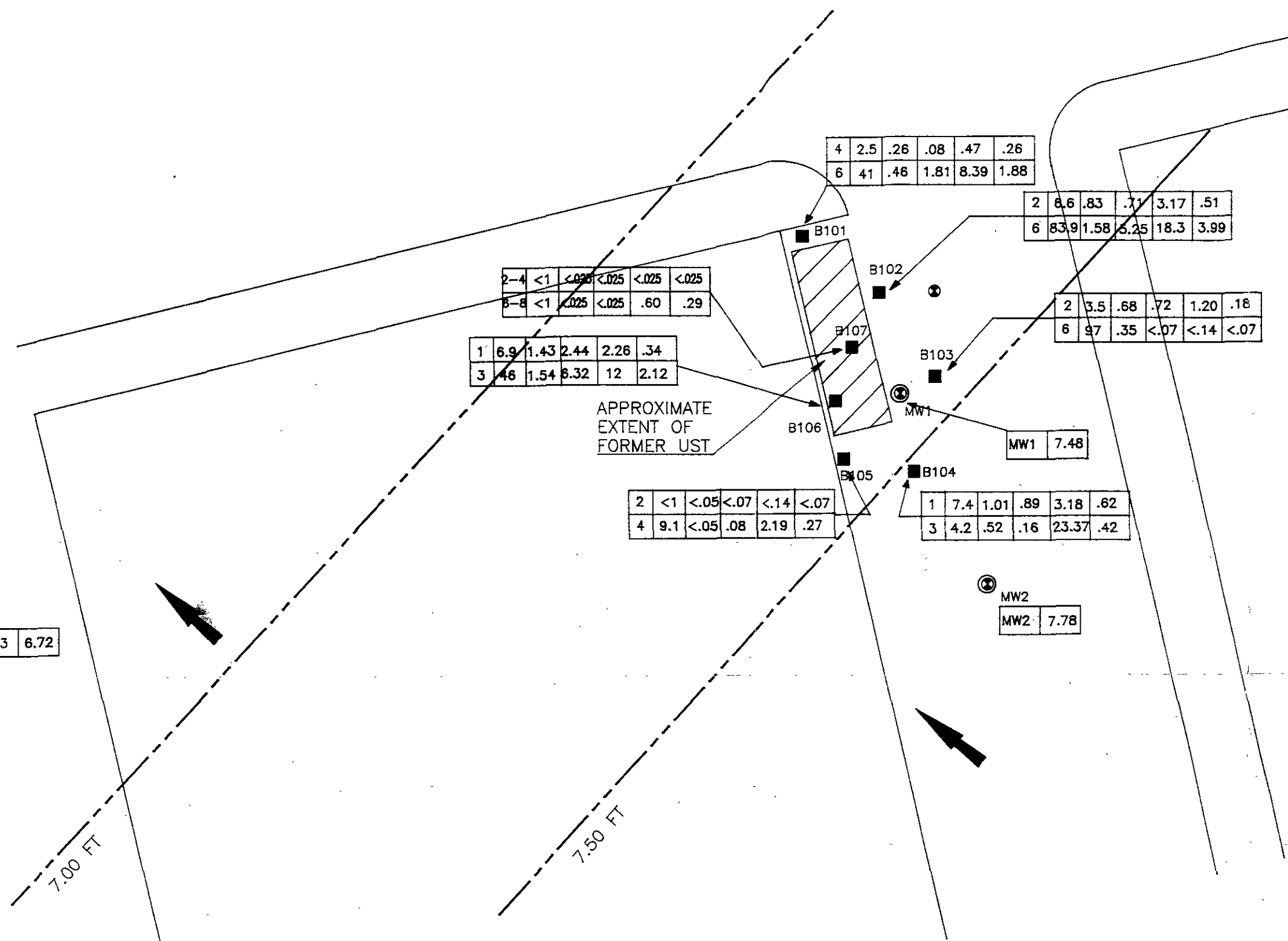
DEPTH IN FEET	TPH (mg/Kg)	BENZENE (μg/Kg)	TOLUENE (μg/Kg)	XYLENE (μg/Kg)	ETHYLBENZENE (μg/Kg)
2	3.5	.68	.72	1.20	.18
6	97	.35	<.07	<.14	<.07



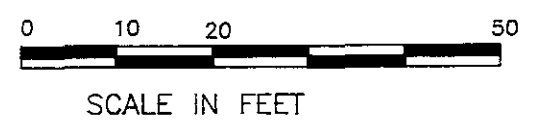
RAC
REMEDIAL ACTION CORPORATION

SITE SKETCH
PREVIOUS BORINGS
1461 PARK AVENUE
EMERYVILLE, CALIFORNIA

CLIENT	UNION BANK	PROJECT	050-03B
DRAWN BY	RP	DATE	4/25/91
CHECKED BY	RP	DATE	2/26/91
APPROVED BY	RP	DATE	2/26/91
DWG	050-03	FIGURE	2



NOTES: 1) ALL LOCATIONS ARE APPROXIMATE.



2	NA	NA	NA	NA	NA	50
6	ND	ND	ND	ND	ND	20

2	ND	NA	NA	NA	NA	15
3.5	NA	41	2.2	5.2	17	85

2	NA	NA	NA	NA	NA	150
6	NA	NA	NA	NA	NA	150

2	1.3	79	8.2	ND	14	80
6	ND	83	16	ND	37	6

2	NA	NA	NA	NA	NA	0
6	NA	NA	NA	NA	NA	0

2	NA	NA	NA	NA	NA	5
6	ND	ND	ND	ND	ND	0

2	10	210	ND	ND	56	50
6	NA	NA	NA	NA	NA	>1000

2	NA	NA	NA	NA	NA	270
---	----	----	----	----	----	-----

2	NA	NA	NA	NA	NA	300
6	NA	NA	NA	NA	NA	650

2	1.8	99	47	3.1	13	175
6	1900	10000	31000	50000	130000	>1000

2	NA	NA	NA	NA	NA	100
6	3400	13000	53000	80000	260000	>1000

2	NA	NA	NA	NA	NA	300
---	----	----	----	----	----	-----

2	NA	NA	NA	NA	NA	120
---	----	----	----	----	----	-----

2	ND	ND	ND	ND	ND	0
6	3.8	150	300	210	650	100

2	NA	NA	NA	NA	NA	20
6	ND	ND	ND	ND	ND	2

2	ND	ND	ND	ND	ND	0
6	ND	ND	ND	ND	ND	NA

2	ND	ND	ND	ND	ND	47
6	ND	ND	ND	ND	ND	1

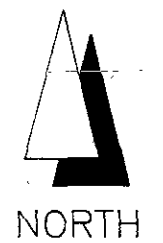
2	NA	NA	NA	NA	NA	15
6	NA	NA	NA	NA	NA	0

- LEGEND**
- EXISTING MONITORING WELL
 - ⊙ EXISTING MONITORING WELL LOCATION (PCC 1990)
 - HAND AUGER BORING SEPT/OCT 1991
 - HAND AUGER BORING MAY 1991
 - POTENTIOMETRIC GROUND WATER ELEVATION ABOVE MEAN SEA LEVEL (ft)
 - ➔ PROBABLE DIRECTION OF GROUND WATER MOVEMENT

1	2	3	4	5	6	7
8	9	10	11	12	13	14

TPH (mg/kg)
BENZENE (µg/kg)
ETHYLBENZENE (µg/kg)
TOLUENE (µg/kg)
XYLENE (µg/kg)
OVA (ppm)

NA NO ANALYSIS
ND NON-DETECT



PARK AVENUE

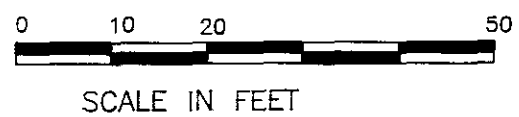
ALLEY

1461 PARK AVENUE
SITE PROPERTY BUILDING

HORTON STREET

APPROXIMATE
EXTENT OF
FORMER UST

NOTES: 1) ALL LOCATIONS ARE APPROXIMATE.



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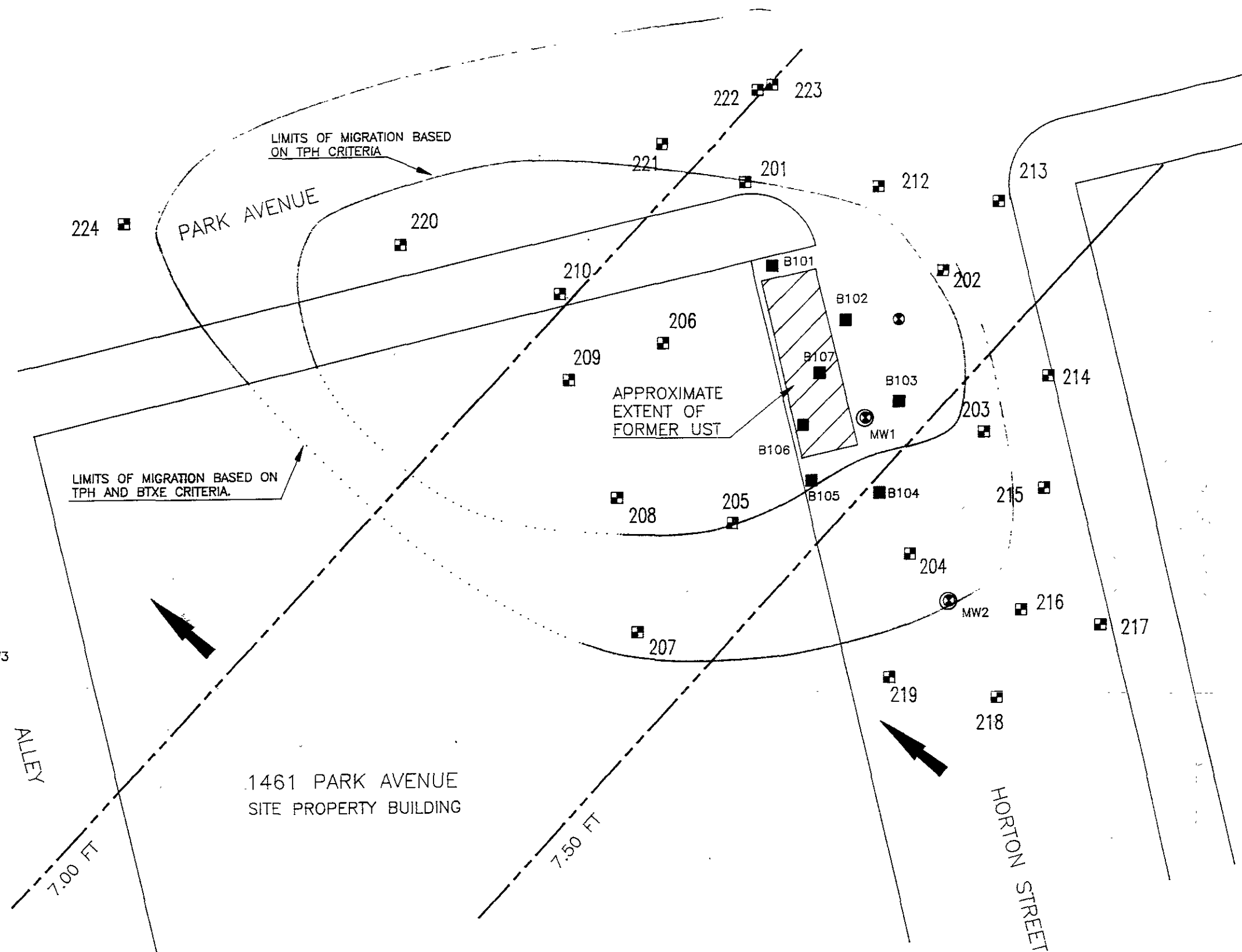
SITE SKETCH
1461 PARK AVENUE
EMERYVILLE, CALIFORNIA

CLIENT	UNION BANK	PROJECT	050-03B
DRAWN BY	<i>[Signature]</i>	DATE	1/25/91
CHECKED BY	<i>[Signature]</i>	DATE	12/16/90
APPROVED BY	<i>[Signature]</i>	DATE	10/18/90

DWG 050-03
FIGURE 3

LEGEND

- ⊙ EXISTING MONITORING WELL
- ⊙ EXISTING MONITORING WELL LOCATION (PCC 1990)
- ▣ HAND AUGER BORING SEPT/OCT 1991
- HAND AUGER BORING MAY 1991
- POTENTIOMETRIC GROUND WATER ELEVATION ABOVE MEAN SEA LEVEL (ft)
- PROBABLE DIRECTION OF GROUND WATER MOVEMENT



LIMITS OF MIGRATION BASED ON TPH CRITERIA

LIMITS OF MIGRATION BASED ON TPH AND BTXE CRITERIA

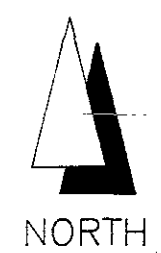
APPROXIMATE EXTENT OF FORMER UST

1461 PARK AVENUE
SITE PROPERTY BUILDING

NOTES: 1) ALL LOCATIONS ARE APPROXIMATE.



SCALE IN FEET



RAC			
REMEDIAL ACTION CORPORATION			
ESTIMATED LIMITS OF MIGRATION 1461 PARK AVENUE EMERYVILLE, CALIFORNIA			
CLIENT	UNION BANK	PROJECT	050-03B
DRAWN BY	DATE 11/15/91	DWG	050-03
CHECKED BY	DATE 12/10/91	FIGURE	
APPROVED BY	DATE 12/15/91		4

APPENDIX A
FIELD PROCEDURES

Additions or modifications to procedures in the Work Plan are delineated in italics.

A.1 HAND AUGER PROCEDURES

1. The hand auger borings will be drilled with a 3-inch diameter hand-held auger by a representative of Remedial Action Corporation.
2. The auger bit will be cleaned prior to drilling each hole using a brush and tap water, Alconox solution, a tap water rinse, and a deionized water rinse. The auger will be air-or paper towel dried before beginning each hole.
3. Soil descriptions, sample type and depth, and related information will be recorded on a boring log under the supervision of a State-Registered Geologist or Professional Engineer from Remedial Action Corporation.
4. Soil samples will be collected in 2-inch inside diameter and 1-and 4-inch long stainless steel tubes. Two 1-inch and 1 4-inch tubes are generally enclosed in the sampler. Prior to initial use, the sample tubes will be immersed in a three percent sulfuric acid solution and then cleaned, rinsed and dried using the procedures described in Item A.1.2.
5. The sampler will be driven into the soil approximately 8 inches using a slide hammer with an approximate weight of 5.5 pounds. The double acting hammer will be then pounded upwards to recover the sampler from the hole.
6. Following retrieval of the sampler the 4-inch tube will be removed from the sampler, the ends covered with aluminum foil, and capped with tight fitting PVC end caps. The sample will be labeled with the sample number, sample depth, project name, date, and project number before being placed in a ziploc bag.
7. The soil in one 1-inch ring and observation during hand augering will be used to describe the soil and one 1-inch ring will be used for field head space analysis.
8. The samples will be placed in ziploc bags stored in an ice chest cooled to a temperature of approximately 40 degrees Fahrenheit using ice.

9. All samples will be delivered to the laboratory within 48 hours of collection. Sample handling, transport, and delivery to the laboratory will be documented using Chain-of-Custody procedures, including the use of Chain-of-Custody forms.

A.2 HEATED HEAD SPACE ANALYSIS

1. Soil will be screened in the field for volatile organic compounds by analyzing the heated head space in a closed container containing a sample of the soil.
2. For screening of volatile organics, soil from the second one inch metal ring from the split spoon sampler is put into a one quart mason jar, and a mason jar lid equipped with a quick-connect valve is immediately screwed on. The mason jar with soil is then labeled, and heated in a water bath to evaporate volatile organics in the sample.
3. The mason jar with the soil sample is placed into a hot water bath at a temperature of 50 degrees C for about 20 minutes.
4. Soil samples are removed from the water bath and connected through a quick connect fitting to a Foxboro Century OVA model 128 which uses a flame ionization detector to measure volatile and flammable organic compounds.
5. The results of the heated head space OVA analysis in ppm multiplied by 0.06 are approximately equal to the concentration of total volatiles in the soil in mg/kg.

LOG OF BORING

DATE DRILLED **September 30, 1991** SHEET **1 of 1**

SURFACE ELEVATION _____ DATUM _____

ELEVATION (feet)	DEPTH (feet)	LAB TESTS	FIELD TESTS	BOREHOLE COMPLETION		SAMPLE TYPE	BLOW COUNTS/FT	SAMPLE NUMBER	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	SOIL DESCRIPTION	TYPE and/or REMARKS
		TPH (mg/kg)	HEADSPACE (ppm/vol)	GRAPHIC	DETAILS							
	0			Concrete							Asphalt	Artificial fill to 1.5 feet
		NA	150			■		201-2		CL	Concrete	
										CL	Reddish brown gravelly clay, gravel up to 1/4", moderately plastic, moist Greyish black clay, plastic, firm, moist	
	5			Bentonite								
		NA	150			■		201-6				
Boring drilled to 7 feet NA = No Analysis												

CLIENT **UNION BANK**



LOG OF BORING

FIGURE NO.

PROJECT NUMBER **050-03B**

REMEDIAL ACTION CORPORATION

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LOG OF BORING

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SURFACE ELEVATION _____ DATUM _____

ELEVATION (feet)	DEPTH (feet)	LAB TESTS	FIELD TESTS	BOREHOLE COMPLETION		SAMPLE TYPE	BLOW COUNTS/FT	SAMPLE NUMBER	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	SOIL DESCRIPTION	TYPE and/or REMARKS
		TPH (mg/kg)	HEADSPACE (ppm/vol)	GRAPHIC	DETAILS							
	0			█	Concrete				█	GW	Asphalt	
		NA	120	█	Bentonite	█		202-2	█	CL	Light brown gravel, up to 1-1/2", loose, moist	
											Greyish black clay, plastic, stiff, moist	Moderate degraded hydrocarbon odor
Boring drilled to 2 feet NA = No Analysis												
CLIENT UNION BANK PROJECT NUMBER 050-03B						REMEDIAL ACTION CORPORATION			LOG OF BORING 202		FIGURE NO.	

LOG OF BORING

DATE DRILLED **September 30, 1991** SHEET **1 of 1**

SURFACE ELEVATION _____ DATUM _____

ELEVATION (feet)	DEPTH (feet)	LAB TESTS	FIELD TESTS	BOREHOLE COMPLETION		SAMPLE TYPE	BLOW COUNTS/FT	SAMPLE NUMBER	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	SOIL DESCRIPTION	TYPE and/or REMARKS
		TPH (mg/kg)	HEADSPACE (ppm/vol)	GRAPHIC	DETAILS							
	0			█	← Concrete				█	GW	Asphalt	
		NA	50	█	← Bentonite	█		203-2	█	CL	Light brown gravel, up to 1-1/2", loose, wet	
											Greyish black clay, local brown mottling, plastic, moist	Strong degraded hydrocarbon odor
Boring drilled to 2 feet NA = No Analysis												
CLIENT UNION BANK PROJECT NUMBER 050-03B						REMEDIAL ACTION CORPORATION				LOG OF BORING 203		FIGURE NO.

LOG OF BORING

DATE DRILLED **September 30, 1991** SHEET **1 of 1**

SURFACE ELEVATION _____ DATUM _____

ELEVATION (feet)	DEPTH (feet)	LAB TESTS	FIELD TESTS	BOREHOLE COMPLETION		SAMPLE TYPE	BLOW COUNTS/FT	SAMPLE NUMBER	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	SOIL DESCRIPTION	TYPE and/or REMARKS
		TPH (mg/kg)	HEADSPACE (ppm/vol)	GRAPHIC	DETAILS							
	0			█	↑				█		Concrete	
		NA	120	█	←	█		204-2	█	GW CL	Light brown gravel, up to 1-1/2", loose, wet Greyish black clay, plastic, moist	Moderate degraded hydrocarbon odor
Boring drilled to 2 feet NA = No Analysis												
CLIENT UNION BANK						RAC				LOG OF BORING		FIGURE NO.
PROJECT NUMBER 050-03B						REMEDIAL ACTION CORPORATION				204		

LOG OF BORING

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SURFACE ELEVATION _____ DATUM _____

ELEVATION (feet)	DEPTH (feet)	LAB TESTS	FIELD TESTS	BOREHOLE COMPLETION		SAMPLE TYPE	BLOW COUNTS/FT	SAMPLE NUMBER	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	SOIL DESCRIPTION	TYPE and/or REMARKS
		TPH (mg/kg)	HEADSPACE (ppm/Vol)	GRAPHIC	DETAILS							
	0			█	← Concrete				█	GW	Concrete	
		NA	300	█	← Bentonite	█		205-2	█	CL	Light brown gravel, up to 1-1/2", loose, wet Greyish black clay, local brown mottling, plastic, moist	Strong degraded hydrocarbon odor
Boring drilled to 3 feet NA = No Analysis												
CLIENT UNION BANK						RAC			LOG OF BORING		FIGURE NO.	
PROJECT NUMBER 050-03B						REMEDIAL ACTION CORPORATION			205			

LOG OF BORING

DATE DRILLED **October 1, 1991** SHEET **1 of 1**

SURFACE ELEVATION DATUM

ELEVATION (feet)	DEPTH (feet)	LAB TESTS	FIELD TESTS	BOREHOLE COMPLETION		SAMPLE TYPE	BLOW COUNTS/FT	SAMPLE NUMBER	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	SOIL DESCRIPTION	TYPE and/or REMARKS
		TPH (mg/kg)	HEADSPACE (ppm/vol)	GRAPHIC	DETAILS							
	0			█	← Concrete				█	GW	Concrete	
		NA	270	█	← Bentonite	█		206-2	█	CL	Light brown gravel, up to 1-1/2", loose, wet	
											Greyish black clay, plastic, stiff, moist	Strong hydrocarbon odor
Boring drilled to 2 feet NA = No Analysis												

CLIENT **UNION BANK**

PROJECT NUMBER **050-03B**



REMEDIAL ACTION CORPORATION

LOG OF BORING

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FIGURE NO.

LOG OF BORING



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SURFACE ELEVATION _____ DATUM _____

ELEVATION (feet)	DEPTH (feet)	LAB TESTS	FIELD TESTS	BOREHOLE COMPLETION		SAMPLE TYPE	BLOW COUNTS/FT	SAMPLE NUMBER	GRAPHIC LOG	U. S. C. S. CLASSIFICATION	SOIL DESCRIPTION	TYPE and/or REMARKS
		TPH (mg/kg)	HEADSPACE (ppm/vol)	GRAPHIC	DETAILS							
	0				Concrete						Asphalt	
		ND	0					207-2		GW CL	Light brown gravel, loose, moist	
											Greyish black clay, plastic, stiff, moist	
	5				Bentonite							
		4	100					207-6			Olive brown, local green mottling, locally wet	
Boring drilled to 7 feet ND = Non Detect												
CLIENT UNION BANK						RAC				LOG OF BORING		FIGURE NO.
PROJECT NUMBER 050-03B						REMEDIAL ACTION CORPORATION				207		

LOG OF BORING

DATE DRILLED **October 1, 1991** SHEET **1 of 1**
 SURFACE ELEVATION _____ DATUM _____

ELEVATION (feet)	DEPTH (feet)	LAB TESTS	FIELD TESTS	BOREHOLE COMPLETION		SAMPLE TYPE	BLOW COUNTS/FT	SAMPLE NUMBER	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	SOIL DESCRIPTION	TYPE and/or REMARKS
		TPH (mg/kg)	HEADSPACE (ppm/vol)	GRAPHIC	DETAILS							
	0				Concrete							
		NA	100					208-2		GW CL	Concrete Light brown gravel, loose, moist Concrete Black clay, very plastic, local brown mottling, moist	Strong degraded hydrocarbon odor
	5				Bentonite							
		3400	>1000					208-6		CL	Grey to light grey clay, occasional 1/4" gravel, locally wet	Very strong hydrocarbon odor, visible vapors Slight to moderate hydrocarbon odor
											Boring drilled to 9 feet NA = No Analysis	

CLIENT **UNION BANK**

PROJECT NUMBER **050-03B**



REMEDIAL ACTION CORPORATION

LOG OF BORING

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FIGURE NO.

LOG OF BORING

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SURFACE ELEVATION _____ DATUM _____

ELEVATION (feet)	DEPTH (feet)	LAB TESTS	FIELD TESTS	BOREHOLE COMPLETION		SAMPLE TYPE	BLOW COUNTS/FT	SAMPLE NUMBER	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	SOIL DESCRIPTION	TYPE and/or REMARKS
		TPH (mg/kg)	HEADSPACE (ppm/Vol)	GRAPHIC	DETAILS							
	0				Concrete						Concrete	
		2	175					209-2		GW CL	Light brown gravel, up to 1/4", loose, moist Black clay, plastic, local brown mottling, moist	Earthy odor Strong hydrocarbon odor
	5				Bentonite			209-6		CL	Light grey silty clay, moderately plastic, moist locally wet	Very strong hydrocarbon odor
	1900		>1000									
Boring drilled to 7 feet												
CLIENT UNION BANK						RAC			LOG OF BORING		FIGURE NO.	
PROJECT NUMBER 050-03B						REMEDIAL ACTION CORPORATION			209			

LOG OF BORING

DATE DRILLED **October 1, 1991** SHEET **1 of 1**

SURFACE ELEVATION _____ DATUM _____

ELEVATION (feet)	DEPTH (feet)	LAB TESTS	FIELD TESTS	BOREHOLE COMPLETION		SAMPLE TYPE	BLOW COUNTS/FT	SAMPLE NUMBER	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	SOIL DESCRIPTION	TYPE and/or REMARKS
		TPH (mg/kg)	HEADSPACE (ppm/vol)	GRAPHIC	DETAILS							
	0			Concrete					Concrete			
		NA	300			□		210-2		GW CL	Light brown fine gravel, loose, moist Dark brown clay, moderately plastic, moist	Earthy odor Moderate hydrocarbon odor
	5					□		210-6		CL	Light grey silty clay, occasional fine gravel, moist	Strong hydrocarbon odor
		NA	650			□						
Boring drilled to 7 feet NA = No Analysis												
CLIENT UNION BANK						RAC			LOG OF BORING		FIGURE NO.	
PROJECT NUMBER 050-03B						REMEDIAL ACTION CORPORATION			210			

LOG OF BORING

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SURFACE ELEVATION _____ DATUM _____

ELEVATION (feet)	DEPTH (feet)	LAB TESTS	FIELD TESTS	BOREHOLE COMPLETION		SAMPLE TYPE	BLOW COUNTS/FT	SAMPLE NUMBER	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	SOIL DESCRIPTION	TYPE and/or REMARKS
		TPH (mg/kg)	HEADSPACE (ppm/vol)	GRAPHIC	DETAILS							
0	0	NA	0	Concrete	← Concrete	□		212-2	Asphalt Concrete	CL	Black clay, plastic, moist	
5	5	NA	0	Bentonite	← Bentonite	□		212-6	Light grey silty clay, locally clayey silt, occasional coarse sand, moderately plastic, moist	CL		

Boring drilled to 7.5 feet
NA = No Analysis

CLIENT **UNION BANK**

PROJECT NUMBER **050-03B**



REMEDIAL ACTION CORPORATION

LOG OF BORING

212

FIGURE NO.

LOG OF BORING

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 SURFACE ELEVATION _____ DATUM _____

ELEVATION (feet)	DEPTH (feet)	LAB TESTS	FIELD TESTS	BOREHOLE COMPLETION		SAMPLE TYPE	BLOW COUNTS/FT	SAMPLE NUMBER	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	SOIL DESCRIPTION	TYPE and/or REMARKS
		TPH (mg/kg)	HEADSPACE (ppm/vol)	GRAPHIC	DETAILS							
	0			█	← Concrete				█		Asphalt	
		NA	5			▣		213-2		CL	Concrete Black clay, plastic, moist	
	5				← Bentonite	▣		213-6		CL	Light to medium brown clay, local brownish yellow mottling, moist, locally wet	

Boring drilled to 7.5 feet
 NA = No Analysis
 ND = Non Detect

LOG OF BORING

DATE DRILLED **October 2, 1991** SHEET **1 of 1**

SURFACE ELEVATION DATUM

ELEVATION (feet)	DEPTH (feet)	LAB TESTS	FIELD TESTS	BOREHOLE COMPLETION		SAMPLE TYPE	BLOW COUNTS/FT	SAMPLE NUMBER	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	SOIL DESCRIPTION	TYPE and/or REMARKS
		TPH (mg/kg)	HEADSPACE (ppm/vol)	GRAPHIC	DETAILS							
	0	NA	3	Concrete	Concrete				Asphalt	GW	Light to olive brown gravel, up to 1-1/2", loose, moist	Slight degraded hydrocarbon odor
				Bentonite	Bentonite			214-2	CL	CL	Black clay, very plastic, moist	
	5	ND	NA	Bentonite	Bentonite			214-6	CL	CL	Light grey clay, local brownish yellow mottling, occasional coarse sand, plastic, moist, locally wet	
Boring drilled to 7.5 feet NA = No Analysis ND = Non Detect												
CLIENT UNION BANK						RAC			LOG OF BORING		FIGURE NO.	
PROJECT NUMBER 050-03B						REMEDIAL ACTION CORPORATION			214			

LOG OF BORING

DATE DRILLED **September 30, 1991** SHEET **1 of 1**

SURFACE ELEVATION _____ DATUM _____

ELEVATION (feet)	DEPTH (feet)	LAB TESTS	FIELD TESTS	BOREHOLE COMPLETION		SAMPLE TYPE	BLOW COUNTS/FT	SAMPLE NUMBER	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	SOIL DESCRIPTION	TYPE and/or REMARKS
		TPH (mg/kg)	HEADSPACE (ppm/vol)	GRAPHIC	DETAILS							
	0			█	Concrete				█	GW	Asphalt	
		ND	0	█		█		215-2	█	CL	Light to olive brown gravel, up to 1-1/2", loose, moist to wet	
				█					█	CL	Black clay, local brown mottling, plastic, moist	
	5			█	Bentonite				█		Light grey clay, local brownish yellow mottling, occasional coarse sand, plastic, moist, locally wet	
		ND	NA	█		█		215-6	█			
Boring drilled to 7.5 feet NA = No Analysis ND = Non Detect												
CLIENT UNION BANK						RAG			LOG OF BORING		FIGURE NO.	
PROJECT NUMBER 050-03B						REMEDIAL ACTION CORPORATION			215			

LOG OF BORING

DATE DRILLED **September 30, 1991** SHEET **1 of 1**

SURFACE ELEVATION _____ DATUM _____

ELEVATION (feet)	DEPTH (feet)	LAB TESTS	FIELD TESTS	BOREHOLE COMPLETION		SAMPLE TYPE	BLOW COUNTS/FT	SAMPLE NUMBER	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	SOIL DESCRIPTION	TYPE and/or REMARKS
		TPH (mg/kg)	HEADSPACE (ppm/vol)	GRAPHIC	DETAILS							
	0			█	█				█	GW CL	Concrete Light brown gravel, up to 1-1/2", loose, wet Greyish black clay, plastic, moist	Strong degraded hydrocarbon odor
		NA	50	█	█			216-2				
Boring drilled to 2 feet NA = No Analysis												
CLIENT UNION BANK						RAC				LOG OF BORING		FIGURE NO.
PROJECT NUMBER 050-03B						REMEDIAL ACTION CORPORATION				216		

LOG OF BORING


DATE DRILLED **October 2, 1991** SHEET **1 of 1**

SURFACE ELEVATION _____ DATUM _____

ELEVATION (feet)	DEPTH (feet)	LAB TESTS	FIELD TESTS	BOREHOLE COMPLETION		SAMPLE TYPE	BLOW COUNTS/FT	SAMPLE NUMBER	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	SOIL DESCRIPTION	TYPE and/or REMARKS
		TPH (mg/kg)	HEADSPACE (ppm/vol)	GRAPHIC	DETAILS							
	0			Concrete							Asphalt	
		ND	47			■		217-2	[Hatched Box]	GW CL	Light brown gravel, loose, moist	
										CL	Black clay, plastic, moist	
										CL	Brownish grey clay, locally sandy, moist	Slight hydrocarbon odor
	5			Bentonite		■		217-6	[Hatched Box]	CL	Light grey silty clay, locally clayey silt, occasional coarse sand, moderately plastic, moist, locally wet	
Boring drilled to 7 feet ND = Non Detect												
CLIENT UNION BANK						RAC			LOG OF BORING		FIGURE NO.	
PROJECT NUMBER 050-03B						REMEDIAL ACTION CORPORATION			217			

LOG OF BORING

DATE DRILLED **October 2, 1991** SHEET **1 of 1**
 SURFACE ELEVATION _____ DATUM _____

ELEVATION (feet)	DEPTH (feet)	LAB TESTS	FIELD TESTS	BOREHOLE COMPLETION		SAMPLE TYPE	BLOW COUNTS/FT	SAMPLE NUMBER	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	SOIL DESCRIPTION	TYPE and/or REMARKS
		TPH (mg/kg)	HEADSPACE (ppm/vol)	GRAPHIC	DETAILS							
	0				Concrete						Asphalt	
		NA	15				218-2			GW CL	Light brown gravel, loose, moist Black clay, local brown mottling, plastic, moist	
	5	NA	0		Bentonite		218-6			CL	Light grey silty clay, locally clayey silt, occasional coarse sand, moderately plastic, moist locally wet	
Boring drilled to 7 feet NA = No Analysis												
CLIENT UNION BANK PROJECT NUMBER 050-03B						 REMEDIAL ACTION CORPORATION				LOG OF BORING 218		FIGURE NO.

LOG OF BORING

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 SURFACE ELEVATION _____ DATUM _____

ELEVATION (feet)	DEPTH (feet)	LAB TESTS	FIELD TESTS	BOREHOLE COMPLETION		SAMPLE TYPE	BLOW COUNTS/FT	SAMPLE NUMBER	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	SOIL DESCRIPTION	TYPE and/or REMARKS
		TPH (mg/kg)	HEADSPACE (ppm/vol)	GRAPHIC	DETAILS							
	0				Concrete						Asphalt	
		NA	20					219-2	GW	CL	Light brown gravel, loose, moist Black clay, local brown mottling, plastic, moist Medium grey/brown	
	5	ND	2		Bentonite			219-6	CL	CL	Light grey silty clay, locally clayey silt, occasional coarse sand, moderately plastic, moist	

Boring drilled to 7 feet
 NA = No Analysis
 ND = Non Detect

LOG OF BORING

DATE DRILLED **October 2, 1991** SHEET **1 of 1**

SURFACE ELEVATION _____ DATUM _____

ELEVATION (feet)	DEPTH (feet)	LAB TESTS	FIELD TESTS	BOREHOLE COMPLETION		SAMPLE TYPE	BLOW COUNTS/FT	SAMPLE NUMBER	GRAPHIC LOG	U. S. C. S. CLASSIFICATION	SOIL DESCRIPTION	TYPE and/or REMARKS
		TPH (mg/kg)	HEADSPACE (ppm/vol)	GRAPHIC	DETAILS							
	0			Concrete					Asphalt Concrete			
	10	50				□		220-2	GW CL		Light brown gravel, loose, moist Black clay, local brown mottling, plastic, moist Olive grey brown, locally silty	Moderate degraded hydrocarbon odor
	5			Bentonite		□		220-6				Strong hydrocarbon odor
	NA		>1000			□						
Boring drilled to 7 feet NA = No Analysis												

CLIENT **UNION BANK**

PROJECT NUMBER **050-03B**



REMEDIAL ACTION CORPORATION

LOG OF BORING

220

FIGURE NO.

LOG OF BORING

DATE DRILLED **October 2, 1991** SHEET **1 of 1**
 SURFACE ELEVATION _____ DATUM _____

ELEVATION (feet)	DEPTH (feet)	LAB TESTS	FIELD TESTS	BOREHOLE COMPLETION		SAMPLE TYPE	BLOW COUNTS/FT	SAMPLE NUMBER	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	SOIL DESCRIPTION	TYPE and/or REMARKS
		TPH (mg/kg)	HEADSPACE (ppm/Vol)	GRAPHIC	DETAILS							
	0				Concrete						Asphalt Concrete	Slight hydrocarbon odor
	1	80						221-2	GW CL	Light brown gravel, loose, moist Black clay, local brownish yellow mottling, plastic, moist		
	5	ND	6		Bentonite			221-6	CL	Light grey silty clay, local coarse sand, moderately plastic, moist Locally wet		
Boring drilled to 8 feet ND = Non Detect												
CLIENT UNION BANK						RAG			LOG OF BORING		FIGURE NO.	
PROJECT NUMBER 050-03B						REMEDIAL ACTION CORPORATION			221			

LOG OF BORING

DATE DRILLED **October 2, 1991** SHEET **1 of 1**

SURFACE ELEVATION _____ DATUM _____

ELEVATION (feet)	DEPTH (feet)	LAB TESTS	FIELD TESTS	BOREHOLE COMPLETION		SAMPLE TYPE	BLOW COUNTS/FT	SAMPLE NUMBER	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	SOIL DESCRIPTION	TYPE and/or REMARKS
		TPH (mg/kg)	HEADSPACE (ppm/Vol)	GRAPHIC	DETAILS							
	0				Concrete						Asphalt	
		ND	15		Bentonite			222-2		GW CL	Light brown gravel, up to 1-1/2", loose, wet Greyish black clay, plastic, moist	
											Wooden obstruction at 3 feet ND = Non Detect	

CLIENT **UNION BANK**

PROJECT NUMBER **050-03B**



REMEDIAL ACTION CORPORATION


LOG OF BORING

222

FIGURE NO.

LOG OF BORING

DATE DRILLED **October 2, 1991** SHEET **1 of 1**
 SURFACE ELEVATION _____ DATUM _____

ELEVATION (feet)	DEPTH (feet)	LAB TESTS	FIELD TESTS	BOREHOLE COMPLETION		SAMPLE TYPE	BLOW COUNTS/FT	SAMPLE NUMBER	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	SOIL DESCRIPTION	TYPE and/or REMARKS
		TPH (mg/kg)	HEADSPACE (ppm/vol)	GRAPHIC	DETAILS							
	0				Concrete Bentonite				GW CL	Asphalt Light brown gravel, up to 1-1/2", loose, wet Greyish black clay, plastic, moist		
											Boring drilled to 3.5 feet where a stone obstruction was encountered Boring not sampled at 2 feet due to close proximity of Boring 222	

LOG OF BORING

DATE DRILLED **October 2, 1991** SHEET **1 of 1**
 SURFACE ELEVATION _____ DATUM _____

ELEVATION (feet)	DEPTH (feet)	LAB TESTS	FIELD TESTS	BOREHOLE COMPLETION		SAMPLE TYPE	BLOW COUNTS/FT	SAMPLE NUMBER	GRAPHIC LOG	U. S. C. S. CLASSIFICATION	SOIL DESCRIPTION	TYPE and/or REMARKS
		TPH (mg/kg)	HEADSPACE (ppm/vol)	GRAPHIC	DETAILS							
	0				Concrete						Asphalt	
		NA	50					224-2		GW CL	Light brown gravel, up to 3", loose, moist Black clay, locally silty, plastic, moist	
	5				Bentonite					CL	Greyish brown, silty clay, moist	
		ND	20					224-6				
Boring drilled to 7 feet NA = No Analysis ND = Non Detect												



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OCT 21 1991

James Farrow
Remedial Action Corp.
505 N. Tustin Ave.
Suite 160
Santa Ana, CA 92705

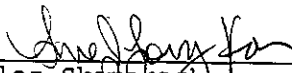
Date: 10-17-91
NET Client Acct No: 789
NET Pacific Log No: 1192
Received: 10-03-91 0800

Client Reference Information

Union-Emeryville, Project: 050-03B

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

Approved by:



Jules Skamarack
Laboratory Manager

JS:rct
Enclosure(s)



NET Pacific, Inc

Client No: 789
Client Name: Remedial Action Corp.
NET Log No: 1192

Date: 10-17-91

Page: 2

Ref: Union-Emeryville, Project: 050-03B

Descriptor, Lab No. and Results

Parameter	Method	Reporting Limit	B207-6	B208-6	Units
			10-01-91 1000	10-01-91 1000	
			99548	99549	
PETROLEUM HYDROCARBONS			--	--	
VOLATILE (SOIL)			--	--	
DILUTION FACTOR *			1	1000	
DATE ANALYZED			10-13-91	10-14-91	
METHOD GC FID/5030			--	--	
as Gasoline		1	3.8	3,400	mg/Kg
METHOD 8020			--	--	
DILUTION FACTOR *			10	1000	
DATE ANALYZED			10-14-91	10-14-91	
Benzene		2.5	150	13,000	ug/Kg
Ethylbenzene		2.5	300	53,000	ug/Kg
Toluene		2.5	210	80,000	ug/Kg
Xylenes, total		2.5	650	260,000	ug/Kg



NET Pacific, Inc

Client No: 789
Client Name: Remedial Action Corp.
NET Log No: 1192

Date: 10-17-91

Page: 3.

Ref: Union-Emeryville, Project: 050-03B

Descriptor, Lab No. and Results

Parameter	Method	Reporting Limit	B209-2	B209-6	Units
			10-01-91 1000	10-01-91 1000	
			99550	99551	
PETROLEUM HYDROCARBONS			--	--	
VOLATILE (SOIL)			--	--	
DILUTION FACTOR *			1	1000	
DATE ANALYZED			10-13-91	10-14-91	
METHOD GC FID/5030			--	--	
as Gasoline	1		1.8	1,900	mg/Kg
METHOD 8020			--	--	
DILUTION FACTOR *			1	1000	
DATE ANALYZED			10-13-91	10-14-91	
Benzene	2.5		99	10,000	ug/Kg
Ethylbenzene	2.5		47	31,000	ug/Kg
Toluene	2.5		3.1	50,000	ug/Kg
Xylenes, total	2.5		13	130,000	ug/Kg



NET Pacific Inc

Client No: 789
*Client Name: Remedial Action Corp.
NET Log No: 1192

Date: 10-17-91

Page: 4

Ref: Union-Emeryville, Project: 050-03B

Descriptor, Lab No. and Results

Parameter	Method	Reporting Limit	B213-6	B214-6	Units
			10-02-91 0700	10-02-91 0700	
			99552	99553	
PETROLEUM HYDROCARBONS			--	--	
VOLATILE (SOIL)			--	--	
DILUTION FACTOR *			1	1	
DATE ANALYZED			10-13-91	10-13-91	
METHOD GC FID/5030			--	--	
as Gasoline	1		ND	ND	mg/Kg
METHOD 8020			--	--	
DILUTION FACTOR *			1	1	
DATE ANALYZED			10-13-91	10-13-91	
Benzene	2.5		ND	ND	ug/Kg
Ethylbenzene	2.5		ND	ND	ug/Kg
Toluene	2.5		ND	ND	ug/Kg
Xylenes, total	2.5		ND	ND	ug/Kg



NET Pacific, Inc

Client No: 789
Client Name: Remedial Action Corp.
NET Log No: 1192

Date: 10-17-91

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Ref: Union-Emeryville, Project: 050-03B

Descriptor, Lab No. and Results

Parameter	Method	Reporting Limit	B217-2	B217-6	Units
			10-02-91 0700	10-02-91 0700	
			99554	99555	
PETROLEUM HYDROCARBONS			--	--	
VOLATILE (SOIL)			--	--	
DILUTION FACTOR *			1	1	
DATE ANALYZED			10-14-91	10-13-91	
METHOD GC FID/5030			--	--	
as Gasoline		1	ND	ND	mg/Kg
METHOD 8020			--	--	
DILUTION FACTOR *			1	1	
DATE ANALYZED			10-14-91	10-13-91	
Benzene		2.5	ND	ND	ug/Kg
Ethylbenzene		2.5	ND	ND	ug/Kg
Toluene		2.5	ND	ND	ug/Kg
Xylenes, total		2.5	ND	ND	ug/Kg



NET Pacific Inc

Client No: 789
Client Name: Remedial Action Corp.
NET Log No: 1192

Date: 10-17-91

Page: 6

Ref: Union-Emeryville, Project: 050-03B

Descriptor, Lab No. and Results

Parameter	Method	Reporting Limit	B219-6	B220-2	Units
			10-02-91 1100	10-02-91 1100	
			99556	99557	
PETROLEUM HYDROCARBONS			--	--	
VOLATILE (SOIL)			--	--	
DILUTION FACTOR *			1	1	
DATE ANALYZED			10-13-91	10-13-91	
METHOD GC FID/5030			--	--	
as Gasoline		1	ND	10	mg/Kg
METHOD 8020			--	--	
DILUTION FACTOR *			1	1	
DATE ANALYZED			10-13-91	10-13-91	
Benzene		2.5	ND	210	ug/Kg
Ethylbenzene		2.5	ND	ND	ug/Kg
Toluene		2.5	ND	ND	ug/Kg
Xylenes, total		2.5	ND	56	ug/Kg



NET Pacific, Inc

Client No: 789
Client Name: Remedial Action Corp.
NET Log No: 1192

Date: 10-17-91
Page: 7

Ref: Union-Emeryville, Project: 050-03B

Descriptor, Lab No. and Results

Parameter	Method	Reporting Limit	B221-2	B221-6	Units
			10-02-91 1100	10-02-91 1100	
			99558	99559	
PETROLEUM HYDROCARBONS			--	--	
VOLATILE (SOIL)			--	--	
DILUTION FACTOR *			1	1	
DATE ANALYZED			10-13-91	10-14-91	
METHOD GC FID/5030			--	--	
as Gasoline		1	1.3	ND	mg/Kg
METHOD 8020			--	--	
DILUTION FACTOR *			1	1	
DATE ANALYZED			10-13-91	10-14-91	
Benzene		2.5	79	83	ug/Kg
Ethylbenzene		2.5	8.2	16	ug/Kg
Toluene		2.5	ND	ND	ug/Kg
Xylenes, total		2.5	14	37	ug/Kg



NET Pacific, Inc

Client No: 789
Client Name: Remedial Action Corp.
NET Log No: 1192

Date: 10-17-91

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Ref: Union-Emeryville, Project: 050-03B

Descriptor, Lab No. and Results

Parameter	Method	Reporting Limit	B222-2	B224-6	Units
			10-02-91 1100	10-02-91 1400	
			99560	99561	
PETROLEUM HYDROCARBONS			--	--	
VOLATILE (SOIL)			--	--	
DILUTION FACTOR *			1	1	
DATE ANALYZED			10-14-91	10-14-91	
METHOD GC FID/5030			--	--	
as Gasoline	1		ND	ND	mg/Kg
METHOD 8020			--	--	
DILUTION FACTOR *			1	1	
DATE ANALYZED			10-14-91	10-14-91	
Benzene	2.5		41	ND	ug/Kg
Ethylbenzene	2.5		2.2	ND	ug/Kg
Toluene	2.5		5.2	ND	ug/Kg
Xylenes, total	2.5		17	ND	ug/Kg



NET Pacific, Inc

Client Acct: 789
Client Name: Remedial Action Corp.
NET Log No: 1192

Date: 10-17-91
Page: 9

Ref: Union-Emeryville, Project: 050-03B

QUALITY CONTROL DATA

Parameter	Reporting Limits	Units	Cal Verif Stand % Recovery	Blank Data	Spike % Recovery	Duplicate Spike % Recovery	RPD
Gasoline	1	mg/Kg	96	ND	98	100	2.0
Benzene	2.5	ug/Kg	91	ND	100	102	2.0
Toluene	2.5	ug/Kg	94	ND	101	114	12
Gasoline	1	mg/Kg	99	ND	75	79	5.2
Benzene	2.5	ug/Kg	92	ND	87	96	9.8
Toluene	2.5	ug/Kg	94	ND	84	81	3.6

COMMENT: Blank Results were ND on other analytes tested.



NET Pacific, Inc

KEY TO ABBREVIATIONS and METHOD REFERENCES

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

Method References

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

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

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

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



NATIONAL
ENVIRONMENTAL
TESTING, INC.

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

RECEIVED
OCT 21 1991

James Farrow
Remedial Action Corp.
505 N. Tustin Ave.
Suite 160
Santa Ana, CA 92705

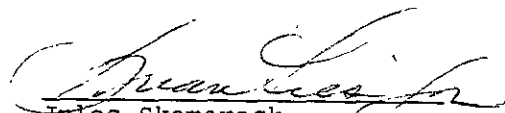
Date: 10-17-91
NET Client Acct No: 789
NET Pacific Log No: 1134
Received: 10-01-91 0800

Client Reference Information

Union Bank- Emeryville, Project: 050-03B

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

Approved by:


Jules Skamarack
Laboratory Manager

JS:rct
Enclosure(s)



NET Pacific, Inc

Client No: 789
Client Name: Remedial Action Corp.
NET Log No: 1134

Date: 10-17-91

Page: 2

Ref: Union Bank- Emeryville, Project: 050-03B

Descriptor, Lab No. and Results

Parameter	Method	Reporting Limit	B2031A	B2032A	Units
			09-30-91 1500	09-30-91 1500	
			99274	99275	
PETROLEUM HYDROCARBONS			--	--	
VOLATILE (SOIL)			--	--	
DILUTION FACTOR *			1	1	
DATE ANALYZED			10-09-91	10-09-91	
METHOD GC FID/5030			--	--	
as Gasoline	1		ND	ND	mg/Kg
METHOD 8020			--	--	
DILUTION FACTOR *			1	1	
DATE ANALYZED			10-09-91	10-09-91	
Benzene	2.5		ND	ND	ug/Kg
Ethylbenzene	2.5		ND	ND	ug/Kg
Toluene	2.5		ND	ND	ug/Kg
Xylenes, total	2.5		ND	ND	ug/Kg



NET Pacific, Inc

Client No: 789
Client Name: Remedial Action Corp.
NET Log No: 1134

Date: 10-17-91

Page: 3

Ref: Union Bank- Emeryville, Project: 050-03B

Descriptor, Lab No. and Results

Parameter	Method	Reporting Limit	99276	Units
B2051A 09-30-91 1600				
PETROLEUM HYDROCARBONS			--	
VOLATILE (SOIL)			--	
DILUTION FACTOR *			1	
DATE ANALYZED			10-10-91	
METHOD GC FID/5030			--	
as Gasoline	1		ND	mg/Kg
METHOD 8020			--	
DILUTION FACTOR *			1	
DATE ANALYZED			10-10-91	
Benzene	2.5		ND	ug/Kg
Ethylbenzene	2.5		ND	ug/Kg
Toluene	2.5		ND	ug/Kg
Xylenes, total	2.5		ND	ug/Kg



NET Pacific, Inc

Client Acct: 789
Client Name: Remedial Action Corp.
NET Log No: 1134

Date: 10-17-91
Page: 4

Ref: Union Bank- Emeryville, Project: 050-03B

QUALITY CONTROL DATA

Parameter	Reporting Limits	Units	Cal Verf Stand % Recovery	Blank Data	Spike % Recovery	Duplicate Spike % Recovery	RPD
Gasoline	1	mg/Kg	94	ND	76	75	1.9
Benzene	2.5	ug/Kg	103	ND	87	104	17
Toluene	2.5	ug/Kg	98	ND	100	107	6.5
Gasoline	1	mg/Kg	94	ND	90	91	1.1

COMMENT: Blank Results were ND on other analytes tested.



NET Pacific, Inc

KEY TO ABBREVIATIONS and METHOD REFERENCES

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

Method References

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

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

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

CHAIN OF CUSTODY RECORD

1134

Shipped By: **RAC** Remedial Action Corporation
 505 N. Tustin Ave., Suite 100
 Santa Ana, California 92715
 714511-9191

Delivered To: NET PACIFIC

PROJECT NAME: UNION BANK - EMERYVILLE

PROJECT NO.: 050-03B

DATE: 9-30-91 PAGE 1 OF 1

SAMPLED BY: J.F. SIGNATURE: James Farson

DELIVERY METHOD: COURIER

TOTAL NO. OF SAMPLES: 3

BORING or SAMP. ID.	SAMPLE NO.	DEPTH or CO-ORDIN.	DATE SAMPLED	TIME SAMPLED	SAMPLE		CONTAINER	PRESERVATION		ANALYSIS REQUIRED
					Material	Method		Temp.	Chem.	
					SOIL	DRIVE	SS	48°F	NONE	
B 203	1-A	2'	9-30-91	15:00	"	"	"	"	"	BTX & TPH (802088) 15.
B 203	2-A	6'	"	"	"	"	"	"	"	BTX & TPH (")
B 205	1-A	2'	9-30-91	16:00	"	"	"	"	"	BTX & TPH (")
CUSTODY SEALED 9/30/91 19:00 J.F.W. *see instructions										

SPECIAL ANALYSIS OR HANDLING REQUIREMENTS:

RELINQUISHED BY:
 Signature: James Farson
 Name: JAMES FARSON
 Company: REMEDIAL ACTION CORP.
 Reason: ANALYSIS

RECEIVED BY:
 Signature: Jeff Winkler
 Name: JEFF WINKLER
 Company: NET
 DATE: 9/30/91
 TIME: 17:25

RELINQUISHED BY:
 Signature: Jeff Winkler
 Name: JEFF WINKLER
 Company: NET
 Reason: TO Lab 9/30 19:00

RECEIVED BY:
 Signature: Kelly Temple
 Name: Kelly Temple
 Company: NET PACIFIC
 DATE: 10/1/91
 TIME: 0800

RELINQUISHED BY:
 Signature: _____
 Name: _____
 Company: _____
 Reason: _____

RECEIVED BY:
 Signature: _____
 Name: _____
 Company: _____
 DATE: _____
 TIME: _____

ADDITIONAL INFORMATION:

CHAIN OF CUSTODY RECORD

1192

Shipped By: **RAC** Remedial Action Corporation
 505 N. Tustin Ave., Suite 160
 Santa Ana, California 92705
 714/511-9191

Delivered To: NET PACIFIC

PROJECT NAME: UMCN - EMERYVILLE PROJECT NO: 050-03, B
 DATE: 10-2-91 PAGE 1 OF 2 SAMPLED BY: J.F. SIGNATURE: [Signature]
 DELIVERY METHOD: CARRIER TOTAL NO. OF SAMPLES: 18 (PAGE 1) = 18 TOTAL = 26

BORING or SAMP. ID.	SAMPLE NO.	DEPTH or CO-ORDIN.	DATE SAMPLED	TIME SAMPLED	SAMPLE		CONTAINER	PRESERVATION		ANALYSIS REQUIRED
					Material	Method		Temp.	Chem.	
										HOLD
B 207	207-6	6'	10-1-91	10:00	Soil	Drive	S. Steel	WFF	None	
B 208	208-2	2'	10-1-91		"	"	"	"	"	
B 208	208-6	6'	10-1-91		"	"	"	"	"	
B 209	209-2	2'	"		"	"	"	"	"	
B 209	209-6	6'	"		"	"	"	"	"	
B 210	210-2	2'	"		"	"	"	"	"	
B 210	210-6	6'	"		"	"	"	"	"	
B 211	211-6	6'	"		"	"	"	"	"	
B 212	212-2	2'	"		"	"	"	"	"	
B 212	212-6	6'	"	16:00	"	"	"	"	"	
B 213	213-2	2	10-2-91	07:00	"	"	"	"	"	
B 213	213-6	6	10-2-91		"	"	"	"	"	
B 214	214-2	2	"		"	"	"	"	"	
B 214	214-6	6	"		"	"	"	"	"	
B 217	217-2	2	"		"	"	"	"	"	
B 217	217-6	6	"		"	"	"	"	"	
B 218	218-2	2	"		"	"	"	"	"	
B 218	218-6	6	"	11:00	"	"	"	"	"	

also checked for analysis
 10/17/91

SPECIAL ANALYSIS OR HANDLING REQUIREMENTS: PLEASE HOLD ALL SAMPLES FOR ANALYSIS. RAC WILL CONTACT NET BEFORE FRIDAY 10-4-91.

RELINQUISHED BY:
 Signature: [Signature]
 Name: JAMES FARROW
 Company: RAC
 Reason: ANALYSIS

RECEIVED BY:
 Signature: [Signature]
 Name: MIKE TAVANI
 Company: NET
 DATE: 10-2-91
 TIME: 16:00

RELINQUISHED BY:
 Signature: [Signature]
 Name: MIKE TAVANI
 Company: NET
 Reason: _____

RECEIVED BY:
 Signature: [Signature]
 Name: Kelly Temple
 Company: NET Pacific
 DATE: 10/3/91
 TIME: 0000

RELINQUISHED BY:
 Signature: _____
 Name: _____
 Company: _____
 Reason: STUDY SEALED

RECEIVED BY:
 Signature: _____
 Name: _____
 Company: _____
 DATE: _____
 TIME: _____

ADDITIONAL INFORMATION: 1900 MWT
PLEASE FAX COPIES OF ALL CHAINS OF CUSTODY

