CORRECTIVE ACTION PLAN

FOR

STID 385

THE WATSON TRUST PROPERTY
1461 PARK AVENUE
EMERYVILLE, CALIFORNIA

PREPARED FOR:

UNION BANK TRUST REAL ESTATE
445 SOUTH FIGUEROA STREET
LOS ANGELES, CA 90071

SUBMITTED BY:

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BEI

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1. INTRODUCTION

This Corrective Action Plan (CAP) outlines the scope and details of the remedial action program as proposed by Blakely Environmental, Inc. (BEI), (909) 390-1792, for the Watson Trust property located at 1461 Park Avenue, Emeryville, California (Figure 1). The corrective action is required by the California Regional Water Quality Control Board (CRWQCB)-Region 2, Mr. Kevin Graves, (510) 286-0435 and the Alameda County Environmental Health Department (ACEHD), Susan Hugo, (510) 567-6700, and was authorized on February 22, 1995 by Union Bank Trust Real Estate as Trustee for the Watson Trust. Copies of this document will be submitted to both the CRWQCB and the ACEHD.

The objective of the proposed corrective action is to perform that testing and remediation necessary for regulatory approval of closure of remediation at the Watson Trust property. A review of residual contaminant contribution, exclusively non-halogenated, isolated, low level petroleums, has identified that this site presently meets regulatory requirements for closure of remediation according to the provisions of the non-attainment zone protocol of the CRWQCB-Region 2. Total petroleum hydrocarbons as gasoline (TPH-g) and benzene are used as constituents of primary concern to identify the hydrocarbon contribution from the site and the limits of the contaminant plume in soil and groundwater. TPH has been delineated to depict the mass of petroleums in soil and groundwater. Benzene has been delineated to depict the extent of contaminant migration in groundwater since benzene is the most miscible of the petroleum compounds tested.

1.1 Site Location and Description

The property, situated approximately a quarter of a mile east of the San Francisco Bay, is located in a commercial area of the City of Emeryville, California at about 122°17' 30" west longitude and 37° 69' north latitude. The site contains one concrete block, single story building that almost covers the entire property. The remaining areas are covered with asphalt or concrete. 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 warehouses and distributes vehicle brake parts and radiators. No manufacturing nor repair processes occurred on-site (RAC, August 1991). Electro Coatings, Inc. (ECI), located in the groundwater upgradient direction, appears to have discharged sufficient hexavalent chromium and halogenated solvent toxicants into groundwater to cause contamination levels which have migrated in the groundwater downgradient direction onto the subject site.

1.2 Previous Investigations

In March 1990, two underground petroleum fuel storage tanks (USTs), installed in 1980 by the Western Brake Co., were removed from the subject site by PCC, Incorporated. A tank closure report was filed with the ACEHD in July 1990. A 3000-gallon tank containing gasoline was found in good condition. The 500-gallon tank, used primarily for diesel storage, showed evidence of leakage due to failure at the welds. The required reports of contamination were filed with the CRWQCB-Region 2, and with the ACEHD.

During the excavation of the tanks, three soil samples and two groundwater samples were obtained from the tank excavations, as groundwater occurs at a depth of about 6.5 feet below grade (bg). The two tanks were located adjacent to each other. The tanks were excavated separately creating

separate pits. The gasoline tank pit was located in about the northern 17 feet and the diesel tank pit in about the southern 13 feet of the former underground storage tank (UST) excavation area. Soil samples were taken at a depth of four feet from the north and south walls of the gasoline tank excavation and one sample was obtained of groundwater standing in the pit. A soil sample was taken at a depth of five feet from the south wall of the diesel tank excavation and one water sample was taken from the groundwater in the pit. After removal of USTs, the soil was returned to the excavation.

Analysis for total petroleum hydrocarbons (TPH) identified 62.3 mg/kg and 460 mg/kg in the north and south walls of the gasoline tank excavation, respectively, and 1580 mg/kg TPH was detected in the south wall of the diesel tank excavation. Analysis for TPH as diesel was also performed, but none was detected. Benzene, toluene, xylenes and ethylbenzene (BTXE) were detected in three samples. In the north wall of the gasoline tank excavation, BTXE was detected at concentrations of 9.8, 207, 947, and 32.9 ug/kg, respectively. In the south wall of the gasoline tank excavation, BTXE was found at concentrations of 1600, 9140, 32,300 and 5080 ug/kg, respectively. In the south wall of the diesel tank excavation, BTXE was detected at concentrations of 17.3, 2600, 100,400 and 481 ug/kg, respectively.

Laboratory testing for TPH as gasoline detected 38.1 mg/l in the free-standing water in the gasoline tank excavation. BTXE concentrations were 2750, 2840, 5890, and 1160 ug/l, respectively. In the free-standing water in the diesel tank excavation, TPH as gasoline was detected at a concentration of 110 mg/l and BTXE at concentrations of 5240, 7040, 15000 and 2420 ug/l, respectively. TPH as diesel was non-detectable in the sample collected from the diesel tank excavation and TPH-d was not analyzed for in the sample collected from the gasoline tank excavation (See Table 1 and Appendix A).

The results of chemical analysis suggest that the 500-gallon "diesel" tank may have contained gasoline during the period of leakage. The tank may have been used for diesel and gasoline storage, but appears to have leaked gasoline.

Elevated concentrations of TPH and BTXE occur in the north and south walls of the gasoline tank excavation and in the south wall of the diesel tank excavation (the soil was not tested from the north wall of the diesel tank excavation). It is probable that all walls of the tank excavations had elevated concentrations of petroleum hydrocarbons.

In September 1990, three borings (MW-1, MW-2 and MW-3) were drilled by PCC to a depth of 20 feet bg adjacent to the site (Figure 2). Soil samples were obtained at depths of 5 and 10 feet bg and analyzed for TPH as gasoline and for BTXE. The concentrations of TPH ranged from less than 2.5 to 150 mg/kg. Concentrations of benzene were from less than 5 to 5,000 ug/kg, toluene from less than 5 to 2,200 ug/kg, ethylbenzene from less than 5 to 3,100 ug/kg and xylenes from less than 5 to 4,900 ug/kg. Upon completion of drilling and soil sampling, 2" schedule 40 PVC monitoring wells were installed in the boreholes. Soil sample data is tabulated in Table 2 and laboratory reports appear as Appendix B. Boring logs are enclosed as Appendix C.

Two weeks after installation, the wells were purged and sampled by Alpha Chemical and Biomedical Laboratories. The samples were analyzed for TPH as gasoline and for BTXE. TPH was detected exclusively in MW-2 at 1.2 mg/l. Benzene was identified in all three wells at concentrations of 1.9 ug/l, 209 ug/l and 5.1 ug/l in MW-1, MW-2 and MW-3, respectively. Sample results are tabulated in Table 3 and appear as Appendix D.

On May 15 and 16, 1991 seven hand augured borings were advanced by Remedial Action Corporation (RAC) to depths ranging from 4.5' bg to 9.5' bg (Appendix E). Fourteen soil samples were collected and analyzed for petroleums, halogenated compounds, and CAM metals (See Table 4 and Appendix F). The maximum TPH-g concentration observed was 97 ppm in boring B103 at 6' bg. The

maximum benzene concentration identified was 1,580 ppb in boring B102 at 6' bg. Composite soil samples from boring B107 identified halogenated compound concentrations below laboratory detection limits. The maximum hexavalent chromium concentration was identified at 17.3 ppm in boring B103 at 6' bg.

In May of 1991, groundwater samples from MW-1, MW-2 and MW-3 were collected by RAC. Results of this sampling episode are displayed in Table 5 and in Appendix G. Maximum dissolved phase petroleum concentrations were observed in monitoring well MW-1 (3.418 mg/l TPH-g). Trichloroethene (TCE) was identified in groundwater monitoring wells MW-1, MW-2, and MW-3 at concentrations of 1.29*, 0.401 and 0.262 mg/l, respectively (*this concentration was recorded as 1.285 ppb in the RAC draft report). Trichloroethane was detected in MW-1 only, at a concentration of 64.3 mg/l. Hexavalent chromium was detected in groundwater in monitoring wells MW-1, MW-2 and MW-3 at concentrations of 0.11 mg/l, 0.26 mg/l and 0.17 mg/l, respectively.

In September and October of 1991, RAC hand augered borings 201 through 224. The boring locations appear on Figure 2, soil sample results are tabulated in Table 6, lab reports appear in Appendix H and boring logs are included as Appendix I. Maximum TPH-g and BTXE levels were observed in boring 208 (TPH-g at 3400 mg/kg and BTXE at 13,000, 80,000 260,000 and 53,000 ug/kg, respectively).

1.3 Historical Site Use

No records of underground storage of hexavalent chromium or TCE were identified in an exhaustive search of site records from the Alameda County Fire Department, the Alameda County Building Department, the ACEHD and the CRWQCB-Region 2. No records of usage of hexavalent chromium nor TCE were identified in a search of records of operations of site occupants. A review of generic radiator storage and distributing operations identified no usage of hexavalent chromium nor TCE as typical for such operations. Subsurface storage on site was solely petroleum fuels.

2. SITE GEOLOGIC CONDITIONS

The Watson Trust site lies on recent alluvial bay muds in the San Francisco Bay area. Site elevation is approximately 12' above mean sea level and the site is less than 1/4 mile east of the San Francisco Bay. Logs of 33 borings drilled in the site vicinity and 11 borings drilled on the ECI site adjacent to and east of the Watson site, identified a comprehensive black clay, clay fill and silty clay zone extending from surface to first subsurface water at approximately 7' bg. The black clay is consistently described as plastic, firm and moist. Please see Figures 3 and 3A, Subsurface Soil Profile On-Site and Subsurface Soil Profile Off-Site.

3. SITE GROUNDWATER CONDITIONS

Groundwater exists in the vicinity of the site at a depth of approximately 7' bg (ECI Facility) and underlays the site at 6.5' to 8' bg. Groundwater pumping wells in the area reportedly utilize water from a depth of 250' bg (CRWQCB, 1991). Area groundwater is reported to flow at a rate of 2' to 123' per year (WCC, 1981) in a west to southwesterly direction as determined by on site and adjacent site (ECI) investigations.

4. HEXAVALENT CHROMIUM AND CHROMIUM CONTAMINATION

Total chromium including hexavalent chromium contamination has migrated from the upgradient area of chromium contamination identified in groundwater underlaying the ECI facility in 1981 by Woodward Clyde Consultants. In 1981 testing performed by Woodward-Clyde identified the following "chromium contaminated groundwater exists in significant volume within the sand and gravel layer" (WCC, 1981) underlaying the subject (ECI) site.

Hexavalent chromium contamination identified in groundwater in 1981 for ECI by Woodward Clyde Consultants, at the ECI chromium waste pit (MW-11) and 180' west of the waste pit (MW-13), at 135 ppm and 325 ppm, respectively, appears to have migrated onto the Watson Trust site via the westerly flowing subsurface groundwater. Analysis of groundwater collected from groundwater monitoring wells MW-9, MW-10, MW-11, MW-12 and MW-13 in 1981 by Woodward Clyde Consultants identified the following:

WELL NUMBER	HEXAVALENT CHROMIUM (mg/l)
MW-9	185
MW-10	14
MW-11	135
MW-12	12
MW-13	325

Analysis of groundwater collected from monitoring wells MW-1 and MW-2, immediately upgradient of the Watson Trust site, and from monitoring well MW-3, downgradient of the Watson Trust site, by RAC in 1991, identified total chromium levels attenuating significantly from the off site, upgradient wells to the off site, downgradient wells. Attenuation was not exhibited by hexavalent chromium levels identified at 0.11, 0.26 and 0.17 ppm in MW-1, MW-2 and MW-3, respectively in 1991 indicating site wide (Watson Trust) contamination resulting from the much more mobile hexavalent chromium component of the total chromium toxicants. Total chromium contamination identified in the groundwater approximately 20' east of the Watson Trust site (in MW-1 and MW-2) was identified at 349 and 353 ppm, respectively. Total chromium contamination identified in the groundwater immediately west of the site (in MW-3) was 47.6 ppm, indicating 85% attenuation of total chromium as measured from the off site, upgradient to the off site, downgradient wells.

Comparison of data obtained in 1981 at the ECI site and in 1991 upgradient and immediately downgradient of the Watson Trust site identifies a significant area of chromium contamination in groundwater. This area of chromium contamination has increased significantly in size and concentration between the two test periods.

5. TRICHLOROETHENE (TCE), TETRACHLOROETHENE (PCE) AND TRICHLOROETHANE (TCA) CONTAMINATION

Chlorinated solvents are reported by the CRWQCB to have been identified in the chromium plume detected in the groundwater upgradient direction, beneath the ECI property (Source: Site Characterization Report, RAC, August 2, 1991, p. 15). Groundwater samples collected from monitoring wells on the ECI property "have been shown to contain concentrations of trichloroethylene as high as 1200 parts per billion" (CRWQCB - Region 2, April 8, 1986). According to the CRWQCB - Region 2, soil and groundwater beneath the ECI property is contaminated with trichloroethene (TCE), tetrachloroethene (PCE) and trichloroethane (TCA) (Appendix J). This solvent contamination has since migrated westerly

as identified in RAC groundwater sampling results in 1991. TCE concentrations were 1.29, 0.401 and 0.262 mg/l in MW-1, MW-2 and MW-3, respectively, representing 78% attenuation across the site to the downgradient monitoring well, MW-3.

6. TPH AND BENZENE CONTAMINATION

TPH and benzene are the constituents used to track the petroleum hydrocarbon plume at the subject site. TPH and benzene concentrations greater than detectable levels in shallow subsurface soil in the vicinity of the removed underground tanks were identified in an isolated area defined by RAC borings 209, 220 and 221. TPH and benzene levels identified at 2' bg in each boring are as follows:

Boring #	TPH (ppm)	Benzene (ppb)
209	1.8	99
220	10	210
221	1.3	79

The total area of impacted shallow soil is less than 1000 square feet.

TPH and benzene concentrations identified in soil immediately above first water (capillary fringe) at 6' bg, are confined to that isolated area described by borings 207, 208, 209 and 221. TPH and benzene levels identified at 6' below grade in each boring are as follows:

Boring #	TPH (ppm)	Benzene (ppb)
207	3.8	150
208	3,400	13,000
209	1,900	10,000
221	ND	83

The total area of impacted soil at 6' bg is less than 1500 square feet. Please see Figures 4 and 4A.

Groundwater analyses for TPH-g and benzene were conducted by RAC in May 1991 in wells MW-1, MW-2 and MW-3 located in both the upgradient (MW-1 and MW-2) and downgradient (MW-3) directions. TPH-g levels were 3.42, 0.11 and ND ppm, respectively and benzene was identified at 1450, 11.2 and 2.7 ppb, respectively. The results indicate 100% attenuation of TPH-g and 99.8% attenuation of benzene across the site from the upgradient to the downgradient monitoring wells.

7. RELATIVE RATES OF BIODEGRADATION

Petroleum contaminants, as identified by the Region 2 of the California Regional Water Quality Control Board Non-Attainment provisions, are "subject to natural attenuation mechanisms" (Appendix K). Halogenated hydrocarbons and metals, however, are not readily subjected to a natural attenuation mechanism. The gasoline constituent, benzene (C_6H_6), exists as an aromatic ring structure of alternating double and single carbon-carbon bonds. This structure allows benzene to delocalize an induced charge when a hydrogen atom is removed. The ring remains stable enough to undergo an oxidation reaction for biodegradation. The environmental aerobic degradation half-life of benzene in groundwater is

approximately 240 hours as published in The Handbook of Environmental Degradation Rates.

Halogenated hydrocarbons (TCE) and metals (chromium) were identified at high levels upgradient of the Watson Trust site and in attenuated concentrations beneath the Watson site. TCE is a molecule which contains three chlorine (Cl) atoms that act as a shielding agent to the central carbon- carbon double bond. A considerable amount of activation energy is required to excite Cl. The excited state of Cl makes it vulnerable to substitution reactions which degrades the carbon-carbon double bond to a single bond and allows further degradation of the molecule. The environmental degradation half-life rate for TCE in groundwater ranges from 7704 hours (10.7 months) to 39672 hours (4.5 years), depending on the degradation mechanism.

Chromium exists as an element, which is the simplest form of any substance (its pure atomic state). Elements are not degraded but are assimilated and/or compounded. Hexavalent chromium [Cr (VI) or Cr^{+6}] forms chromates and dichromates, which are toxic, mutagenic and soluble over a wide pH range. Hexavalent chromium is a highly positively charged metal. This high positive charge attracts water molecules by an induced dipole. Water molecules accumulate and surround hexavalent chromium until the positive charge is neutralized. This allows Cr^{+6} to be in an aqueous phase and highly mobile in groundwater. Hexavalent chromium, like many other metals, is resistant to biodegradation. Degradation of Cr(VI) to the less toxic, trivalent chromium (Cr(III)) can occur by addition of other chemicals (Fe^{+2}) or electrochemical mechanisms (pH > 5).

TPH and benzene concentrations in soil and groundwater will be subject to physical, chemical and biological processes which act to continually dilute, disperse and degrade the contaminants which are more susceptible to these processes than chlorinated or chromium compounds. Since drinking water is extracted from much deeper aquifers in the area of the subject site, approximately 250' bg, the low density petroleum and aromatic compounds will remain hydraulically insulated from the deeper aquifers and will attenuate naturally. The dense chlorinated solvents and chromiums will not biodegrade efficiently and will communicate vertically through the shallower groundwater into deeper aquifers. It is also concluded that limited residual petroleums in groundwater, isolated to the north eastern area of the site, will attenuate naturally as a function of available oxygen within that time period necessary for remediation of the hexavalent chromium and solvents sourced off-site at the groundwater upgradient ECI facility.

8. SCOPE OF WORK

It is concluded that hexavalent chromium, TCE, TCA and other solvents and acids, which appeared to have been stored without permit and were discharged directly onto the soil without permit at the ECI facility, bordering the Watson Trust site in the groundwater upgradient direction, have likely resulted in the contamination of the shallow groundwater and soil underlying the Watson Trust site. (Alameda County Health Care Services, Notices of Violation against ECI, December 24, 1987, November 13, 1982. Appendix J).

As the petroleum contamination in both the soil and groundwater is primarily confined to an isolated area on site and is of low level concentration off-site, it is proposed that remediation be accomplished according to the non-attainment area provision of the CRWQCB-Region 2 based upon the following:

7. 1) There is little likelihood that best available technology will be sufficient to remove existing chromium and solvent contamination resulting from upgradient leakage.

2) The comprehensive subsurface clays and silts are very low yielding sediments which cannot be effectively treated by soil vapor extraction. The presence of a cement warehouse above the contaminated zone precludes excavation.

3) The petroleum contaminant plume in groundwater underlying the site is of limited extent, and confined mostly to the site with low-level concentrations identified in the immediate off-site monitoring wells.

4) In situ natural biodegradation of the petroleums will occur efficiently as a function of available oxygen in groundwater.

5) Existing chromium and solvent contamination have limited the usability and quality of the groundwater.

6) Testing has adequately identified the lateral extent of the petroleum contamination in soil as limited primarily to the Watson Trust site and an isolated area off site delineated by soil borings 220, 221, and 222.

7) Pump tests at adjacent sites (ECI) and EPA guidelines for application of vapor extraction and pump and treat technologies have identified that such systems are ineffective for removal of petroleum residuals from soils with high clay or organic content. (See Appendix L).

8) The source of the petroleum contamination has been eliminated by removal of all underground storage tank and piping systems on site.

9) Cleanup of the exclusive dissolved and adsorbed phase petroleums will not be cost effective as identified in (7) above.

10) A plan for containment by monitoring of peripheral groundwater monitoring wells is presented in Section 8.1 in this proposal.

8.1 Groundwater Sampling

BEI will perform a quarterly groundwater monitoring program on groundwater monitoring wells MW-6 located approximately 200' downgradient of MW-3 and MW-1 through MW-3 for a period of two years following receipt of written approval of this plan acknowledging the Watson Trust as contributor of exclusively petroleum contamination and not halogenated volatile organics or hexavalent chromium. After successful completion of this monitoring, BEI will request site closure and no further action to be identified in a letter from the CRWQCB-Region 2. General steps of the groundwater sampling protocol for groundwater monitoring wells MW-6 and MW-1 through MW-3 are summarized as follows:

1. Measure water levels.
2. Purge the well and determine groundwater parameters.
3. Collect one equipment blank.
4. Withdraw the samples and one duplicate sample.
5. Preserve sample water as necessary.
6. Store samples for transport.
7. Analyze samples by EPA methods 8015-M for gas and 8020 for volatile aromatics with minimum detection limits 0.05 ppm (8015) and 0.5 ppb (8020).
8. Identify dissolved oxygen content in each sample.

9. Submit a quarterly groundwater monitoring report containing the results of the quarterly sampling event to the CRWQCB.
10. Sample purge and development water for solvents and metals and properly dispose of this water.

Well Purging - Water standing in a well for several days or longer, prior to sampling, may not be representative of in-situ or formation water. This "stagnant" water may be affected by:

- Oxidation-reduction conditions of water in the well being different from those in the formation.
- Volatilization occurring in the standing water.
- Slow reactions between the well materials and the water, accentuating parameters of interest.

As a result, the standing water must be purged or evacuated from the well to allow complete replacement by fresh formation water.

The volume of water that must be removed from each well to obtain a representative sample will be determined by continuous monitoring of the groundwater parameters, including pH, specific conductivity and temperature. The point at which the purging process is considered adequate will be demonstrated by a stabilization of these parameters. This will be accomplished by periodically checking the parameter values as each well is pumped. It is expected that the values will change significantly during the course of three sets of measurements.

8.2 Analytical Methods and Quality Assurance

A California Department of Health Services certified laboratory will conduct all chemical analysis of site samples. The chosen laboratory will maintain strict conformance to EPA standard methodologies, quality assurance/quality control (QA/QC) protocols and standard laboratory practices supporting EPA procedures.

9. FIELD DOCUMENTATION AND CHAIN-OF-CUSTODY

The following sections describe the recording system for documenting all site field activities and the sample Chain-of-Custody Program.

9.1 Field Log Book

An accurate chronological recording of all field activities is vital to the documentation of any environmental investigation. To accomplish this, bound and numbered field log books will be maintained by the field team to provide a daily record of significant events, observations, deviations from the Corrective Action Plan and measurements collected during the field activities. The Blakely Environmental On Site Supervisors will determine the necessity for any deviations from this plan. The records will contain sufficient information so that the work activities can be reconstructed without relying on the collector's memory. All entries will be signed, dated and made with waterproof ink. Corrections to the log book will be made by drawing one line through the error, initialing and dating. The log book

will always be stored in a secure location.

9.2 Chain-of-Custody

The objective of the Chain-of-Custody Program is to allow the tracking of possession and handling of individual samples from the time of field collection through laboratory analysis. Once a sample is collected, it becomes part of the Chain-of-Custody process. A sample is "in custody" when (1) it is in someone's possession; (2) it is within visual proximity of that person; (3) it is in that persons possession, but locked up and sealed (e.g. during transport); or (4) it is in a designated secure sample storage area.

9.2.1 Chain-of-Custody Form

Chain-of-Custody records establish the documentation necessary to trace sample possession from the time of collection to analysis. A serialized Chain-of-Custody will be completed and will accompany each batch of samples. The record will contain the following information.

- Project name and number;
- Names of sampling team members;
- Laboratory destination;
- Sample number;
- Sample location and description;
- Date and time collected;
- Sample type;
- Container type;
- Special instructions;
- Signatures of persons involved in the chain-of-possession.

When sample custody is transferred to another individual, the samples must be relinquished by the present custodian and received by the new custodian. This will be recorded at the bottom of the Chain-of-Custody form where the persons involved will sign, date and note the time of transfer. During field operations, each project manager will act as the custodian for the samples he or she collects. Samples will not be left unattended unless placed, along with the Chain-of-Custody form, in a secure container.

The Chain-of-Custody form is a multi-part form that allows the record to be kept in duplicate. One copy will accompany the sample shipment to the laboratory and one copy will be kept with the field log book. All documents that accompany shipments will be enclosed in zip-lock bag and taped to the inside top cover of the shipping container.

Chain-of-Custody form provide official communication to the laboratory by listing the particular analysis required for each sample. This also furnishes further evidence that the Chain-of-Custody is complete.

9.2.2 Sample Identification

Sample labels prevent the misidentification of samples. Following sample collection, labels will be affixed to each sample container. Labels will record the following type of information.

- Project name and number;
- Sample identification number;
- Name and sample collector;
- Date and time of collection;
- Analytical parameters;
- Pertinent comments;

Labels will be sufficiently durable to remain legible even when wet.

10. HEALTH AND SAFETY PLAN

The purpose of the project Health and Safety Plan (HASP) is to provide guidelines and procedures to ensure the health and physical safety of people working at the Watson Trust property. The goal of the HASP is to provide precautionary and responsive measures for the protection of on-site personnel, the general public and the environmental. A HASP is included as Appendix M.

11. DOCUMENTS REVIEWED

1. Notification by the California Regional Water Quality Control Board that the Electro Coatings facility is the probable source of chromium and volatile organic (TCE, possible TCA) contamination, California Regional Water Quality Control Board, San Francisco Bay Region (Region 2), April 8, 1986, Donald Dalke, Chief Toxics Cleanup Division, File #2199.9075 (Appendix J).

2. Site Information Summary, California Department of Health Services (DHS),Disposalofchromic acid plating wastes into an on-site shallow disposal well between 1964 and 1965 (Appendix J).

3. Notice of Violation, ECI, Alameda County Health Care Services, Hazardous Waste Treatment on-site and storage in excess of 90 days at the ECI facility, Nov. 1987 (Appendix J).

4. Notice of Violation, ECI, Alameda County Health Care Services, discharge and surficial accumulation of puddled chromium and liquid waste at the ECI facility, December 24, 1987 (Appendix J).

5. Groundwater Investigation, Electro Coating Industries, Woodward-Clyde Consultants, 1981.

6. Site Characterization, Electro Coating Industries, Kleinfelder & Associates, November 1983.

7. Site Characterization, Watson Trust site, 1461 Park Avenue, Emeryville, Remedial Action Corporation (RAC), August 2, 1991.

8. Additional Site Characterization, Watson Trust Site, RAC, December 16, 1991.

9. Implementation of Non-Attainment areas, San Francisco Bay Region of the CRWQCB (Appendix K).

10. Policies and procedures for investigation and cleanup and abatement of discharges under Water Code Section 13304, State Water Resources Control Board, January 18, 1995 as amended April 21, 1994.

11. Quantitative Risk Management of Hazardous Waste Sites, Paul Hadley, California Department of Toxic Substances Control and Richard M. Sedmen, Oregon Department of Environmental Quality, December 1993.

12. Restoring Contaminated Groundwater: An Achievable Goal: Jacqueline MacDonald, Michael Kavanaugh, Environmental Science and Technology, Vol. 28, Nov. 8, 1994, pages 362-368.

13. Handbook of Environmental Degradation Rates, Howard et al. 1991, Lewis Publishers.

14. Geotechnical Practice for Waste Disposal, D. Daniels, 1993, Chapman & Hall.

15. Site Usage Review, The Watson Trust Site, 1461 Park Ave, Emeryville, Blakely Environmental, Inc., October 1994.

TABLES

TABLE 1
SUMMARY OF LABORATORY ANALYSIS
SAMPLES COLLECTED FROM TANK EXCAVATIONS BY PCC - MARCH 1990

Sample I.D.	Sample Matrix	TPH-g mg/kg	TPH-d mg/kg	Benzene ug/kg	Toluene ug/kg	Xylene ug/kg	Ethylbenzene ug/kg
South Wall Diesel Tank Pit	Soil	1580	ND	17.3	2600	100,400	481
South Wall Gas Tank Pit	Soil	460	ND	1600	9140	32,300	5080
North Wall Gas Tank Pit	Soil	62.3	NA	9.8	207	947	32.9
Diesel Tank Pit	Water	110,000	ND	5240	7040	15,000	2420
Gas Tank Pit	Water	38,100	NA	2750	2840	5890	1160

ND: **Not Detected**
NA: **Not Analyzed**

TABLE 2
SUMMARY OF SOIL SAMPLE ANALYSIS
SAMPLES COLLECTED FROM BORINGS MW-1 THROUGH MW-3 BY PCC-OCT. 1990

Sample ID	TPH-g mg/kg	Benzene ug/kg	Toluene ug/kg	Xylene ug/kg	Ethylbenzene ug/kg
MW-1 @ 5'	150	5000	2200	3100	4900
MW-1 @ 10'	ND	93	ND	ND	ND
MW-2 @ 5'	ND	14	ND	ND	ND
MW-2 @ 10'	ND	35	ND	ND	ND
MW-3 @ 5'	ND	5.1	ND	ND	ND
MW-3 @ 10'	ND	ND	ND	ND	ND

ND: Not Detected

TABLE 3
SUMMARY OF LABORATORY ANALYSIS
GROUNDWATER SAMPLES COLLECTED FROM MW-1 THROUGH MW-3 BY PCC - OCT. 1990

Sample I.D.	TPH-g mg/l	Benzene ug/l	Toluene ug/l	Ethylbenzene ug/l	Xylene ug/l
MW-1	~~ND~~	1.9	1.1	ND	3.3
MW-2	1,200	209	33.7	5.4	128
MW-3	~~ND~~	5.1	ND	ND	ND

ND: Not Detected

TABLE 4
SUMMARY OF LABORATORY AI
HAND AUGERED SOIL BORINGS ADVANCEI

Location		B101	B101	B102	B102	B103	B103
Sample Number		101.4.1	101.6.1	102.2.1	102.6.1	103.2.1	103.6.1
TPH EPA 8015 Modified (mg/kg)		2.5	41	6.6	83.9	3.5	97
Benzene EPA 8020 (mg/kg)		0.26	0.46	0.83	1.58	0.68	0.35
Ethylbenzene EPA 8020 (mg/kg)		0.26	1.83	0.51	3.99	0.18	< 0.07
Toluene EPA 8020 (mg/kg)		0.08	1.81	0.71	5.25	0.72	< 0.07
Xylene EPA 8020 (mg/kg)		0.47	8.39	3.17	18.3	1.20	< 0.14
	Antimony	NA	NA	NA	NA	NA	NA
	Arsenic	NA	NA	NA	NA	NA	NA
	Barium	NA	NA	NA	NA	NA	NA
	Beryllium	NA	NA	NA	NA	NA	NA
	Cadmium	NA	NA	NA	NA	NA	NA
CAM	Chromium-Total	NA	26	NA	106	NA	113
Metals	Chromium-Hexavelant	NA	< 2.5	NA	< 2.5	NA	17.3
EPA	Cobalt	NA	NA	NA	NA	NA	NA
3950 & 7196	Copper	NA	NA	NA	NA	NA	NA
	Lead Total	NA	NA	NA	NA	NA	NA
	Mercury	NA	NA	NA	NA	NA	NA
	Molybdenum	NA	NA	NA	NA	NA	NA
	Nickel	NA	NA	NA	NA	NA	NA
	Selenium	NA	NA	NA	NA	NA	NA
	Silver	NA	NA	NA	NA	NA	NA
	Thallium	NA	NA	NA	NA	NA	NA
	Vanadium	NA	NA	NA	NA	NA	NA
	Zinc	NA	NA	NA	NA	NA	NA

NOTE: **NA = NO ANALYSIS**
FOR SAMPLE LOCATION SEE FIGURE 2

RESULTS OF LABORA
GROUNDWATER SAMPLI

DESCRIPTION		GROUNDWATER MONITORI		
Location		**MW-1**	**MW-1**	**MW-1**
Sample Number		1.0.1	1.C.1	1.M.1
TPH EPA 8015 Modified ug/l		3418	NA	NA
Benzene EPA 8020 ug/l		1454	NA	NA
Ethylbenzene EPA 8020 ug/l		9.4	NA	NA
Toluene EPA 8020 ug/l		273	NA	NA
Xylene EPA 8020 ug/l		599	NA	NA
	Antimony	NA	NA	1.66
	Arsenic	NA	NA	<0.003
	Barium	NA	NA	0.12
	Beryllium	NA	NA	<0.02
	Cadium	NA	NA	<0.01
CAM	Chromium-Total	NA	NA	349
Metals	Chromium-Hexavalent	NA	0.11	NA
EPA	Cobalt	NA	NA	<0.5
3050 & 7196	Copper	NA	NA	<0.02
(mg/l)	Lead-Total	NA	NA	<0.05
	Mercury	NA	NA	<0.0005
	Molybdenum	NA	NA	<0.05
	Nickel	NA	NA	0.06
	Selenium	NA	NA	<0.01
	Silver	NA	NA	<0.02
	Thallium	NA	NA	<0.04
	Vanadium	NA	NA	<0.5
	Zinc	NA	NA	0.03

NOTE: **NA = NO ANALYSES**
FOR MONITORING WELL LOCATIONS SEE FIGUR

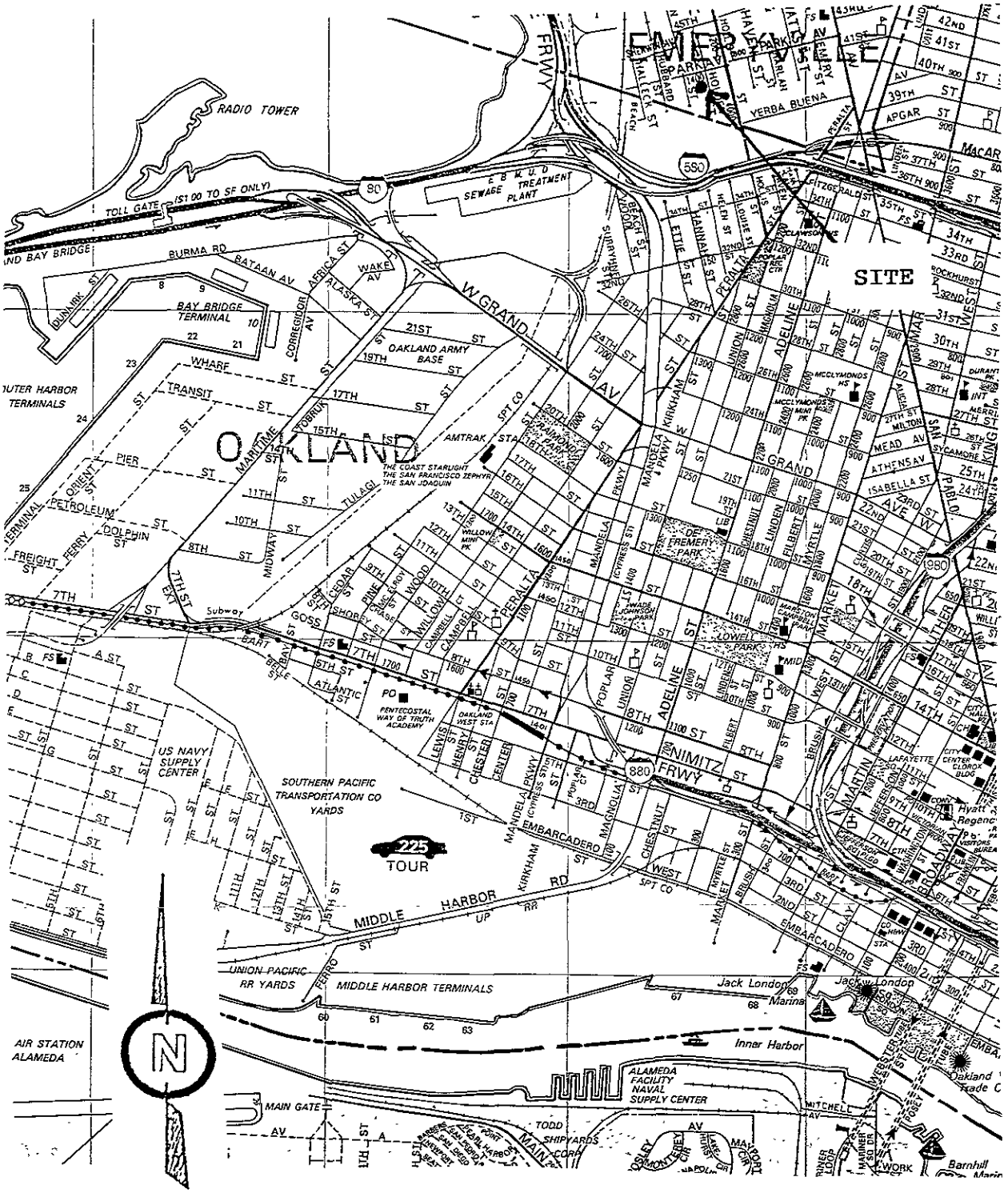
TABLE 6
SUMMARY OF LABORATORY AN
HAND AUGERED SOIL BORINGS ADVANCED BY RAC IN S

Boring	Sample Depth (ft)	TPH (mg/kg)	Benzene (ug/kg)	Toluene (u
201	2	NA	NA	NA
201	6	NA	NA	NA
202	2	NA	NA	NA
203	2	NA	NA	NA
204	2	NA	NA	NA
205	2	NA	NA	NA
206	2	NA	NA	NA
207	2	ND	ND	ND
207	6	3.8	150	210
208	2	NA	NA	NA
208	6	3400	13000	80000
209	2	1.8	99	3.1
209	6	1900	10000	50000
210	2	NA	NA	NA
210	6	NA	NA	NA
212	2	NA	NA	NA
212	6	NA	NA	NA
213	2	NA	NA	NA
213	6	ND	ND	ND
214	2	NA	NA	NA
214	6	ND	ND	ND
215	2	ND	ND	ND
215	6	ND	ND	ND
216	2	NA	NA	NA
217	2	ND	ND	ND
217	6	ND	ND	ND
218	2	NA	NA	NA
218	6	NA	NA	NA
219	2	NA	NA	NA
219	6	ND	ND	ND
220	2	10	210	ND
220	6	ND	ND	ND
221	2	1.3	79	ND
221	6	ND	83	ND
222	2	ND	NA	NA
222	3.5	NA	41	5.2
224	2	NA	NA	NA
224	6	ND	ND	ND

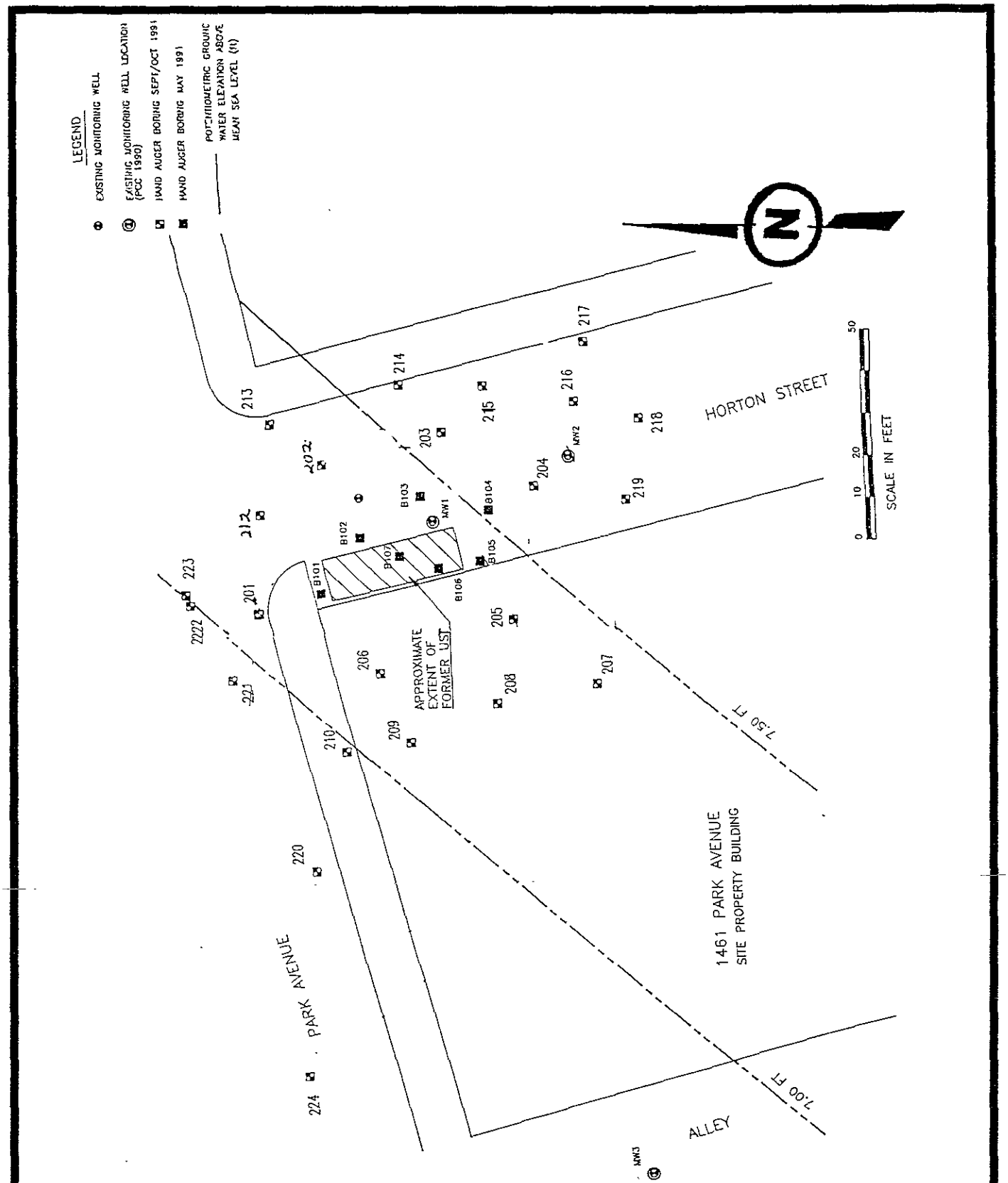
NA = NOT ANALYZED

ND = NOT DETECTED

FIGURES

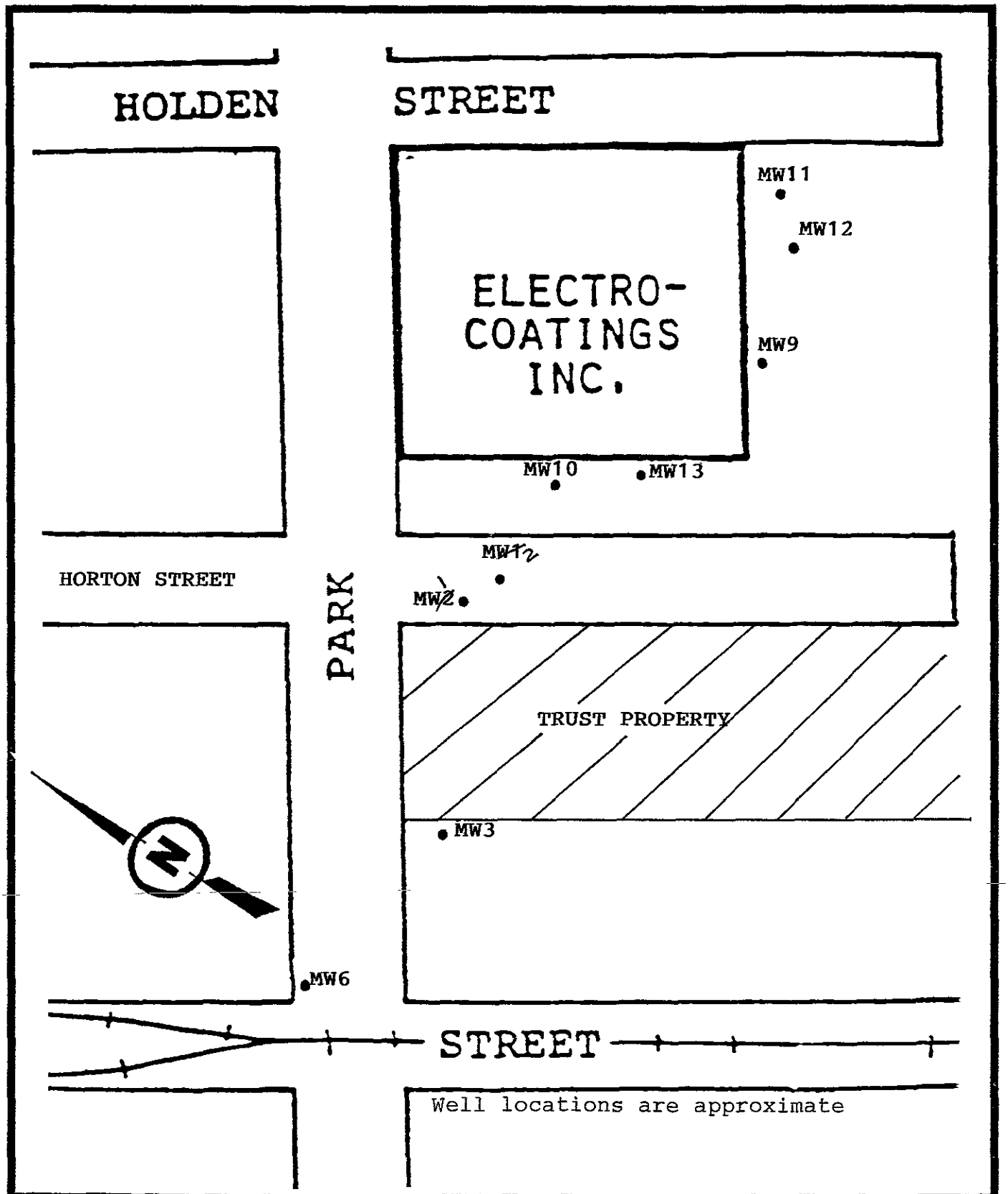


Blakely Environmental Inc. 320 S. Milliken Ave.Suite A Ontario, CA 91761	**Site Location Map** Watson Trust 1461 Park Ave. Emeryville, California	FIGURE: 1 February 1995



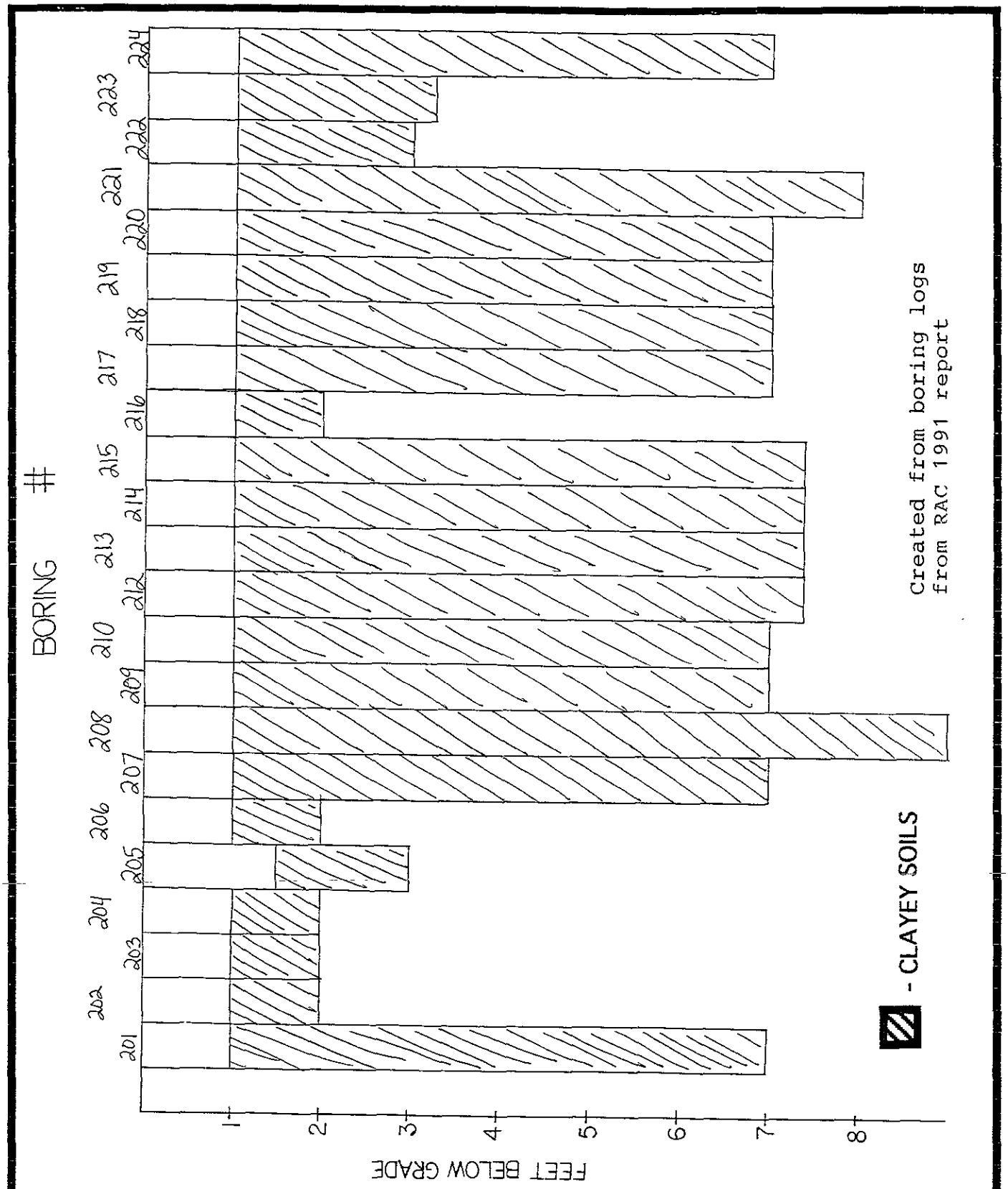
Blakely Environmental Inc. 320 S. Milliken Ave.Suite A Ontario, CA 91761	**Site Layout Map** Watson Trust 1461 Park Avenue Emeryville, California	FIGURE: 2 March 1995

Map from RAC report



Blakely Environmental Inc. 320 S. Milliken Ave.Suite A Ontario, CA 91761	**Offsite Well Locations** Watson Trust 1461 Park Avenue Emeryville, California	FIGURE: 2A March 1995

Map from J.H. Kleinfelder & Assoc.



Blakely Environmental Inc. 320 S. Milliken Ave.Suite A Ontario, CA 91761	**Generalized Soil Profile - On Site** Watson Trust 1461 Park Avenue Emeryville, California	FIGURE: 3 February 1995

Blakely Environmental Inc.
320 S. Milliken Ave.Suite A
Ontario, CA 91761

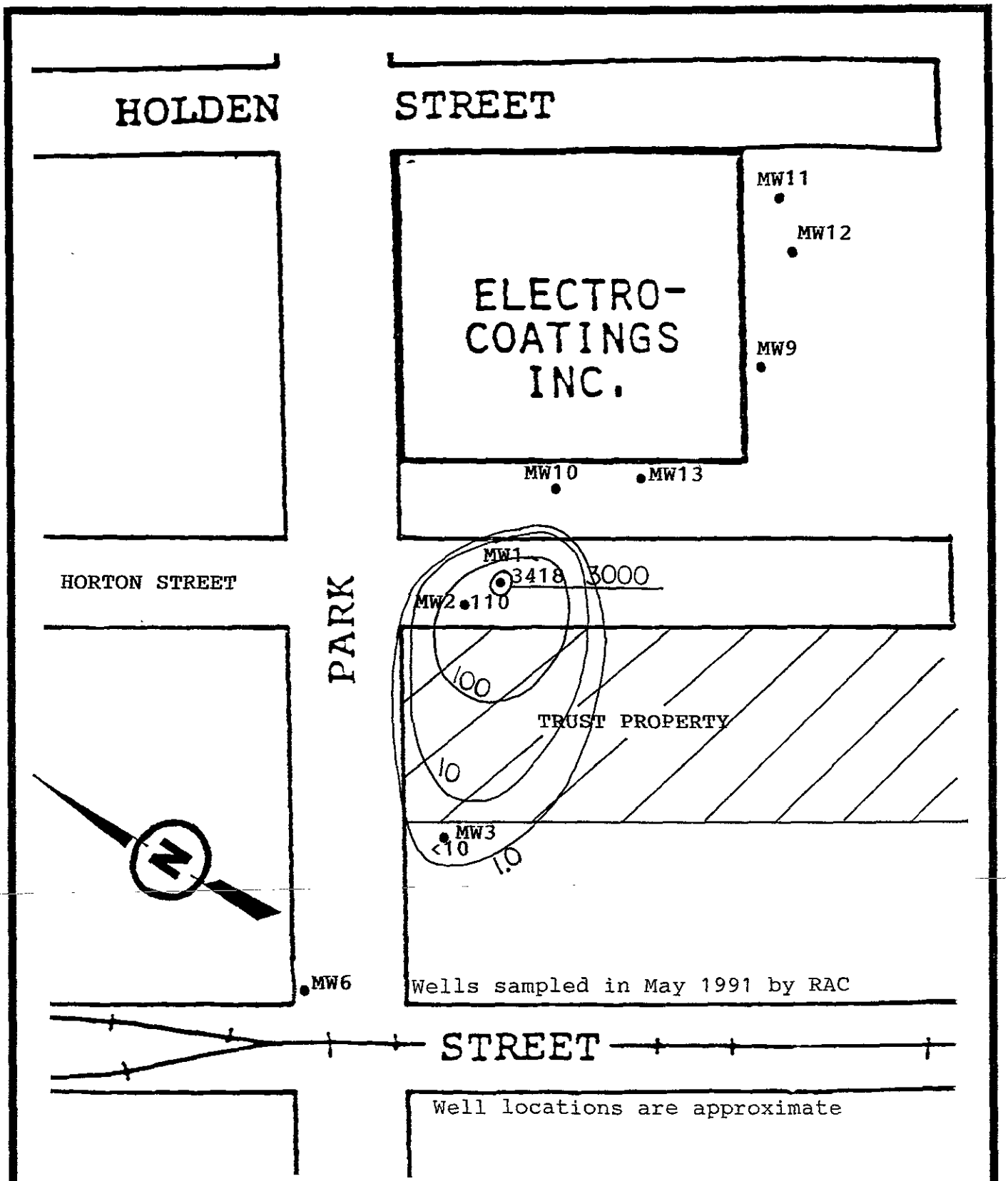
Generalized Soil Profile - Off Site
Watson Trust
1461 Park Avenue
Emeryville, California

FIGURE:3A

February 1995

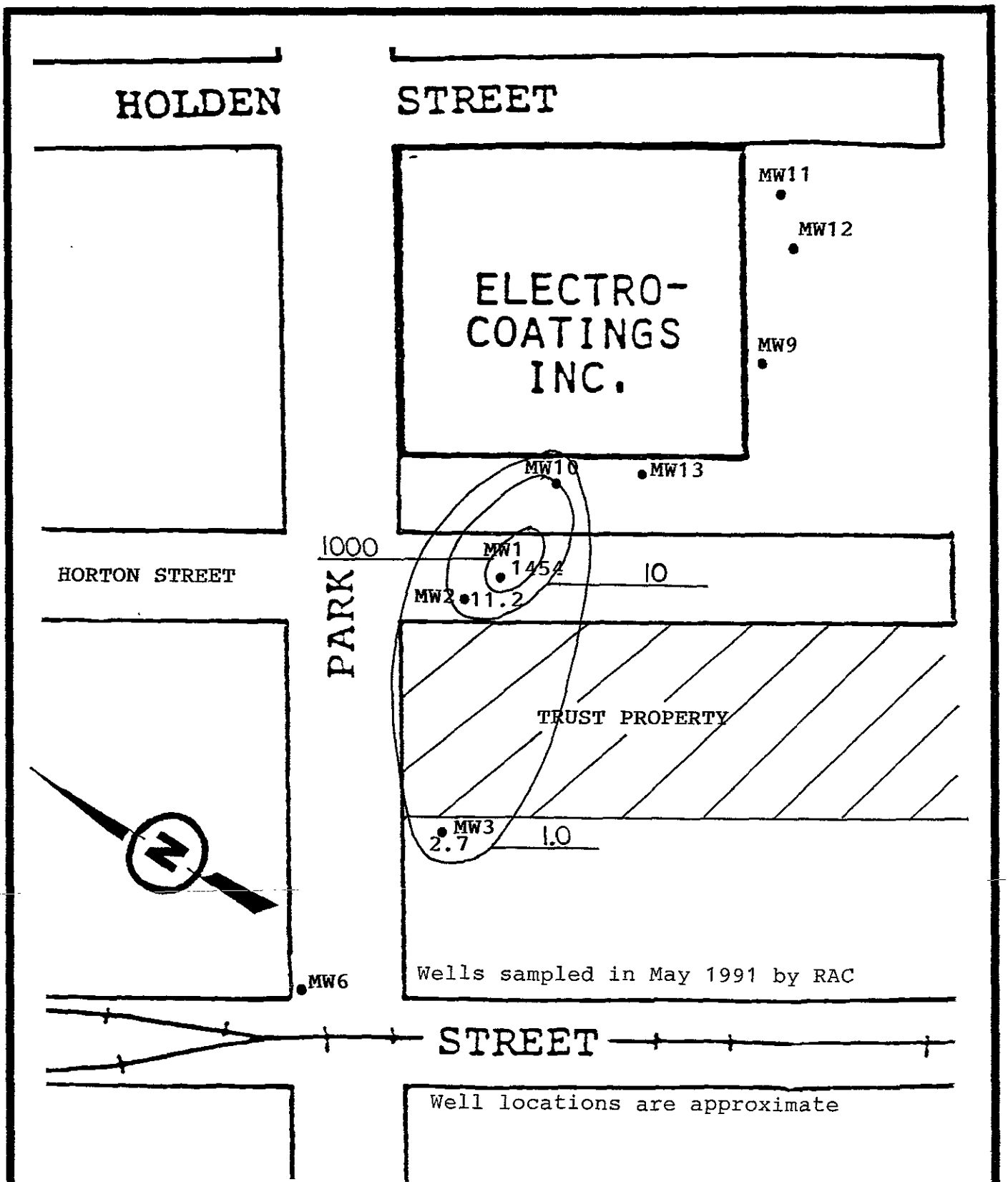
Generalized soil profile determined via 11 groundwater monitoring wells at the Electro Coatings property located east of the Watson Trust

Adapted from report by Woodward-Clyde Consultants, 1981



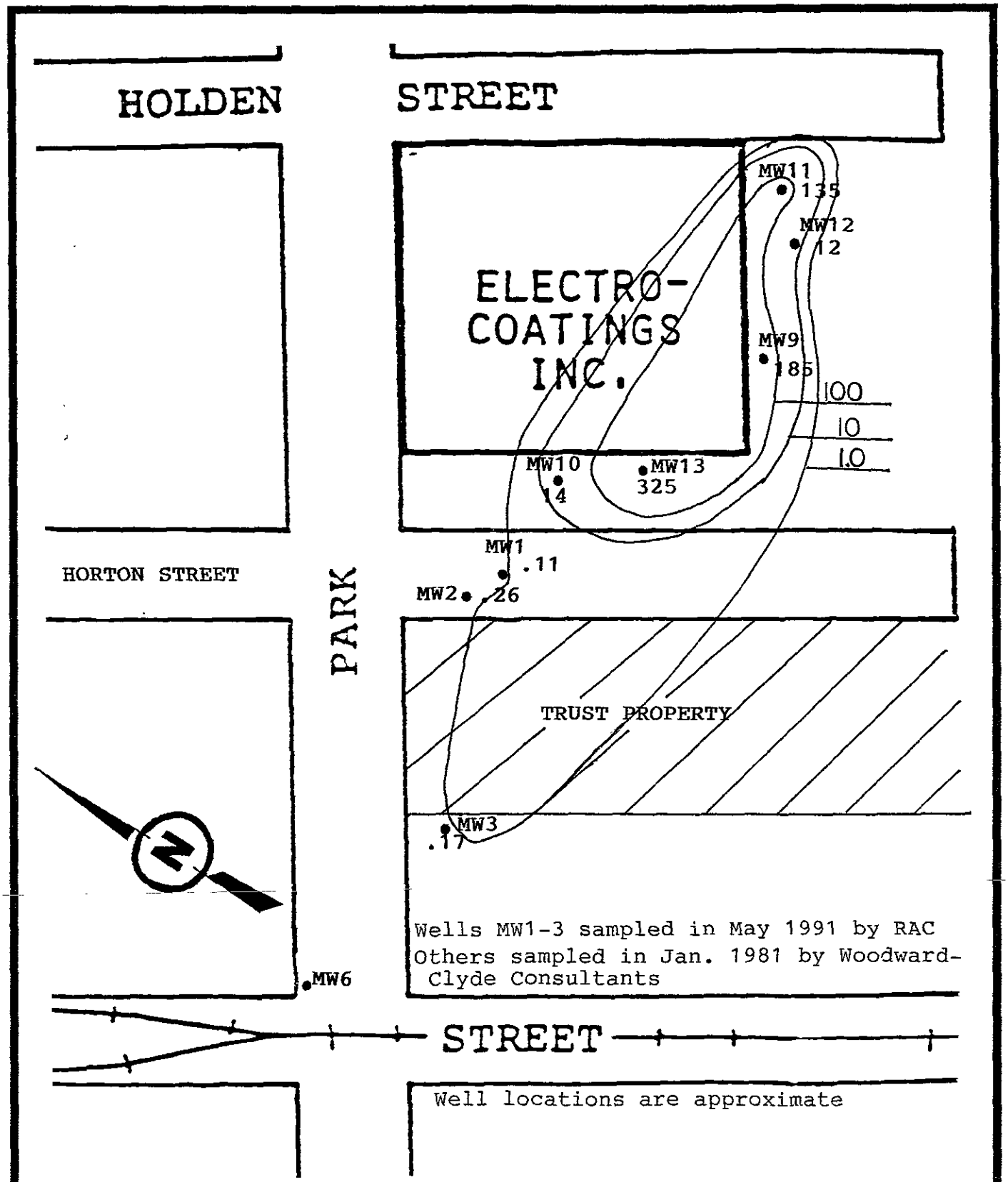
Blakely Environmental Inc. 320 S. Milliken Ave.Suite A Ontario, CA 91761	**TPH -g Isoconcentration Diagram (ppB)** Watson Trust 1461 Park Avenue Emeryville, California	FIGURE: 4 March 1995

Map from J.H. Kleinfelder & Assoc.



Blakely Environmental Inc. 320 S. Milliken Ave.Suite A Ontario, CA 91761	**Benzene Isoconcentration Diagram (ppB)** Watson Trust 1461 Park Avenue Emeryville, California	FIGURE: 4A March 1995

Map from J. H. Kleinfelder & Assoc.



Blakely Environmental Inc. 320 S. Milliken Ave.Suite A Ontario, CA 91761	**Chromium (+6) Isoconcentration Diagram** (ppM) Watson Trust 1461 Park Avenue Emeryville, California	FIGURE: 5 March 1995

Map from J.H. Kleinfelder & Assoc.

APPENDICES

APPENDIX A

ALPHA CHEMICAL & BIOMEDICAL LABORATORIES

Joe E. Hodgkins, Ph.D.
Director

March 28, 1990

Property Contamination Control, Inc.
Attn: Ron Richmond
2220 Livingston Street / Suite 208
Oakland, CA. 94606

REPORT
TOTAL PETROLEUM HYDROCARBONS AS GASOLINE/DIESEL/BTXE
pH/ORGANIC LEAD
RE: WESTERN BRAKE BUILDING, EMERYVILLE

Sample Identification:

Location	:	Western Brake , 1461 Park Ave., Emeryville. See map.
ACBL Sample # 8340	:	# 1, soil, diesel tank excavation pit. Taken from the south wall of the pit, 6' form SW corner. Depth = 5', 1' above water level.
# 8341	:	# 2, water, taken from diesel tank excavation pit.
# 8342	:	# 3, soil, gas tank excavation pit. Taken from south wall of pit in the SE corner. Depth = 4', 1' above water level.
# 8343	:	# 4, soil, gas tank excavation pit. Taken from north wall of pit, 3' from NW corner. Depth = 4', 1' above water level.
# 8344	:	# 5 water, taken from gas tank excavation pit.
# 8345	:	Travel Blank.
Date sampled	:	3/14/90, 2:00 to 4:00 pm by Scott Forbes, ACBL chemist.
Received in Lab	:	3/14/90, 5:30 pm.

Results:

	# 8344	Detection Limit
Benzene	2750 ug/L	.3 ug/L
Toluene	2840 ug/L	.3 ug/L
Xylenes	5890 ug/L	.6 ug/L
Ethylbenzene	1160 ug/L	.3 ug/L
Total Petroleum Hydrocarbons, as gasoline	38100 ug/L	50 ug/L
pH	6.85	

Joe E. Hodgkins, Ph.D., C.T.
Laboratory Director

Enclosures (Chain of Custody, Map)

CHAIN OF CUSTODY RECORD

ALPHA CHEMICAL & BIOMEDICAL LABORATORIES

CLIENT
NAME: Ron Richmond
ADDRESS: 2220 Livingston St., Suite 208
Oakland, CA. 94606
PHONE:

PROJECT: Western Brake Building
SAMPLER (signature): Scott Forbes

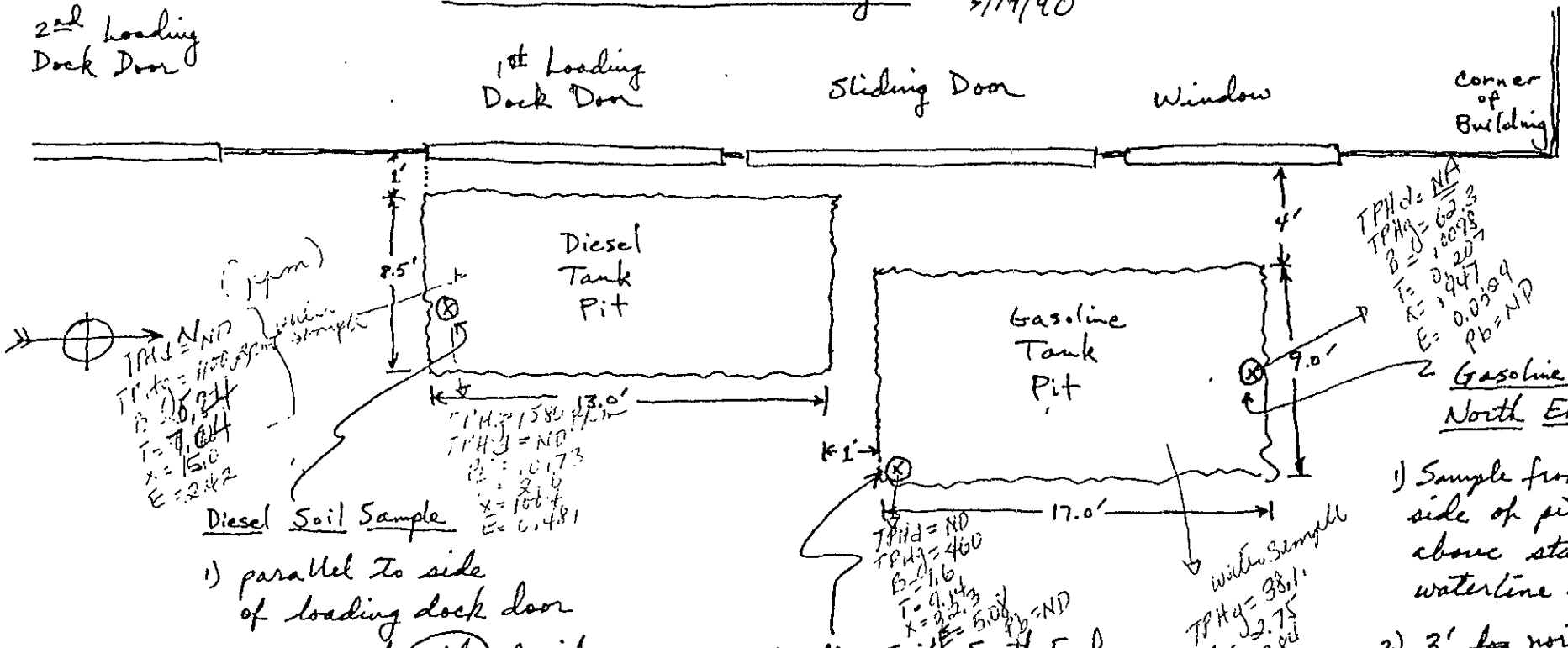
ACBL SAMPLE NO.	COLLECTED Date/Time	SAMPLE IDENTIFICATION	NO. of Containers	TPH-Gas	TPH-Diesel	BTXE	Organic Lead	pH	REMARKS / SAMPLE CONDITION ON RECEIPT
8340	3/14/90 2:00	1) Diesel Tank - South end - Soil	2	X	X	X			Soil in brass tube w/ foil-cap-tape
8341	2:10	2) Diesel Tank - Water	2	X	X	X			Water in 1 liter EPA jar
8342	3:40	3) Gas Tank - South end - Soil	3	X	X	X	X		Soil in brass tube w/ foil-cap-tape
8343	3:50	4) Gas Tank - North end - Soil	3	X		X	X		" " " " " "
8344	4:00	5) Gas Tank - Water	4	X		X		X	Water in 40ml VOA Vials
8345		6) Travel Blank	1						" " " " "

Relinquished by (signature):	Date/Time	Received by (signature):
Scott Forbes	3/14/90 5:30	
Relinquished by (signature):	Date/Time	Received by (signature):

REMARKS

Relinquished by (signature):	Date/Time	Received by (signature):
Received in Laboratory by (signature): Janet Nielsen	Date/Time 3/14/90 5:30	

Western Drake Building 3/14/90



Diesel Soil Sample

1) parallel to side of loading dock door
2) On south side of pit 5' from surface (not from bottom of pit)
3) 7' from side of building
4) Standing water in bottom of pit, sample taken above water mark

Gasoline Soil South End

1) Sample taken from side of pit, above standing waterline
2) Sample taken in corner, 4' from surface.
3) Sample 11' from wall of building, 5½' north of the north end of the loading dock door

Gasoline Soil North End

1) Sample from side of pit, above standing waterline.
2) 3' north of south side of window — 7' from wall of building
3) 4' from surface

SITE MAP - Sample locations

Diesel Tank ~ 500 gals - 6" standing water covering 1/3 of pit floor.

Gasoline Tank ~ 3000 gals - 6" to 12" standing water covering most of floor.

APPENDIX B

CHROMALAB, INC.

Analytical Laboratory
Specializing in GC-GC/MS

- Environmental Analysis
- Hazardous Waste (#E694)
- Drinking Water (#955)
- Waste Water
- Consultation

September 19, 1990

ChromaLab File No.: 0990048

AQUA SCIENCE ENGINEERS, INC.

Attn: Ron Richmond

RE: Six soil samples for Gasoline/BTEX analysis

Project Location: 1461 PARK AVE., EMERYVILLE
Date Sampled: Sept. 11-12,1990 Date Submitted: Sept. 12, 1990
Date Extracted: Sept. 14-18,1990 Date Analyzed: Sept.14-18,1990

RESULTS:

Sample No.	Gasolline (mg/Kg)	Benzene (µg/Kg)	Toluene (µg/Kg)	Ethyl Benzene (µg/Kg)	Total Xylenes (µg/Kg)
MW #I, SAMPLE 1	150	5000	2200	3100	4900
MW #I, SAMPLE 2	N.D.	93	N.D.	N.D.	N.D.
MW #II, SAMPLE 1	N.D.	14	N.D.	N.D.	N.D.
MW #II, SAMPLE 2	N.D.	35	N.D.	N.D.	N.D.
MW #III, SAMPLE 1	N.D.	5.1	N.D.	N.D.	N.D.
MW #III, SAMPLE 2	N.D.	N.D.	N.D.	N.D.	N.D.
BLANK	N.D.	N.D.	N.D.	N.D.	N.D.
SPIKE RECOVERY	98.7%	86.1%	92.5%	94.4%	93.5%
DUP SPIKE REC.	91.1%	89.3%	89.7%	90.0%	107.6%
DETECTION LIMIT	2.5	5	5	5	5
METHOD OF ANALYSIS	5030/ 8015	8020	8020	8020	8020

ChromaLab, Inc.

David Duong
Senior Chemist

Eric Tam (by DD)
Eric Tam
Laboratory Director

2239 Omega Road, #1 • San Ramon, California 94583
415/831-1788 • Facsimile 415/831-8798

aqua science engineers inc.

Aqua Science Engineers, Inc.,
P.O. Box 535, San Ramon, CA 94583 • 415-820-9391

Chain of Custod

DATE 09/12/90 PAGE 01 OF 00

PROJ. 1461 Park Ave Emeryville CA
COMPANY PCC
ADDRESS 2220 Livingston St #208
Oakland, CA 94606

SAMPLERS (SIGNATURE) Ron Redmond (PHONE NO.) 532-2442

ANALYSIS REQUEST

SAMPLE ID.	DATE	TIME	MATRIX	LAB ID.	TPH - Gasoline (EPA 5030)	TPH - Gasoline (5030) w/BTEX (EPA 602, 8020)	TPH - Diesel (EPA 3510, 3550)	PURGEABLE AROMATICS BTEX (EPA 602, 8020)	PURGEABLE HALOCARBONS (EPA 601, 8010)	VOLATILE ORGANICS (EPA 624, 8240)	BASE/NEUTRALS, ACIDS (EPA 624/627, 8270)	TOTAL OIL & GREASE (EPA 5030E)	PESTICIDES/PCB (EPA 608, 8080)	PHENOLS (EPA 604, 8040)	METALS: Cd, Cr, Pb, Zn	CAM METALS (18) w/Cr VI	PRIORITY POLLUTANT METALS (13)	NUMBER OF CONTAINERS
MW-1 Sample 1	9-11-90	9 AM				✓												1
MW-1 Sample 2	9/11	10 AM				✓												1
MW-2 Sample 1	9/11	12 PM				✓												1
MW-2 Sample 2	9/11	12 PM				✓												1
MW-3 Sample 1	9/12	9:30 AM				✓												1
MW-3 Sample 2	9/12	9:30 AM				✓												1

CHROMALAB FILE # 990048

PROJECT INFORMATION	
PROJECT.	
PO NO	
SHIPPING ID NO.	
VIA.	

SAMPLE RECEIPT	
TOTAL NO. OF CONTAINERS	06
CHAIN OF CUSTODY SEALS	
REC'D GOOD CONDITION/COLD	
CONFORMS TO RECORD	
LAB NO.	

SPECIAL INSTRUCTIONS/COMMENTS:

Normal TAT

RELINQUISHED BY 1.	RELINQUISHED BY 2.	RELINQUISHED BY 3.
(Signature) Ron Redmond (Time) 9:30 AM	(Signature) (Time)	(Signature) (Time)
(Printed Name) Ron Redmond (Date) 9/12/90	(Printed Name) (Date)	(Printed Name) (Date)
(Company)	(Company)	(Company)
RECEIVED BY 1.	**RECEIVED BY 2.**	**RECEIVED BY (LABORATORY) 3.**
(Signature) (Time)	(Signature) (Time)	(Signature) David Duong 9:40 PM (Time)
(Printed Name) (Date)	(Printed Name) (Date)	(Printed Name) DAVID DUONG 09/12/90 (DATE)
(Company)	(Company)	(LAB) Chromalab, Inc.

APPENDIX C

PROJECT; 1461 Park Ave. Emeryville, CA. MW # 1

SOILS DESCRIPTION	Graphic symbol	Well Completion	HB	REMARKS
Clay dark brown silty gravelly 20-30% gravels			ptld cement	locking well cover 2" schedule 40 pvc blank
Clay dark brown sandy gravelly moist to wet			benonite pellets	soil sample 5' gasoline oder saturation zone prox 6.5 'to 7.5'
Clay gray silty gravel mixed wet			#3 sand	soil sample 10' no odor
Clays gray to brown mixed wet to moist				2" schedule 40 pvc 0.01" slotted
Clays gray to brown mixed moist				

PROPERTY CONTAMINATION CONTROL, INC. logged by: date logged:

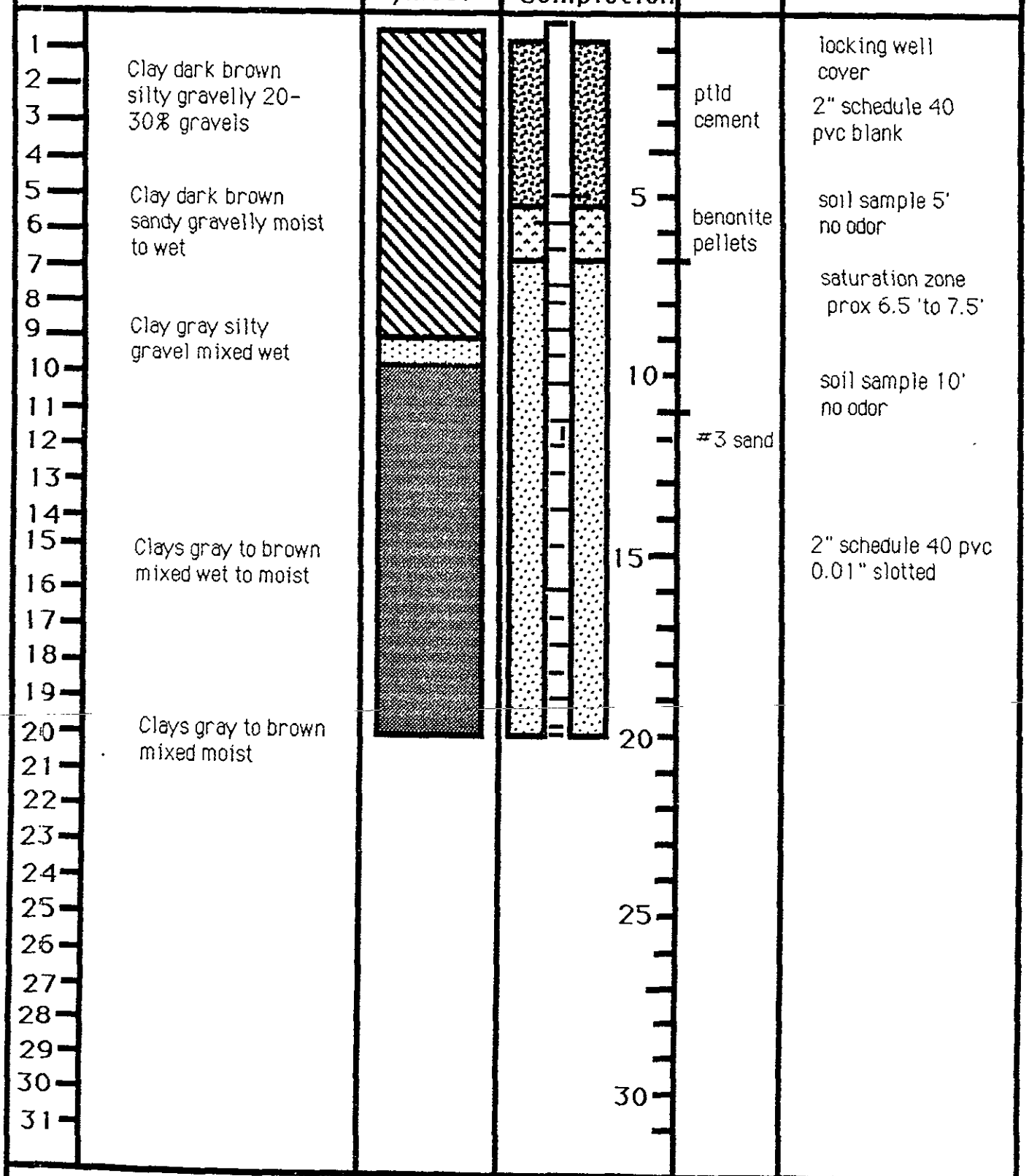
PROJECT; 1461 Park Ave. Emeryville, CA. MW # 2

SOILS DESCRIPTION	Graphic symbol	Well Completion	HB	REMARKS
Clay dark brown silty gravelly 20-30% gravels			ptld cement	locking well cover 2" schedule 40 pvc blank
Clay dark brown sandy gravelly moist to wet			benonite pellets	soil sample 5' no odor saturation zone prox 6.5 'to 7.5
Clay gray silty gravel mixed wet			#3 sand	soil sample 10' no odor
Clays gray to brown mixed wet to moist				2" schedule 40 pvc 0.01" slotted
Clays gray to brown mixed moist				

PROPERTY CONTAMINATION CONTROL, INC. logged by: date logged:

PROJECT; 1461 Park Ave. Emeryville, CA. MW # 3

SOILS DESCRIPTION	Graphic symbol	Well Completion	HB	REMARKS
Clay dark brown silty gravelly 20-30% gravels			ptld cement	locking well cover 2" schedule 40 pvc blank
Clay dark brown sandy gravelly moist to wet			benonite pellets	soil sample 5' no odor saturation zone prox 6.5 'to 7.5'
Clay gray silty gravel mixed wet			#3 sand	soil sample 10' no odor
Clays gray to brown mixed wet to moist				2" schedule 40 pvc 0.01" slotted
Clays gray to brown mixed moist				



PROPERTY CONTAMINATION CONTROL, INC. logged by: [illegible] date logged: Apr 86

APPENDIX D

Analysis:

Total Petroleum Hydrocarbons as gasoline, by EPA Method 5030/Ca.
Dept. of Health Services method, LUFT Manual.
Analysis date: 10/9/90.
BTXE by EPA Method 5030/8020.
Analysis date: 10/9/90.

Results:

	MW 1 # 0163 µg/L	MW 2 # 0164 µg/L	Detection Limit µg/L
Benzene	1.9	209	0.3
Toluene	1.1	33.7	0.3
Xylenes	3.3	128	0.6
Ethylbenzene	ND	5.4	0.3
Total Petroleum Hydrocarbons, as gasoline	ND	1200	50

	MW 3 # 0165 µg/L	Detection Limit µg/L
Benzene	5.1	0.3
Toluene	ND	0.3
Xylenes	ND	0.6
Ethylbenzene	ND	0.3
Total Petroleum Hydrocarbons, as gasoline	ND	50

ND = None Detected

QA/QC Data:	Percent Recovery Spike	Relative Percent Difference Duplicate
Benzene	97 %	5.3 %
Toluene	101 %	---
Xylenes	101 %	---
Ethylbenzene	91 %	---
Total Petroleum Hydrocarbons, as gasoline	118 %	---

Joe E. Hodgkins, Ph.D., C.T.
Laboratory Director

Enclosures (Chain of Custody,
Well Data Sheets, & Map)
pcc.rpt

ALPHA CHEMICAL & BIOMEDICAL LABORATORIES

CLIENT

NAME: PCC ("Western Brake")

ADDRESS: 2220 Livingston Suite 208
Oakland CA 94606

PHONE: (415) 532-2442

PROJECT: Western Brake, 1461 Park Ave, Emeryville CA

SAMPLER (signature): Scott Forbes

ACBL SAMPLE NO.	COLLECTED Date/Time	SAMPLE IDENTIFICATION	NO. of Containers	ANALYSIS: BTXE, EPA 8020	ANALYSIS: TPH as Gasoline	REMARKS/ SAMPLE CONDITION ON RECEIPT
0162	9/26/90 10:30	Field Blank	1	X	X	40 ml VOA Vials w/ Teflon
0163	(") 11:30	MW-1	2	X	X	septa
0164	(") 12:30	MW-2	2	X	X	Sampled w/ Bailer
0165	(") 2:00	MW-3	2	X	X	3 well volumes then constant pH, Conductivity & Temp.

Relinquished by (signature):	Date/Time	Received by (signature):
Scott Forbes	9/26/90 4:12	
Relinquished by (signature):	Date/Time	Received by (signature):

REMARKS
Samples cold on ice

Relinquished by (signature):	Date/Time	Received by (signature):
Received in Laboratory by (signature):	Date/Time	
Vicky Russell	9/26/90 4:12pm	

APPENDIX E

LOG OF BORING

DATE DRILLED **May 16, 1991** SHEET **1 of 1**

SURFACE ELEVATION DATUM

ELEVATION (feet)	DEPTH (feet)	LAB TESTS TPH (mg/kg)	FIELD TESTS HEADSPACE (ppm(vol))	BOREHOLE COMPLETION GRAPHIC	BOREHOLE COMPLETION DETAILS	SAMPLE TYPE	BLOW COUNTS/FT	SAMPLE NUMBER	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	SOIL DESCRIPTION	TYPE and/or REMARKS
	0				Concrete					GW	Asphalt - 6"	
										CL	Light brown pea-gravel	
			133					101-2			Grey to olive grey clay with brown mottles, plastic, local coarse sand, moist,	Moderate hydrocarbon odor
		3	4140		Bentonite			101-4				
	5											
		41	NA					101-6				
											Boring completed to a depth of 6.5 feet.	

CLIENT **UNION BANK**

PROJECT NUMBER **050-03**

RAC

REMEDIAL ACTION CORPORATION

LOG OF BORING **B101**

FIGURE NO.

LOG OF BORING

DATE DRILLED May 16, 1991 SHEET 1 of 1

SURFACE ELEVATION DATUM

ELEVATION (feet)	DEPTH (feet)	LAB TESTS TPH (mg/kg)	FIELD TESTS HEADSPACE (ppm(vol))	BOREHOLE COMPLETION GRAPHIC	BOREHOLE COMPLETION DETAILS	SAMPLE TYPE	BLOW COUNTS/FT	SAMPLE NUMBER	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	SOIL DESCRIPTION	TYPE and/or REMARKS
	0				Concrete					GW	Asphalt - 6"	
										CL	Light brown to grey pea-gravel	
		7	250		Bentonite			102-2			Dark grey to black, clay with local brown mottles, stiff, plastic, moist,	Moderate hydrocarbon odor
	5										Olive grey, wet	Slight hydrocarbon odor
		84	550					102-6			Boring completed to a depth of 6.5 feet.	

CLIENT **UNION BANK**

PROJECT NUMBER **050-03**

RAC

REMEDIAL ACTION CORPORATION

LOG OF BORING **B102**

FIGURE NO.

LOG OF BORING

DATE DRILLED **May 16, 1991** SHEET **1 of 1**

SURFACE ELEVATION DATUM

ELEVATION (feet)	DEPTH (feet)	LAB TESTS TPH (mg/kg)	FIELD TESTS HEADSPACE (ppm(vol))	BOREHOLE COMPLETION GRAPHIC	BOREHOLE COMPLETION DETAILS	SAMPLE TYPE	BLOW COUNTS/FT	SAMPLE NUMBER	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	SOIL DESCRIPTION	TYPE and/or REMARKS
	0				Concrete						Asphalt - 6"	
										GC	Grey to olive green pea-gravel, angular to sub angular, slightly moist	
		4	2540					103-2		CL	Olive grey to black clay, locally dusky yellow, occassional brown and green mottling, stiff, plastic, sand up to 0.25", moist.	Moderate hydrocarbon odor
			260					103-4				
	5											
		97	5		Bentonite			103-6				Saturated soil at 8.0 feet
											Boring completed at a depth of 8.3 feet.	

CLIENT **UNION BANK**

PROJECT NUMBER **050-03**

RAC

REMEDIAL ACTION CORPORATION

LOG OF BORING **B103**

FIGURE NO.

LOG OF BORING

DATE DRILLED **May 15, 1991** SHEET **1 of 1**

SURFACE ELEVATION DATUM

ELEVATION (feet)	DEPTH (feet)	LAB TESTS TPH (mg/kg)	FIELD TESTS HEADSPACE (ppm(vol))	BOREHOLE COMPLETION GRAPHIC	BOREHOLE COMPLETION DETAILS	SAMPLE TYPE	BLOW COUNTS/FT	SAMPLE NUMBER	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	SOIL DESCRIPTION	TYPE and/or REMARKS
	0				Concrete						Asphalt - 10"	
		7	350					104-1		GW CL	Dark olive grey clay, stiff, plastic, moist	Moderate hydrocarbon odor
		4	NA		Bentonite			104-3			Boring completed to 3.5 feet.	

CLIENT **UNION BANK**

PROJECT NUMBER **050-03**

RAC REMEDIAL ACTION CORPORATION

LOG OF BORING **B104**

FIGURE NO.

LOG OF BORING

DATE DRILLED **May 15, 1991** SHEET **1 of 1**

SURFACE ELEVATION DATUM

ELEVATION (feet)	DEPTH (feet)	LAB TESTS TPH (mg/kg)	FIELD TESTS HEADSPACE (ppm(vol))	BOREHOLE COMPLETION GRAPHIC	BOREHOLE COMPLETION DETAILS	SAMPLE TYPE	BLOW COUNTS/FT	SAMPLE NUMBER	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	SOIL DESCRIPTION	TYPE and/or REMARKS
	0				Concrete					SM	Moderate yellow brown silty sand, well graded, fine to coarse grained, loose, dry	
										CL		
		<1.0	1780		Bentonite			105-2			Dark grey to black clay, local brown mottles, stiff, plastic, moist to wet	Moderate hydrocarbon odor
		9	880					105-4				
											Boring completed to 4.5 feet.	

CLIENT - **UNION BANK**

PROJECT NUMBER **050-03**

RAC

REMEDIAL ACTION CORPORATION

LOG OF BORING **B105**

FIGURE NO.

LOG OF BORING

DATE DRILLED **May 15, 1991** SHEET **1 of 1**

SURFACE ELEVATION DATUM

ELEVATION (feet)	DEPTH (feet)	LAB TESTS: TPH (mg/kg)	FIELD TESTS: HEADSPACE (ppm(vol))	BOREHOLE COMPLETION: GRAPHIC	BOREHOLE COMPLETION: DETAILS	SAMPLE TYPE	BLOW COUNTS/FT	SAMPLE NUMBER	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	SOIL DESCRIPTION	TYPE and/or REMARKS
	0				Concrete					GW	Asphalt - 4"	
		7	NA					106-1			Light brown gravel, moist	
										CL	Dark olive grey clay, stiff, plastic, moderately organic, moist	Slight to moderate hydrocarbon odor
		46	2100		Bentonite			106-3				
											Boring completed to 4 feet.	

CLIENT **UNION BANK**

PROJECT NUMBER **050-03**

RAC

REMEDIAL ACTION CORPORATION

LOG OF BORING **B106**

FIGURE NO.

LOG OF BORING

DATE DRILLED **May 16, 1991** SHEET **1 of 1**

SURFACE ELEVATION DATUM

ELEVATION (feet)	DEPTH (feet)	LAB TESTS: TPH (mg/kg)	FIELD TESTS: HEADSPACE (ppm(vol))	BOREHOLE COMPLETION: GRAPHIC	BOREHOLE COMPLETION: DETAILS	SAMPLE TYPE	BLOW COUNTS/FT	SAMPLE NUMBER	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	SOIL DESCRIPTION	TYPE and/or REMARKS
	0				Concrete					CL	Brown to yellow brown clay, occassional ghravel of 2.0", occassionally sandy, locally plastic, frequently blocky, slightly moist	Man-made fill.
			0					107-2				Saturated soil at 3 feet
		A= <1	5400					107-4				
	5				Bentonite							Moderate hydrocarbon odor
			>10K					107-6				
										SC	Dark olive brown sand, fine grained, subangular, blocky, wet	
		B= <1	>10K					107-8				
			>10K					107-9		CL	Dusky yellow green clay, occassional light olive brown mottling, stiff, plastic,	
											Boring completed to 9.5 feet.	

10K = Greated than 10,000 ppm.

A = Composite sample 2' and 4'.

B = Composite sample 6' and 8'.

CLIENT **UNION BANK**

PROJECT NUMBER **050-03**

RAC

REMEDIAL ACTION CORPORATION

LOG OF BORING **B107**

FIGURE NO.

APPENDIX F

NET Pacific, Inc.

Client Name: Remedial Action Corp.
Client Ref.: 050-03 / Union Bank, Emeryville

NET Job No.: 4453A
Lab Series : 26905-26925

Date Reported: 05-28-91
Date Received: 05-17-91 1430

Matrix : Soil

Sample ID :	B-101 @ 4	B-102 @ 2	B-103 @ 2
Lab No. :	26905	26906	26907

ANALYTES/METHOD	RESULTS			R.L.	UNITS
METHOD 8020/8015 COMB.					
Date Extracted	05-22-91	05-22-91	05-22-91		
Date Analyzed	05-23-91	05-23-91	05-23-91		
Reporting Limit Multiplier	1	1	1		
AROMATIC VOLATILES					
Benzene	0.26	0.83	0.68	0.05	mg/Kg
Ethylbenzene	0.26	0.51	0.18	0.07	mg/Kg
Toluene	0.08	0.71	0.72	0.07	mg/Kg
Xylenes, total	0.47	3.17	1.20	0.14	mg/Kg
TOT. PET. HYDROCARBONS	--	--	--		
as Gasoline	2.5	6.6	3.5	1.0	mg/Kg
Surrogate Spike-8020/8015	--	--	--		
Chlorobenzene	98	94	98		% Rec

ND - Not Detected at the Reporting Limit

NET Pacific, Inc.

Client Name: Remedial Action Corp.
Client Ref.: 050-03 / Union Bank, Emeryville

NET Job No.: 4453A
Lab Series : 26905-26925

Date Reported: 05-28-91
Date Received: 05-17-91 1430

Matrix : Soil

Sample ID :	B-104 @ 1	B-104 @ 3	B-105 @ 2
Lab No. :	26908	26909	26910

ANALYTES/METHOD	RESULTS			R.L.	UNITS
METHOD 8020/8015 COMB.					
Date Extracted	05-22-91	05-22-91	05-22-91		
Date Analyzed	05-23-91	05-23-91	05-23-91		
Reporting Limit Multiplier	1	1	1		
AROMATIC VOLATILES					
Benzene	1.01	0.52	ND	0.05	mg/Kg
Ethylbenzene	0.62	0.42	ND	0.07	mg/Kg
Toluene	0.89	0.16	ND	0.07	mg/Kg
Xylenes, total	3.18	23.37	ND	0.14	mg/Kg
TOT. PET. HYDROCARBONS	--	--	--		
as Gasoline	7.4	4.2	ND	1.0	mg/Kg
Surrogate Spike-8020/8015	--	--	--		
Chlorobenzene	95	91	96		% Rec

ND - Not Detected at the Reporting Limit

NET Pacific, Inc.

Client Name: Remedial Action Corp.
Client Ref.: 050-03 / Union Bank, Emeryville

NET Job No.: 4453A
Lab Series : 26905-26925

Date Reported: 05-28-91
Date Received: 05-17-91 1430

Matrix : Soil

Sample ID :	B-105 @ 4	B-106 @ 1	B-106 @ 3
Lab No. :	26911	26912	26913

ANALYTES/METHOD	RESULTS			R.L.	UNITS
METHOD 8020/8015 COMB.					
Date Extracted	05-22-91	05-22-91	05-22-91		
Date Analyzed	05-23-91	05-23-91	05-23-91		
Reporting Limit Multiplier	1	1	1		
AROMATIC VOLATILES					
Benzene	ND	1.43	1.54	0.05	mg/Kg
Ethylbenzene	0.27	0.34	2.12	0.07	mg/Kg
Toluene	0.08	2.44	6.32	0.07	mg/Kg
Xylenes, total	2.19	2.26	12.0	0.14	mg/Kg
TOT. PET. HYDROCARBONS	--	--	--		
as Gasoline	9.1	6.9	46	1.0	mg/Kg
Surrogate Spike-8020/8015	--	--	--		
Chlorobenzene	95	93	95		% Rec

ND - Not Detected at the Reporting Limit

NET Pacific, Inc.

Client Name: Remedial Action Corp.
Client Ref.: 050-03 / Union Bank, Emeryville

NET Job No.: 4453B
Lab Series : 26905-26925

Date Reported: 06-04-91
Date Received: 05-17-91 1430

Matrix : Soil

Sample ID :	B-101 @ 6	B-102 @ 6	B-103 @ 6
Lab No. :	26914	26915	26916

ANALYTES/METHOD		RESULTS			R.L.	UNITS
Acid Digestion	3050	05-28-91	05-28-91	05-28-91		
METALS Total		--	--	--		
Chromium(VI)	7196	ND	ND	17.3	2.5	mg/Kg
Chromium	6010	26.1	109	113	0.5	mg/Kg
METHOD 8020/8015 COMB.						
Date Extracted		05-22-91	05-22-91	05-22-91		
Date Analyzed		05-23-91	05-23-91	05-24-91		
Reporting Limit Multiplier		1	1	1		
AROMATIC VOLATILES						
Benzene		0.46	1.58	0.35	0.05	mg/Kg
Ethylbenzene		1.83	3.99	ND	0.07	mg/Kg
Toluene		1.81	5.25	ND	0.07	mg/Kg
Xylenes, total		8.39	18.3	ND	0.14	mg/Kg
TOT. PET. HYDROCARBONS		--	--	--		
as Gasoline		41	83.9	ND	1.0	mg/Kg
Surrogate Spike-8020/8015		--	--	--		
Chlorobenzene		97	92	97		% Rec

ND - Not Detected at the Reporting Limit

NET Pacific, Inc.

Client Name: Remedial Action Corp.
Client Ref.: 050-03 / Union Bank, Emeryville

NET Job No.: 4453C
Lab Series : 26905-26925

Date Reported: 06-05-91
Date Received: 05-17-91 1430

Matrix : Soil

Sample ID :	Composite:	Composite:
Lab No. :	26917	26918

ANALYTES/METHOD		RESULTS		R.L.	UNITS
FISH TOXICITY BIOASSAY - CAM Screening (96Hr. LC50)		100	95	--	% surv.
Soil pH	9045	8.8	8.3		pH units
Reactive Sulfide	9030	ND	ND	2.0	mg/Kg
Reactive Cyanide	9010	ND	ND	0.4	mg/Kg
Flashpoint	1010B	>200	>200	--	deg F
Acid Digestion	3050	05-28-91	05-28-91		
17 CAM Metals, Total					
METALS Total		--	--		
Antimony	6010	ND	ND	2.5	mg/Kg
Arsenic	7061	1.50	4.30	0.15	mg/Kg
Barium	6010	97.1	76.3	0.5	mg/Kg
Beryllium	6010	ND	ND	1.0	mg/Kg
Cadmium	7130	ND	ND	0.5	mg/Kg
Chromium(VI)	7196	ND	ND	2.5	mg/Kg
Chromium	6010	39.7	39.4	0.5	mg/Kg
Cobalt	7200	7.4	5.8	2.5	mg/Kg
Copper	7210	14.0	10.7	1.0	mg/Kg
Lead	7420	30.4	10.4	2.5	mg/Kg
Mercury	7470	ND	ND	0.05	mg/Kg
Molybdenum	6010	ND	ND	2.5	mg/Kg
Nickel	7520	53.8	34.1	1.5	mg/Kg
Selenium	7741	ND	ND	0.5	mg/Kg
Silver	7760	ND	ND	1.0	mg/Kg
Thallium	6010	ND	ND	5.0	mg/Kg
Vanadium	6010	26.2	21.0	2.5	mg/Kg
Zinc	7950	39.8	31.4	1.0	mg/Kg
METHOD 8015					
Date Extracted		05-22-91	05-22-91		
Date Analyzed		05-24-91	05-24-91		
Detection Limit Multiplier		1	1		
TOT. PET. HYDROCARBONS as Gasoline		-- ND	-- ND	1.0	mg/Kg
Surrogate Spike-8020/8015		--	--		
Chlorobenzene		87	92		% Rec

ND - Not Detected at the Reporting Limit

NET Pacific, Inc.

Client Name: Remedial Action Corp.
Client Ref.: 050-03 / Union Bank, Emeryville

NET Job No.: 4453C
Lab Series : 26905-26925

Date Reported: 06-05-91
Date Received: 05-17-91 1430

Matrix : Soil

Sample ID :	Composite: B-107 @ 2,4	Composite: B-107 @ 6,8
Lab No. :	26917	26918

ANALYTES/METHOD	RESULTS		R.L.	UNITS
METHOD 8240				
Date Extracted	05-22-91	05-22-91		
Date Analyzed	05-28-91	05-29-91		
Reporting Limit Multiplier	1	1		
GC/MS VOLATILES	--	--		
Acetone	ND	ND	50	ug/Kg
Benzene	ND	ND	25	ug/Kg
Bromodichloromethane	ND	ND	25	ug/Kg
Bromoform	ND	ND	25	ug/Kg
Bromomethane	ND	ND	25	ug/Kg
2-Butanone (MEK)	ND	ND	50	ug/Kg
Carbon Disulfide	ND	ND	25	ug/Kg
Carbon Tetrachloride	ND	ND	25	ug/Kg
Chlorobenzene	ND	ND	25	ug/Kg
Chloroethane	ND	ND	25	ug/Kg
2-Chloroethylvinyl ether	ND	ND	50	ug/Kg
Chloroform	ND	ND	25	ug/Kg
Chloromethane	ND	ND	25	ug/Kg
Dibromochloromethane	ND	ND	25	ug/Kg
1,2-Dichlorobenzene	ND	ND	25	ug/Kg
1,3-Dichlorobenzene	ND	ND	25	ug/Kg
1,4-Dichlorobenzene	ND	ND	25	ug/Kg
1,1-Dichloroethane	ND	ND	25	ug/Kg
1,2-Dichloroethane	ND	ND	25	ug/Kg
1,1-Dichloroethene	ND	ND	25	ug/Kg
trans-1,2-Dichloroethene	ND	ND	25	ug/Kg
1,2-Dichloropropane	ND	ND	25	ug/Kg
cis-1,3-Dichloropropene	ND	ND	25	ug/Kg
trans-1,3-Dichloropropene	ND	ND	25	ug/Kg
Ethylbenzene	ND	29	25	ug/Kg
2-Hexanone	ND	ND	50	ug/Kg
Methylene chloride	ND	ND	50	ug/Kg
4-Methyl-2-Pentanone	ND	ND	50	ug/Kg
Styrene	ND	ND	25	ug/Kg
1,1,2,2-Tetrachloroethane	ND	ND	25	ug/Kg
Tetrachloroethene	ND	ND	25	ug/Kg
Toluene	ND	ND	25	ug/Kg
1,1,1-Trichloroethane	ND	ND	25	ug/Kg
1,1,2-Trichloroethane	ND	ND	25	ug/Kg

ND - Not Detected at the Reporting Limit

NET Pacific, Inc.

Client Name: Remedial Action Corp.
Client Ref.: 050-03 / Union Bank, Emeryville

NET Job No.: 4453C
Lab Series : 26905-26925

Date Reported: 06-05-91
Date Received: 05-17-91 1430

Matrix : Soil

Sample ID :	Composite: B-107 @ 2,4	Composite: B-107 @ 6,8
Lab No. :	26917	26918

ANALYTES/METHOD	RESULTS		R.L.	UNITS
Trichloroethene	ND	ND	25	ug/Kg
Trichlorofluoromethane	ND	ND	25	ug/Kg
Vinyl Acetate	ND	ND	50	ug/Kg
Vinyl chloride	ND	ND	25	ug/Kg
Xylenes, total	ND	60	25	ug/Kg
SURROGATE SPIKE				
1,2 Dichloroethane-d4	104	104		% Rec.
Toluene - d8	101	107		% Rec.
Bromofluorobenzene	99	105		% Rec.

ND - Not Detected at the Reporting Limit

APPENDIX G

NET Pacific, Inc.

Client Name: Remedial Action Corp.
Client Ref.: 050-03 / Union Bank, Emeryville

NET Job No.: 4453F
Lab Series : 26905-26925

Date Reported: 06-05-91
Date Received: 05-17-91 1430

Matrix : Water

Sample ID :	MW-1	MW-2	MW-3
Lab No. :	26922	26923	26924

ANALYTES/METHOD		RESULTS			R.L.	UNITS
pH	9040	6.9	7.0	6.9		pH units
17 CAM Metals, Total						
Antimony	200.7	1.66	1.51	0.06	0.05	mg/L
Arsenic	206.3	ND	ND	ND	0.003	mg/L
Barium	200.7	0.12	ND	ND	0.05	mg/L
Beryllium	200.7	ND	ND	ND	0.02	mg/L
Cadmium	213.1	ND	ND	ND	0.01	mg/L
Chromium(VI)	7196	0.11	0.26	0.17	0.05	mg/L
Chromium	200.7	349	353	47.6	0.01	mg/L
Cobalt	219.1	ND	ND	ND	0.05	mg/L
Copper	220.1	ND	ND	ND	0.02	mg/L
Lead	239.1	ND	ND	ND	0.05	mg/L
Mercury	245.1	ND	ND	ND	0.0005	mg/L
Molybdenum	200.7	ND	ND	ND	0.05	mg/L
Nickel	249.1	0.06	ND	ND	0.03	mg/L
Selenium	270.3	ND	ND	ND	0.01	mg/L
Silver	272.1	ND	ND	ND	0.02	mg/L
Thallium	200.7	ND	ND	ND	0.04	mg/L
Vanadium	200.7	ND	ND	ND	0.5	mg/L
Zinc	289.1	0.03	ND	0.04	0.02	mg/L

ND - Not Detected at the Reporting Limit

NET Pacific, Inc.

Client Name: Remedial Action Corp.
Client Ref.: 050-03 / Union Bank, Emeryville

NET Job No.: 4453F
Lab Series : 26905-26925

Date Reported: 06-05-91
Date Received: 05-17-91 1430

Matrix : Water

Sample ID :	MW-1	MW-2	MW-3
Lab No. :	26922	26923	26924

ANALYTES/METHOD	RESULTS			R.L.	UNITS
METHOD 8010/8020 COMB.					
Date Analyzed	05-24-91	05-24-91	05-24-91		
Reporting Limit Multiplier	100	100	100		
HALOGENATED VOLATILES	--	--	--		
Bromodichloromethane	ND	ND	ND	0.5	ug/L
Bromoform	ND	ND	ND	1.0	ug/L
Bromomethane	ND	ND	ND	1.0	ug/L
Carbon tetrachloride	ND	ND	ND	0.5	ug/L
Chlorobenzene	ND	67.5	ND	0.5	ug/L
Chloroethane	ND	ND	ND	1.0	ug/L
2-Chloroethylvinyl ether	ND	ND	ND	1.0	ug/L
Chloroform	ND	ND	ND	0.5	ug/L
Chloromethane	ND	ND	ND	1.0	ug/L
Dibromochloromethane	ND	ND	ND	0.5	ug/L
1,2-Dichlorobenzene	ND	ND	ND	0.5	ug/L
1,3-Dichlorobenzene	ND	ND	ND	0.5	ug/L
1,4-Dichlorobenzene	ND	ND	ND	0.5	ug/L
Dichlorodifluoromethane	ND	ND	ND	1.0	ug/L
1,1-Dichloroethane	ND	ND	ND	0.5	ug/L
1,2-Dichloroethane	ND	ND	ND	0.5	ug/L
1,1-Dichloroethene	ND	ND	ND	0.5	ug/L
trans-1,2-Dichloroethene	ND	ND	ND	0.5	ug/L
1,2-Dichloropropane	ND	ND	ND	0.5	ug/L
cis-1,3-Dichloropropene	ND	ND	ND	0.5	ug/L
trans-1,3-Dichloropropene	ND	ND	ND	0.5	ug/L
Methylene chloride	ND	ND	ND	1.0	ug/L
1,1,2,2-Tetrachloroethane	ND	ND	ND	0.5	ug/L
Tetrachloroethene	ND	ND	ND	0.5	ug/L
1,1,1-Trichloroethane	64.3	ND	ND	0.5	ug/L
1,1,2-Trichloroethane	ND	ND	ND	0.5	ug/L
Trichloroethene	1,290	401	262	0.5	ug/L
Trichlorofluoromethane	ND	ND	ND	1.0	ug/L
Vinyl chloride	ND	ND	ND	1.0	ug/L
AROMATIC VOLATILES					
Benzene	1,450	11.2	2.7	0.5	ug/L
Ethylbenzene	9.4	ND	ND	0.5	ug/L
Toluene	273	1.2	ND	0.5	ug/L
Xylenes, total	599	1.0	ND	0.5	ug/L

ND - Not Detected at the Reporting Limit

NET Pacific, Inc.

Client Name: Remedial Action Corp.
Client Ref.: 050-03 / Union Bank, Emeryville

NET Job No.: 4453F
Lab Series : 26905-26925

Date Reported: 06-05-91
Date Received: 05-17-91 1430

Matrix : Water

Sample ID :	MW-1	MW-2	MW-3
Lab No. :	26922	26923	26924

ANALYTES/METHOD	RESULTS			R.L.	UNITS
Surrogate Spike	--	--	--		
2-Chlorotoluene	102	95	87		% Rec
METHOD 8015					
Detection Limit Multiplier	1	1	1		
Date Analyzed	05-24-91	05-24-91	05-24-91		
TOT. PET. HYDROCARBONS	--	--	--		
as Gasoline	3,420	110	ND	10	ug/L
Surrogate Spike-8020/8015	--	--	--		
Chlorobenzene	102	101	102		% Rec

ND - Not Detected at the Reporting Limit

NET Pacific, Inc.

Client Name: Remedial Action Corp.
Client Ref.: 050-03 / Union Bank, Emeryville

NET Job No.: 4453G
Lab Series : 26905-26925

Date Reported: 06-04-91
Date Received: 05-17-91 1430

Matrix : Water

Sample ID : Drum 9 R
Lab No. : 26925

ANALYTES/METHOD		RESULTS	R.L.	UNITS
pH	9040	7.6		pH units
METALS Total		--		
Chromium(VI)	7196	0.09	0.05	mg/L
Chromium	200.7	342	0.01	mg/L

ND - Not Detected at the Reporting Limit

APPENDIX H

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

Parameter	Method	Reporting Limit	Descriptor, Lab No. and Results B207-6 10-01-91 1000 99548	B208-6 10-01-91 1000 99549	Units
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

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: 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 Date: 10-17-91
Client Name: Remedial Action Corp.
NET Log No: 1192 Page: 2

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

Parameter	Method	Reporting Limit	Descriptor, Lab No. and Results B207-6 10-01-91 1000 99548	B208-6 10-01-91 1000 99549	Units
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 Date: 10-17-91
Client Name: Remedial Action Corp.
NET Log No: 1192 Page: 3

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

Parameter	Method	Reporting Limit	Descriptor, Lab No. and Results B209-2 10-01-91 1000 99550	B209-6 10-01-91 1000 99551	Units
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 Date: 10-17-91
Client Name: Remedial Action Corp.
NET Log No: 1192 Page: 4

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

Parameter	Method	Reporting Limit	Descriptor, Lab No. and Results B213-6 10-02-91 0700 99552	B214-6 10-02-91 0700 99553	Units
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

ent No: 789
ent Name: Remedial Action Corp.
Log No: 1192

Date: 10-17-91

Page: 5

. Union-Emeryville, Project: 050-03B

	Method	Reporting Limit	Descriptor, Lab No. and Results B217-2 10-02-91 0700 99554	 B217-6 10-02-91 0700 99555	Units
ARBONS			--	--	
*			--	--	
			1	1	
030			10-14-91	10-13-91	
			--	--	
		1	ND	ND	mg/Kg
*			--	--	
			1	1	
			10-14-91	10-13-91	
		2.5	ND	ND	ug/Kg
		2.5	ND	ND	ug/Kg
		2.5	ND	ND	ug/Kg
		2.5	ND	ND	ug/Kg

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

Parameter	Method	Reporting Limit	Descriptor, Lab No. and Results B219-6 10-02-91 1100 99556	B220-2 10-02-91 1100 99557	Units
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 Date: 10-17-91
Client Name: Remedial Action Corp.
NET Log No: 1192 Page: 7

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

Parameter	Method	Reporting Limit	Descriptor, Lab No. and Results B221-2 10-02-91 1100 99558	 B221-6 10-02-91 1100 99559	Units
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 Date: 10-17-91
Client Name: Remedial Action Corp.
NET Log No: 1192 Page: 8

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

Parameter	Method	Reporting Limit	Descriptor, Lab No. and Results B222-2 10-02-91 1100 99560	B224-6 10-02-91 1400 99561	Units
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

Ref: Union-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	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 [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 Date: 10-17-91
Client Name: Remedial Action Corp.
NET Log No: 1134 Page: 2

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

Parameter	Method	Reporting Limit	Descriptor, Lab No. and Results B2031A 09-30-91 1500 99274	 B2032A 09-30-91 1500 99275	Units
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 Date: 10-17-91
Client Name: Remedial Action Corp.
NET Log No: 1134 Page: 3

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

Parameter	Method	Reporting Limit	Descriptor, Lab No. and Results B2051A 09-30-91 1600 99276	Units
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

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 [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.

CHAIN OF CUSTODY RECORD

Shipped By: RAC Remedial Action Corporation
505 N. Tustin Ave., Suite 140
Santa Ana, California 92705
714/541-4555

Delivered To: NET PACIFIC

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

BORING or SAMP. ID.	SAMPLE NO.	DEPTH or CO-ORDIN.	DATE SAMPLED	TIME SAMPLED	SAMPLE Material	SAMPLE Method	CONTAINER	PRESERVATION Temp.	PRESERVATION Chem.	ANALYSIS REQUIRED
										HOLD
B 207	207-6	6'	10-1-91	10:00	Soil	Core	S. Steel	4°F	None	8015 x 8020 as Gas (comb
B 208	208-2	2'	10-1-91		"	"	"	"	"	HOLD
B 208	208-6	6'	10-1-91		"	"	"	"	"	8015 x 8020 as Gas (com
B 209	209-2	2'	"		"	"	"	"	"	" "
B 209	209-6	6'	"		"	"	"	"	"	" "
B 210	210-2	2'	"		"	"	"	"	"	HOLD
B 210	210-6	6'	"		"	"	"	"	"	HOLD
B 211	211-6	6'	"		"	"	"	"	"	HOLD
B 212	212-2	2'	"		"	"	"	"	"	HOLD
B 212	212-6	6'	"	16:00	"	"	"	"	"	HOLD
B 213	213-2	2	10-2-91	07:00	"	"	"	"	"	8015 & 8020 as Gas (comb
B 213	213-6	6	10-2-91		"	"	"	"	"	HOLD
B 216	216-2	2	"		"	"	"	"	"	8015 & 8020 as Gas (comb
B 216	216-6	6	"		"	"	"	"	"	" "
B 217	217-2	2	"		"	"	"	"	"	" "
B 217	217-6	6	"		"	"	"	"	"	HOLD
B 218	218-2	2	"		"	"	"	"	"	HOLD
B 218	218-6	6	"	11:00	"	"	"	"	"	[redacted]

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:
Name:
Company:
DATE: 10-2-91
TIME: 16:00

RELINQUISHED BY:
Signature:
Name:
Company:
Reason:

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

RELINQUISHED BY:
Signature:
Name:
Company:
Reason:

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

ADDITIONAL INFORMATION: 8015 & 8020 M AS GASOLINE / COMBINED ANALYSIS

(1134)

CHAIN OF CUSTODY RECORD

Shipped By: RAC Remedial Action Corporation
505 N. Tustin Ave., Suite 160
Santa Ana, California 92705
714/541-9153

Delivered To: NET PACIFIC

PROJECT NAME: UNION BANK - EMERYVILLE
PROJECT NO.: 050-038

DATE: 9-30-91 | PAGE 1 OF 1
SAMPLED BY: J.F. | SIGNATURE: James Fan

DELIVERY METHOD: COURIER
TOTAL NO. OF SAMPLES: 3

BORING or SAMP. ID.	SAMPLE NO.	DEPTH or CO-ORDIN.	DATE SAMPLED	TIME SAMPLED	SAMPLE Material	SAMPLE Method	CONTAINER	PRESERVATION Temp.	PRESERVATION Chem.	ANALYSIS REQUIRED
					Soil	Drive	SS	48°F	None	
B 203 1-A		2'	9-30-91	15:00	"	"	"	"	"	BTXE & TPH (8020/8015 M
B 203 2-A		6'	"	"	"	"	"	"	"	BTXE & TPH ("
B 205 1-A		2'	9-30-91	16:00	"	"	"	"	"	BTXE & TPH ("

CUSTODY SEALED 9/30/91 @ 19:00 J.W.

SPECIAL ANALYSIS OR HANDLING REQUIREMENTS: total extract

RELINQUISHED BY:
Signature: James Fan
Name: JAMES FARROW
Company: RAMSAM ACTION CORP.
Reason: ANALYSIS

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

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

VIA

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
714/541-9353

Delivered To: NET PACIFIC

PROJECT NAME: UNION - EMERYVILLE | PROJECT NO.: 050-03, B

DATE: 10-2-91 | PAGE 1 OF 2 | SAMPLED BY: J.F. | SIGNATURE: [signature]

DELIVERY METHOD: COURIER | TOTAL NO. OF SAMPLES: PAGE 1 = 18 (TOTAL = 26)

BORING or SAMP. ID.	SAMPLE NO.	DEPTH or CO-ORDIN.	DATE SAMPLED	TIME SAMPLED	SAMPLE Material	SAMPLE Method	CONTAINER	PRESERVATION Temp.	PRESERVATION Chem.	ANALYSIS REQUIRED
										HOLD
B207	207-6	6'	10-1-91	10:00	Soil	Drive	S.Steel	4°F	None	
B208	208-2	2'	10-1-91		"	"	"	"	"	
B208	208-6	6'	10-1-91		"	"	"	"	"	
B209	209-2	2'	"		"	"	"	"	"	
B209	209-6	6'	"		"	"	"	"	"	
B210	210-2	2'	"		"	"	"	"	"	
B210	210-6	6'	"		"	"	"	"	"	
B211	211-6	6'	"		"	"	"	"	"	
B212	212-2	2'	"		"	"	"	"	"	
B212	212-6	6'	"	16:00	"	"	"	"	"	
B213	213-2	2	10-2-91	07:00	"	"	"	"	"	
B213	213-6	6	10-2-91		"	"	"	"	"	
B214	214-2	2	"		"	"	"	"	"	
B214	214-6	6	"		"	"	"	"	"	
B217	217-2	2	"		"	"	"	"	"	
B217	217-6	6	"		"	"	"	"	"	
B218	218-2	2	"		"	"	"	"	"	
B218	218-6	6	"	11:00	"	"	"	"	"	

(Handwritten along analysis column: See attached fax for analysis information [illegible] 10/3/91)

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

RELINQUISHED BY:		RECEIVED BY:		
Signature	[signature]	Signature	[signature]	DATE: 10-2-91
Name	JAMES FARROW	Name	MIKE TAVANI	
Company	RAC	Company	NET	TIME: 16:00
Reason	ANALYSIS			

RELINQUISHED BY:		RECEIVED BY:		
Signature	[signature]	Signature	[signature]	DATE: 10/3/91
Name	MIKE TAVANI	Name	Kelly Temple	
Company	NET	Company	NET Pacific	TIME: 0800
Reason				

RELINQUISHED BY:		RECEIVED BY:		
Signature		Signature		DATE:
Name		Name		
Company		Company		TIME:
Reason				

CUSTODY SEALED 10/2/91

ADDITIONAL INFORMATION: @ 1900 [initials]
~~PLEASE FAX COPIES OF~~ ALL CHAINS OF CUSTODY

CHAIN OF CUSTODY RECORD

1192

Shipped By: RAC Remedial Action Corporation
505 N. Tustin Ave., Suite 140
Santa Ana, California 92705
714/541-4351

Delivered To: NET PACIFIC

PROJECT NAME: UNION-ENCRYUCLE | PROJECT NO.: 050-03 B

DATE: 10-2-91 | PAGE 2 OF 2 | SAMPLED BY: J.F. | SIGNATURE: James Farrow

DELIVERY METHOD: COURIER | TOTAL NO. OF SAMPLES: PAGE 2 = 8 (TOTAL = 26)

BORING or SAMP. ID.	SAMPLE NO.	DEPTH or CO-ORDIN.	DATE SAMPLED	TIME SAMPLED	SAMPLE Material	SAMPLE Method	CONTAINER	PRESERVATION Temp.	PRESERVATION Chem.	ANALYSIS REQUIRED
B219	219-2	2	10-2-91	11:00	SOIL	DRIVE	S. Steel	4°C	NONE	HOLD
B219	219-6	6	"		"	"	"	"	"	
B220	220-2	2	"		"	"	"	"	"	
B221	221-2	2	"		"	"	"	"	"	
B221	221-6	6	"		"	"	"	"	"	
B222	222-2	2	"		"	"	"	"	"	
B224	224-2	2	"	V	"	"	"	"	"	
B224	224-6	6	"	14:00	"	"	"	"	"	

CUSTODY SEALED 10/2/91 @ 1400 Mike Tavani

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

RELINQUISHED BY:
Signature: James Farrow
Name: JAMES FARROW
Company: RAC
Reason: ANALYSIS

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

RELINQUISHED BY:
Signature: Mike Tavani
Name: MIKE TAVANI
Company: NET
Reason:

RECEIVED BY:
Signature: Kelly Temple
Name: Kelly Temple
Company: NET Pacific
DATE: 10/2/91
TIME: 0800

RELINQUISHED BY:
Signature:
Name:
Company:
Reason:

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

ADDITIONAL INFORMATION:

CHAIN OF CUSTODY RECORD

Shipped By: RAC Remedial Action Corporation
505 N. Tustin Ave., Suite 160
Santa Ana, California 92705
714/541-4993

Delivered To: NET PACIFIC

PROJECT NAME: UNION-ENCINITAS | PROJECT NO.: 050-03 B

DATE: 10-2-91 | PAGE 2 OF 2 | SAMPLED BY: J.F. | SIGNATURE: James Farren

DELIVERY METHOD: COURIER | TOTAL NO. OF SAMPLES: PAGE 2 = 8 (TOTAL = 26)

BORING or SAMP. ID.	SAMPLE NO.	DEPTH or CO-ORDIN.	DATE SAMPLED	TIME SAMPLED	SAMPLE Material	SAMPLE Method	CONTAINER	PRESERVATION Temp.	PRESERVATION Chem.	ANALYSIS REQUIRED	
B219	219-2	2	10-2-91	11:00	SOIL	BRASS	S. Steel	4°F	NONE	HOLD	
B219	219-6	6	"		"	"	"	"	"	8020 x 8015 M Gas/Combined	
B220	220-2	2	"		"	"	"	"	"	"	"
B221	221-2	2	"		"	"	"	"	"	"	"
B221	221-6	6	"		"	"	"	"	"	"	"
B222	222-2	2	"	V	"	"	"	"	"	HOLD	
B224	224-2	2	"	14:00	"	"	"	"	"	8015 8020 M Gas/Combined	
B224	224-6	6	"		"	"	"	"	"		

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

RELINQUISHED BY:
Signature: James Farren
Name: JAMES FARREN
Company: RAC
Reason: ANALYSIS

RECEIVED BY:
Signature:
Name:
Company:
DATE: 10-2-91
TIME: 16:00

RELINQUISHED BY:
Signature:
Name:
Company:
Reason:

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

RELINQUISHED BY:
Signature:
Name:
Company:
Reason:

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

ADDITIONAL INFORMATION:
PLEASE HOLD REMAINING SAMPLES.
8015 & 8020 M AS GASOLINE / COMBINED.

APPENDIX I

LOG OF BORING

DATE DRILLED September 30, 1991 SHEET 1 of 1

SURFACE ELEVATION DATUM

ELEVATION (feet)	DEPTH (feet)	LAB TESTS TPH (mg/kg)	FIELD TESTS HEADSPACE (ppm/vol)	BOREHOLE COMPLETION GRAPHIC	BOREHOLE COMPLETION DETAILS	SAMPLE TYPE	BLOW COUNTS/FT	SAMPLE NUMBER	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	SOIL DESCRIPTION	TYPE and/or REMARKS
	0				Concrete						Asphalt Concrete	
		NA	150					201-2		CL	Reddish brown gravelly clay, gravel up to 1/4", moderately plastic, moist	Artificial fill to 1.5 feet
	5									CL	Greyish black clay, plastic, firm, moist	
		NA	150		Bentonite			201-6				

Boring drilled to 7 feet
NA = No Analysis

CLIENT **UNION BANK**

PROJECT NUMBER **050-03B**

RAC
REMEDIAL ACTION CORPORATION

LOG OF BORING **201**

FIGURE NO.

LOG OF BORING

DATE DRILLED September 30, 1991 SHEET 1 of 1

SURFACE ELEVATION DATUM

ELEVATION (feet)	DEPTH (feet)	LAB TESTS: TPH (mg/kg)	FIELD TESTS: HEADSPACE (ppm/vol)	BOREHOLE COMPLETION: GRAPHIC	BOREHOLE COMPLETION: DETAILS	SAMPLE TYPE	BLOW COUNTS/FT	SAMPLE NUMBER	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	SOIL DESCRIPTION	TYPE and/or REMARKS
	0										Asphalt	
					Concrete					GW	Light brown gravel, up to 1-1/2", loose, moist	
		NA	120		Bentonite			202-2		CL	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**

RAC
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 TPH (mg/kg)	FIELD TESTS HEADSPACE (ppm/vol)	BOREHOLE COMPLETION GRAPHIC	BOREHOLE COMPLETION DETAILS	SAMPLE TYPE	BLOW COUNTS/FT	SAMPLE NUMBER	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	SOIL DESCRIPTION	TYPE and/or REMARKS
	0				Concrete						Asphalt	
										GW	Light brown gravel, up to 1-1/2", loose, wet	
		NA	50		Bentonite			203-2		CL	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**

RAC
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 TPH (mg/kg)	FIELD TESTS HEADSPACE (PPM/vol)	BOREHOLE COMPLETION GRAPHIC	BOREHOLE COMPLETION DETAILS	SAMPLE TYPE	BLOW COUNTS/FT	SAMPLE NUMBER	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	SOIL DESCRIPTION	TYPE and/or REMARKS
	0				Concrete						Concrete	
	1	NA	120		Bentonite			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

PROJECT NUMBER 050-03B

RAC
REMEDIAL ACTION CORPORATION

LOG OF BORING 204

FIGURE NO.

LOG OF BORING

DATE DRILLED September 30, 1991 SHEET 1 of 1

SURFACE ELEVATION DATUM

ELEVATION (feet)	DEPTH (feet)	LAB TESTS TPH (mg/kg)	FIELD TESTS HEADSPACE (ppm/vol)	BOREHOLE COMPLETION GRAPHIC	BOREHOLE COMPLETION DETAILS	SAMPLE TYPE	BLOW COUNTS/FT	SAMPLE NUMBER	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	SOIL DESCRIPTION	TYPE and/or REMARKS
	0				Concrete						Concrete	
										GW	Light brown gravel, up to 1-1/2", loose, wet	
					Bentonite					CL	Greyish black clay, local brown mottling, plastic, moist	Strong degraded hydrocarbon odor
		NA	300					205-2				

Boring drilled to 3 feet
NA = No Analysis

CLIENT UNION BANK

PROJECT NUMBER 050-03B

RAC
REMEDIAL ACTION CORPORATION

LOG OF BORING 205

FIGURE NO.

LOG OF BORING

DATE DRILLED October 1, 1991 SHEET 1 of 1

SURFACE ELEVATION DATUM

ELEVATION (feet)	DEPTH (feet)	LAB TESTS TPH (mg/kg)	FIELD TESTS HEADSPACE (ppm/vol)	BOREHOLE COMPLETION GRAPHIC	BOREHOLE COMPLETION DETAILS	SAMPLE TYPE	BLOW COUNTS/FT	SAMPLE NUMBER	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	SOIL DESCRIPTION	TYPE and/or REMARKS
	0				Concrete						Concrete	
		NA	270		Bentonite			206-2		GW	Light brown gravel, up to 1-1/2", loose, wet	
										CL	Greyish black clay, plastic, stiff, moist	Strong hydrocarbon odor

Boring drilled to 2 feet
NA = No Analysis

CLIENT **UNION BANK**

PROJECT NUMBER **050-03B**

RAC
REMEDIAL ACTION CORPORATION

LOG OF BORING **206**

FIGURE NO.

LOG OF BORING

DATE DRILLED September 30, 1991 SHEET 1 of 1

SURFACE ELEVATION DATUM

ELEVATION (feet)	DEPTH (feet)	LAB TESTS TPH (mg/kg)	FIELD TESTS HEADSPACE (PPm/Vol)	BOREHOLE COMPLETION GRAPHIC	BOREHOLE COMPLETION DETAILS	SAMPLE TYPE	BLOW COUNTS/FT	SAMPLE NUMBER	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	SOIL DESCRIPTION	TYPE and/or REMARKS
	0				Concrete						Asphalt	
										GW	Light brown gravel, loose, moist	
										CL	Greyish black clay, plastic, stiff, moist	
		ND	0					207-2				
	5				Bentonite							
		4	100					207-6			Olive brown, local green mottling, locally wet	
											Boring drilled to 7 feet ND = Non Detect	

CLIENT **UNION BANK**

PROJECT NUMBER **050-03B**

RAC *REMEDIAL ACTION CORPORATION*

LOG OF BORING **207**

FIGURE NO.

LOG OF BORING

DATE DRILLED October 1, 1991 SHEET 1 of 1

SURFACE ELEVATION DATUM

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

CLIENT **UNION BANK**

PROJECT NUMBER **050-03B**

RAC

REMEDIAL ACTION CORPORATION

LOG OF BORING **208**

FIGURE NO.

LOG OF BORING

DATE DRILLED September 30, 1991 SHEET 1 of 1

SURFACE ELEVATION DATUM

ELEVATION (feet)	DEPTH (feet)	LAB TESTS TPH (mg/kg)	FIELD TESTS HEADSPACE (ppm/vol)	BOREHOLE COMPLETION GRAPHIC	BOREHOLE COMPLETION DETAILS	SAMPLE TYPE	BLOW COUNTS/FT	SAMPLE NUMBER	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	SOIL DESCRIPTION	TYPE and/or REMARKS
	0				Concrete						Concrete	
										GW	Light brown gravel, up to 1/4", loose, moist	
		2	175					209-2		CL	Black clay, plastic, local brown mottling, moist	Earthy odor Strong hydrocarbon odor
	5				Bentonite							Very strong hydrocarbon odor
		1900	>1000					209-6		CL	Light grey silty clay, moderately plastic, moist locally wet	
											Boring drilled to 7 feet	

CLIENT **UNION BANK**

PROJECT NUMBER **050-03B**

RAC

REMEDIAL ACTION CORPORATION

LOG OF BORING **209**

FIGURE NO.

LOG OF BORING

DATE DRILLED October 1, 1991 SHEET 1 of 1

SURFACE ELEVATION DATUM

ELEVATION (feet)	DEPTH (feet)	LAB TESTS TPH (mg/kg)	FIELD TESTS HEADSPACE (PPm/Vol)	BOREHOLE COMPLETION GRAPHIC	BOREHOLE COMPLETION DETAILS	SAMPLE TYPE	BLOW COUNTS/FT	SAMPLE NUMBER	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	SOIL DESCRIPTION	TYPE and/or REMARKS
	0				Concrete						Concrete	
										GW	Light brown fine gravel, loose, moist	
										CL	Dark brown clay, moderately plastic, moist	Earthy odor Moderate hydrocarbon odor
		NA	300					210-2				
	5									CL	Light grey silty clay, occassional fine gravel, moist	
					Bentonite							Strong hydrocarbon odor
		NA	650					210-6				
											Boring drilled to 7 feet NA = No Analysis	

CLIENT **UNION BANK**

PROJECT NUMBER **050-03B**

RAC

REMEDIAL ACTION CORPORATION

LOG OF BORING **210**

FIGURE NO.

LOG OF BORING

DATE DRILLED October 1, 1991 SHEET 1 of 1

SURFACE ELEVATION DATUM

ELEVATION (feet)	DEPTH (feet)	LAB TESTS TPH (mg/kg)	FIELD TESTS HEADSPACE (ppm/vol)	BOREHOLE COMPLETION GRAPHIC	BOREHOLE COMPLETION DETAILS	SAMPLE TYPE	BLOW COUNTS/FT	SAMPLE NUMBER	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	SOIL DESCRIPTION	TYPE and/or REMARKS
	0				Concrete						Asphalt Concrete	
		NA	0					212-2		CL	Black clay, plastic, moist	
	5				Bentonite							
		NA	0					212-6		CL	Light grey silty clay, locally clayey silt, occasional coarse sand, moderately plastic, moist	
											Boring drilled to 7.5 feet NA = No Analysis	

CLIENT **UNION BANK**

PROJECT NUMBER **050-03B**

RAC REMEDIAL ACTION CORPORATION

LOG OF BORING **212**

FIGURE NO.

LOG OF BORING

DATE DRILLED October 2, 1991 SHEET 1 of 1

SURFACE ELEVATION DATUM

ELEVATION (feet)	DEPTH (feet)	LAB TESTS TPH (mg/kg)	FIELD TESTS HEADSPACE (ppm/vol)	BOREHOLE COMPLETION GRAPHIC	BOREHOLE COMPLETION DETAILS	SAMPLE TYPE	BLOW COUNTS/FT	SAMPLE NUMBER	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	SOIL DESCRIPTION	TYPE and/or REMARKS
	0				Concrete						Asphalt Concrete	
		NA	5					213-2		CL	Black clay, plastic, moist	
	5				Bentonite					CL	Light to medium brown clay, local brownish yellow mottling, moist, locally wet	
		ND	0					213-6				
											Boring drilled to 7.5 feet NA = No Analysis ND = Non Detect	

CLIENT **UNION BANK**

PROJECT NUMBER **050-03B**

RAC

REMEDIAL ACTION CORPORATION

LOG OF BORING **213**

FIGURE NO.

LOG OF BORING

DATE DRILLED October 2, 1991 SHEET 1 of 1

SURFACE ELEVATION DATUM

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

CLIENT **UNION BANK**

PROJECT NUMBER **050-03B**

RAC REMEDIAL ACTION CORPORATION

LOG OF BORING **214**

FIGURE NO.

LOG OF BORING

DATE DRILLED September 30, 1991 SHEET 1 of 1

SURFACE ELEVATION DATUM

ELEVATION (feet)	DEPTH (feet)	LAB TESTS TPH (mg/kg)	FIELD TESTS HEADSPACE (ppm/vol)	BOREHOLE COMPLETION GRAPHIC	BOREHOLE COMPLETION DETAILS	SAMPLE TYPE	BLOW COUNTS/FT	SAMPLE NUMBER	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	SOIL DESCRIPTION	TYPE and/or REMARKS
	0	ND	0		Concrete			215-2		GW CL	Asphalt Light to olive brown gravel, up to 1-1/2", loose, moist to wet Black clay, local brown mottling, plastic, moist	
	5	ND	NA		Bentonite			215-6		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**

PROJECT NUMBER **050-03B**

RAC
REMEDIAL ACTION CORPORATION

LOG OF BORING **215**

FIGURE NO.

LOG OF BORING

DATE DRILLED September 30, 1991 SHEET 1 of 1

SURFACE ELEVATION DATUM

ELEVATION (feet)	DEPTH (feet)	LAB TESTS TPH (mg/kg)	FIELD TESTS HEADSPACE (ppm/vol)	BOREHOLE COMPLETION GRAPHIC	BOREHOLE COMPLETION DETAILS	SAMPLE TYPE	BLOW COUNTS/FT	SAMPLE NUMBER	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	SOIL DESCRIPTION	TYPE and/or REMARKS
	0				Concrete						Concrete	
		NA	50		Bentonite			216-2		GW CL	Light brown gravel, up to 1-1/2", loose, wet	Strong degraded hydrocarbon odor
											Greyish black clay, plastic, moist	

Boring drilled to 2 feet
NA = No Analysis

CLIENT **UNION BANK**

PROJECT NUMBER **050-03B**

RAC
REMEDIAL ACTION CORPORATION

LOG OF BORING **216**

FIGURE NO.

LOG OF BORING

DATE DRILLED October 2, 1991 SHEET 1 of 1

SURFACE ELEVATION DATUM

ELEVATION (feet)	DEPTH (feet)	LAB TESTS TPH (mg/kg)	FIELD TESTS HEADSPACE (ppm/vol)	BOREHOLE COMPLETION GRAPHIC	BOREHOLE COMPLETION DETAILS	SAMPLE TYPE	BLOW COUNTS/FT	SAMPLE NUMBER	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	SOIL DESCRIPTION	TYPE and/or REMARKS
	0				Concrete						Asphalt	
										GW	Light brown gravel, loose, moist	
		ND	47					217-2		CL	Black clay, plastic, moist	
										CL	Brownish grey clay, locally sandy, moist	Slight hydrocarbon odor
	5											
		ND	1		Bentonite			217-6		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**

PROJECT NUMBER **050-03B**

RAC
REMEDIAL ACTION CORPORATION

LOG OF BORING **217**

FIGURE NO.

LOG OF BORING

DATE DRILLED October 2, 1991 SHEET 1 of 1

SURFACE ELEVATION DATUM

ELEVATION (feet)	DEPTH (feet)	LAB TESTS TPH (mg/kg)	FIELD TESTS HEADSPACE (ppm/vol)	BOREHOLE COMPLETION GRAPHIC	BOREHOLE COMPLETION DETAILS	SAMPLE TYPE	BLOW COUNTS/FT	SAMPLE NUMBER	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	SOIL DESCRIPTION	TYPE and/or REMARKS
	0				Concrete						Asphalt	
										GW	Light brown gravel, loose, moist	
										CL	Black clay, local brown mottling, plastic, moist	
		NA	15					218-2				
	5				Bentonite					CL	Light grey silty clay, locally clayey silt, occasional coarse sand, moderately plastic, moist locally wet	
		NA	0					218-6				

Boring drilled to 7 feet
NA = No Analysis

CLIENT **UNION BANK**

PROJECT NUMBER **050-03B**

RAC
REMEDIAL ACTION CORPORATION

LOG OF BORING **218**

FIGURE NO.

LOG OF BORING

DATE DRILLED October 2, 1991 SHEET 1 of 1

SURFACE ELEVATION DATUM

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

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

CLIENT **UNION BANK**

PROJECT NUMBER **050-03B**

RAC
REMEDIAL ACTION CORPORATION

LOG OF BORING **219**

FIGURE NO.

LOG OF BORING

DATE DRILLED October 2, 1991 SHEET 1 of 1

SURFACE ELEVATION DATUM

ELEVATION (feet)	DEPTH (feet)	LAB TESTS TPH (mg/kg)	FIELD TESTS HEADSPACE (ppm/vol)	BOREHOLE COMPLETION GRAPHIC	BOREHOLE COMPLETION DETAILS	SAMPLE TYPE	BLOW COUNTS/FT	SAMPLE NUMBER	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	SOIL DESCRIPTION	TYPE and/or REMARKS
	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	NA	>1000		Bentonite			220-6				Strong hydrocarbon odor

Boring drilled to 7 feet
NA = No Analysis

CLIENT **UNION BANK**

PROJECT NUMBER **050-03B**

RAC
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 TPH (mg/kg)	FIELD TESTS HEADSPACE (ppm/vol)	BOREHOLE COMPLETION GRAPHIC	BOREHOLE COMPLETION DETAILS	SAMPLE TYPE	BLOW COUNTS/FT	SAMPLE NUMBER	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	SOIL DESCRIPTION	TYPE and/or REMARKS
	0				Concrete						Asphalt Concrete	
		1	80					221-2		GW CL	Light brown gravel, loose, moist Black clay, local brownish yellow mottling, plastic, moist	Slight hydrocarbon odor
	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**

PROJECT NUMBER **050-03B**

RAC
REMEDIAL ACTION CORPORATION

LOG OF BORING **221**

FIGURE NO.

LOG OF BORING

DATE DRILLED October 2, 1991 SHEET 1 of 1

SURFACE ELEVATION DATUM

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

CLIENT **UNION BANK**

PROJECT NUMBER **050-03B**

RAC 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: TPH (mg/kg)	FIELD TESTS: HEADSPACE (ppm/vol)	BOREHOLE COMPLETION: GRAPHIC	BOREHOLE COMPLETION: DETAILS	SAMPLE TYPE	BLOW COUNTS/FT	SAMPLE NUMBER	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	SOIL DESCRIPTION	TYPE and/or REMARKS
	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

CLIENT **UNION BANK**

PROJECT NUMBER **050-03B**

RAC *REMEDIAL ACTION CORPORATION*

LOG OF BORING **223**

FIGURE NO.

LOG OF BORING

DATE DRILLED October 2, 1991 SHEET 1 of 1

SURFACE ELEVATION DATUM

ELEVATION (feet)	DEPTH (feet)	LAB TESTS TPH (mg/kg)	FIELD TESTS HEADSPACE (ppm/vol)	BOREHOLE COMPLETION GRAPHIC	BOREHOLE COMPLETION DETAILS	SAMPLE TYPE	BLOW COUNTS/FT	SAMPLE NUMBER	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	SOIL DESCRIPTION	TYPE and/or REMARKS
	0	NA	50		Concrete			224-2		GW	Asphalt	
										CL	Light brown gravel, up to 3", loose, moist	
											Black clay, locally silty, plastic, moist	
	5	ND	20		Bentonite			224-6		CL	Greyish brown, silty clay, moist	

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

CLIENT **UNION BANK**

PROJECT NUMBER **050-03B**

RAC
REMEDIAL ACTION CORPORATION

LOG OF BORING **224**

FIGURE NO.

APPENDIX J

ALAMEDA COUNTY
HEALTH CARE SERVICES
DAVID J. KEARS, AGENCY
XXXXXXXXXXXXXXX Agency Director

Telephone Number:(415) 874-7237

CERTIFIED P 241 310 282

CALIFORNIA REGIONAL WATER

NOV 18 1987

QUALITY CONTROL BOARD

November 13, 1987

Electro-Coatings, Inc.
1421 Park Ave.
Emeryville, CA 94608

Attention: William G. Moore

NOTICE OF VIOLATION

Dear Mr. Moore:

On October 29, 1987 an inspection of your facility was conducted by Larry Seto and Lizabeth Rose of this Department. The purpose of this inspection was to confirm that the nitric acid spill which had occurred the previous night was adequately cleaned up. A routine hazardous waste generator inspection was also conducted at this time. The following violations of the California Administrative Code, Title 22, Division 4, Chapter 30, were found:

1. Hazardous waste containers were not marked in accordance with Sections 66504 and 66508.

2. Hazardous wastes were accumulated on site for greater than 90 days, Section 66508.

3. Treatment of hazardous waste on site (i.e. evaporation, neutralization) without a variance from the Department of Health Services, Toxic Substances Control Division. This is in violation of Section 66371 which requires permits for treatment or a variance from this requirement.

4. On site disposal of hazardous waste without a permit. Spilled material from a caustic tank overflow was noted on the floor and spilled rinse/wastewater had accumu- under processing tanks. This is in violation of Section 25189.5 of the Health and Safety Code.

Mr. William G. Moore
Electro-Coatings, Inc.
1421 Park Ave.
Emeryville, CA 94608

In accordance with Section 66328 (d), Title 22, you are directed to submit a plan of correction within 14 days stating your actions to be taken to correct these violations and the expected dates of completion.

Your attention is directed to Sections 25183, 25189, and 25191 of the California Hazardous Waste Control Law which provides for civil and criminal penalties of up to $25,000 per day, per violation, for violations of the California Hazardous Waste Control Law and Regulations.

It was also noted during the inspection that there are two abandoned underground storage tanks at your facility. The Health and Safety Code, Division 20, Chapter 6.7, Section 25297 specifies requirements for tank closure. You must submit a closure plan in accorance with the California Administrative Code, Title 23, Chapter 3, Subchapter 16, Article 7. Your closure plan should be submitted with your plan of correction.

If you have any questions concerning this matter, please contact Lizabeth Rose, at 874-7237.

Sincerely,

Rafat A. Shahid,
Chief, Division of Hazardous Materials

cc: Dwight Hoenig, Department of Health Services
Gil Jensen, Alameda County District Attorney, Consumer and Environmental Protection
Robin Breuer, Regional Water Quality Control Board
Jim Eversole, City of Emeryville Fire Department

ALAMEDA COUNTY
HEALTH CARE SERVICES
AGENCY
J. MICHAEL LEAHY, Agency Director

470-27th Street, Third Floor
Oakland, California 94612
(415) 874-7237

CERTIFIED P 241 310 283

December 24, 1987

Electro-Coatings, Inc.
1421 Park Ave.
Emeryville, CA 94608

Attention: William G. Moore

NOTICE OF VIOLATION

Dear Mr. Moore:

On November 23, 1987 Lizabeth Rose drove by your facility and noticed what appeared to be ponded liquid under your "evaporation" tank which is located on the eastern side of your property. There were also puddles of a yellow liquid noticed in the soil "off site" adjacent to this area.

Ms. Rose suspected the material to be hazardous waste and obtained two liquid samples. Lowell Miller, Senior Hazardous Materials Specialist was present during the sampling and took several photographs. Sample analysis revealed that both samples contained levels of chromium at hazardous waste concentrations. Disposal of hazardous waste without a permit or at any point not authorized is a violation of the Health and Safety Code Section 25189.5.

In accordance with the California Administrative Code, Title 22, Division 4, Chapter 30, Section 66328 (d), you are directed to submit a plan of correction within 14 days stating your actions to be taken to correct this violation and the expected date of completion.

Your attention is directed to Sections 25183, 25189, and 25191 of the California Hazardous Waste Control Law which provides for civil and criminal penalties of up to $25,000 per day, per violation, for violations of the California Hazardous Waste Control Law and Regulations.

Mr. William G. Moore
Electro-Coatings, Inc.
Emeryville, CA

Should you have any questions concerning th
contact Lizabeth Rose, Hazardous Materials Sp
874-7237.

Sincerely,

Rafat A. Shahid, Chief,
Division of Hazardous Materials

cc: Dwight Hoenig, Department of Health Serv
Gil Jensen, Alameda County District Att
and Environmental Protection
Robin Breuer, Regional WAter Quality Con
Jim Eversole, City of Emeryville Fire De

STATE OF CALIFORNIA—THE RESOURCES AGENCY

GEORGE DEUKMEJIAN, Governor

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD

FRANCISCO BAY REGION

1111 JACKSON STREET, ROOM 6040

OAKLAND 94607

Phone: Area Code 415
464-1255

April 8, 1986

File No. 2199.9075 (RWM)

Kathleen Poling
Director of Administration and Legal Services
Electro Coatings, Inc.
1605 School Street
Moraga, Ca. 94556

Dear Ms. Poling:

This letter is a follow up to the meeting held on April 2, 1986 between you, your consultant, and Regional Board staff concerning the soil and groundwater pollution at your Emeryville plant.

As you already know, soil and groundwater beneath your facility are contaminated with chromium, the extent of which has been reasonably defined. Subsequent sampling and analysis of groundwater samples also revealed the presence of volatile organic chemicals, principally trichloroethylene, tetrachloroethylene, and trichloroethane, the extent of which have not been defined at this time. You stated your belief that there was a lack of documentation to indicate the source of these chemicals. However, we believe that the evidence does not support your assessment because (1) trichloroethylene was used as a degreaser in your nickel plating operation prior to the current use of trichloroethane, and (2) groundwater samples from monitoring wells on your property have been shown to contain concentrations of trichloroethylene as high as 1200 parts per billion.

It is our opinion, based upon the evidence of chemical usage, past waste disposal practices, and soil and groundwater monitoring results, that your facility is the probable source of the chromium contamination and a portion of, if not all, of the volatile organic chemical contamination. Concentrations of trichloroethylene in specific offsite wells (notably monitoring well 21), do provide evidence of possible past or existing offsite source(s) that have contributed to the pollution.

The report by Kleinfelder & Associates dated November 1983 indicates that groundwaters in deeper aquifer zones are potentially suitable for a potable water supply, and for industrial or agricultural purposes. Monitoring data at the site demonstrates that the shallow groundwater pollution is migrating, although at a relatively slow rate. Interconnections may exist between the shallow and deeper aquifers, providing an avenue for degradation of unaffected and potentially usable groundwaters.

It is the Regional Board staff position, as stated on numerous occasions at meetings and in correspondence, that the site hydrogeology and distribution of pollutants should be accurately characterized, existing and potential beneficial uses of the area water resources should be identified, and remedial action alternatives with associated costs should be developed corresponding to the cleanup levels as outlined in the March 1983 report "Regional Board Staff Guidelines with Respect to Establishing a Procedure to Identify Water Quality Objectives for Hazardous Material Site Cleanup." After an evaluation of the above information, an appropriate cleanup level can be determined.

To adress our water quality concerns, it is my understanding that you will submit before May 30, 1986 a proposal and schedule for a long term monitoring program at the site. This program may be modified at a later date to verify the adequacy of an appropriate remedial action alternative. It is suggested that this program include, but need not be limited to, the following tasks:

(1) Establish a common datum, and take periodic water table measurements in all wells to reliably document groundwater gradient, flow, and fluctuations.

(2) Sample and analyze groundwater samples periodically from all wells for total and hexavalent chromium, and for the chlorinated hydrocarbons detected by previous analysis.

(3) Conduct a priority pollutant scan on water samples from two existing onsite wells to determine all constituents present in the groundwaters.

(4) Submit results in periodic technical monitoring reports.

In addition, a technical report will be submitted by August 29, 1986, that proposes a plan for definition of the extent of the volatile organic chemical pollutant plume. This proposal should provide available information on the locations, operations, and chemicals used, of local facilities that may have contributed to the solvent pollution by past or present operations. This report shall also provide a comprehensive summary of existing data that characterizes the site hydrogeology and distribution of pollutants. The following is a list of items which should be included :

(1) Locations, drilling methods, construction details, development methods, and lithologic logs for all existing wells.

(2) Tabular summary of historical water elevation data identifying methods of measurement, dates of measurement,

enclosure 4

survey reference datum, top of casing, depth to water, and water surface elevations.

(3) Summary of all historical water quality data.

(4) Water elevation and/or piezometric surface contour maps.

(5) Updated geological cross sections both parallel and perpendicular to groundwater flow.

(6) Detailed base maps showing the locations of all monitoring wells, and adjacent facilities and structures.

(7) Updated iso-contration maps for the groundwater pollution.

(8) All pump test data including methods of measurement, methodology and assumptions of aquifer analysis, and results.

(9) Available lithologic and construction data for nearby wells identified in the well canvass.

Data collected for the above report shall be used to develop detailed, technical alternatives for remediation of the soil and groundwater affected by the chromium pollution. These alternatives with associated costs corresponding to the cleanup levels as outlined in the March 1983 guidelines shall be submitted by October 31, 1986.

If you have any questions concerning the requirements of this letter contact Robin Breuer or Michael Amman at (415) 464-1255.

Sincerely,

Donald D. Dalke

Donald D. Dalke, Chief
Toxics Cleanup Division

cc: Howard Hatayama, DOHS/TSCD
Gisele Wolf, City of Emeryville
Rafat Shahid, Alameda County Health Department

SITE INFORMATION SUMMARY

Electro-Coatings
1401 Park Avenue
Emeryville, CA.

HISTORY:

Electro-Coatings began plating operations at the Emeryville location in 1963. This site was previously occupied by Industrial Hard Chrome.

DESCRIPTION OF PROBLEM:

Between 1964 and 1965, Electro-Coatings disposed chromic acid plating wastes into an on-site shallow disposal well. The Regional Water Quality Control Board, (RWQCB) received information regarding the disposal of the waste water and ordered Electro-Coatings to stop disposal. Electro-Coatings ceased using the well. Subsequent analysis of the groundwater showed chromium contamination in significant quantities to a depth of 15 feet beneath the Electro-Coatings site. Direction of the groundwater movement is westerly. Underlying groundwater in the area is unuseable.

SAMPLING AND RESULTS:

For the last four years, Electro-Coatings and the RWQCB have been studying the chromium-contaminated groundwater problem. Phase I of the groundwater study has been completed to determine the groundwater and soil characteristics of the areas as well as the extent of contamination.

CLEAN-UP AND MITIGATION MEASURES:

Further study of the geologic condition at Electro-Coatings is required to better define the type and feasibility of various clean-up procedures. Plans for Phase II of the study include drilling additional monitoring wells and analyzing soil suspected of having high chromium contamination.

APPENDIX K

STATE OF CALIFORNIA

PETE WILSON Governor

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION
2101 WEBSTER STREET, SUITE 500
OAKLAND, CA 94612
(510) 286-1255

October 21,1994

To: Distribution List Attached

Subject: Implementation of Non-Attainment Areas

Attached is a memo intended to provide assistance to regulators, Dischargers and their consultants for implementation of the Basin Plan provisions regarding non-attainment of ground water cleanup levels.

I have scheduled a meeting on November 22,1994 at 9:30 a.m. in our 4th floor Board Room to discuss this memo and to receive your suggestions for improving its clarity and usefulness.

I would appreciate your written comments prior to the meeting to help focus the discussion. I intend to make necessary changes based upon your written comments and our discussions.

Please address your written comments [marked up copy of the memo is sufficient] to the attention of Mr. Donald Dalke. If you have any questions you may call either Donald Dalke at [286-0503], Stephen Morse at [286-0304] or Linda Spencer at [286-0789]

Sincerely,

Steven R. Ritchie
Executive Officer

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State of California

Memorandum

DRAFT

To: Board and Local Agency Staff
Distribution list

Date: October 20, 1994
File No. 1210.49 (DDD)

From: Steven R. Ritchie, Executive Officer
REGIONAL WATER QUALITY CONTROL BOARD
San Francisco Bay Region
2101 Webster St., Suite 500
Oakland, CA 94612

Subject: **Implementation of Ground Water Non-Attainment Areas**

With the adoption of the Ground Water Basin Plan amendments of August 17, 1994, the Regional Board has again confirmed their approval of the concept and implementation of Ground Water "Non-Attainment Areas". The Basin Plan amendments must yet be approved by the State Water Board and the Office of Administrative Law before Non-Attainment Areas can be cited as policy. However, awaiting State Water Board and OAL approval, we can implement the non-attainment provisions of the Basin Plan amendments for ground water cleanups on a case-by-case basis provided the record substantiates the rationale for utilizing the non-attainment option for the particular site.

This memorandum is intended to provide the assistance and direction to Board staff and local agencies that will allow the use of the non-attainment provisions of the Board's Basin Plan for any site that qualifies. I expect all regulatory agency staff to aggressively insure that all Dischargers are made aware of the non-attainment option and are provided with a copy of this memorandum. I strongly encourage all staff to look for opportunities to use the non-attainment option.

There are many areas where this memo requires decisions that involve professional judgement, such as on cost-effectiveness, plumes that cross property boundaries, limited risk, and no significant migration etc. It is our belief that these decisions will become easier as we start working through these decisions on specific sites.

It is recommended that a Discharger, after reviewing this memorandum, and believing that it's site qualifies for consideration, contact either the local oversight agency or the Regional Board. The Discharger will present the available information that supports its findings and will receive a preliminary response from the regulatory agencies. The regulatory agencies could indicate that the site does or does not qualify; appears to qualify or not to qualify; and indicate in what area they have concerns. The Discharger could then make a decision to present a formal request, with all the supporting data, to be considered under the non-attainment provisions. A Joint meeting with the local agency and the Regional Board could be requested, if necessary, to discuss the site.

Remember, this is a plume management option that the Discharger may or may not choose. The memo is divided into three parts: I. General rationale for Non-Attainment Areas; II. Basin Plan Language; and III. Implementation Assistance for Use of Non-Attainment Areas.

I. General Rationale for Non-Attainment Areas

The Board's ground water Basin Plan amendments were adopted in October of 1992 and modified in August,1994. These amendments included a section on "Non-Attainment of Ground Water Cleanup Levels" at cleanup sites.

The non-attainment area concept was adopted in recognition of the following:

a. Board and national experience [1994 National Research Council Report-Alternatives for Ground Water Cleanup] with ground water cleanup demonstrates the likelihood of not achieving drinking water standards with current best available ground water cleanup technology. A copy of the report abstract is attached.

b. Achieving drinking water standards is even more unlikely where the ground water is in low yielding sediments, like clays and silts, where sorption of pollutants on soil particles is greater.

c. Many ground water plumes are of limited areal extent and/or of low concentration. These types of plumes have limited water quality, environmental or human health risks. Installation and operation of ground water treatment systems at these sites is costly in relation to the impacts of such sites on the reasonable protection of beneficial uses [i.e. not cost-effective].

d. In-situ natural biodegradation of petroleum hydrocarbon plumes in shallow aquifers has been shown to occur. Natural biodegradation, with adequate source removal, may provide an acceptable cleanup strategy for sites with limited impacts.

II. Basin Plan Language

The following is an excerpt from the Basin Plan amendments of August 1994 as contained in Chapter IV. Implementation, Cleanup of Polluted Sites, section 4) setting cleanup levels.

Non-Attainment of Ground Water Cleanup Levels

As a result of the findings described above under "Progress of Regional Water Board's Program", and in consideration of the reasonable protection of beneficial uses and the maximum benefit to the people of the state pursuant to State Water Resources Control Board's Resolution No. 68-16, the Regional Water Board may establish non-attainment areas.

Non-attainment areas are limited ground water pollution zones where concentrations are above water quality objectives.

It is not the intent of the Regional Water Board to allow dischargers who have caused, permitted, or threatened to cause or permit, conditions of pollution or nuisance to avoid responsibilities for cleanup. However, in some cases cleanup to levels which comply with all applicable water quality

objectives may not be technologically or economically achievable within a reasonable period of time. In these cases, a non-attainment area is an option for a discharger to consider as a management strategy. To ensure the protection of beneficial uses of ground water, the Board will require dischargers to develop a plan to contain and manage polluted ground water (criteria d, below). To document compliance with this plan, the Regional Water Board will require dischargers to monitor for containment at points located at the pollution plume boundary, the property boundary, or at other appropriate locations. However, established cleanup levels that meet water quality objectives must be achieved at containment monitoring points. The Regional Water Board will limit further discharges of waste to land and to ground water within non-attainment areas.

Non-attainment areas may be established as acceptable containment and management strategies for two categories of sites listed here and described in detail below:

I). Sites which have ground water pollution and residual soil pollution with limited water quality, environmental, and human health risks;

II). Sites for which the approved cleanup program has not resulted in compliance with water quality objectives.

The criteria for each Category is listed below. The Regional Water Board may establish a Category I, non-attainment area for classes of sites (e.g., geographic locations, pollutant types, geologic conditions) based on the criteria stated below. The Regional Water Board will determine which sites meet the Category II criteria.

Category I: Sites which have ground water pollution and residual soil pollution with limited water quality, environmental, and human health risks;

Sites which fall under Category I, typically have small plumes and, with appropriate management, have limited environmental and human health risks. In order for a site to be considered under Category I, the Discharger must submit information that adequately addresses ALL of the following four criteria (a. through d.), must have conducted site investigation pursuant to Resolution 92-49, and must have adequately defined the vertical and horizontal extent of soil and ground water pollution.

a. The discharger has demonstrated (e.g., pump tests, ground water monitoring, transport modeling), and will verify (e.g., ground water monitoring) that no significant pollutant migration will occur due to hydrogeologic or chemical characteristics ; ***and***

b. Adequate source removal and/or isolation is undertaken to limit future migration of pollutants to ground water; ***and***

c. Dissolved phase cleanup is not cost-effective due to limited water quality, environmental, and human health risks and separate phases have been or are actively being removed; ; ***and***

d. An acceptable plan is submitted and implemented for containing and managing the remaining human health, water quality, and environmental risks, if any, posed by residual soil and ground water pollution. This plan should include an assessment of human health and environmental risks; management measures (e.g., deed notifications/restrictions; indemnification agreements; site operation, maintenance, health and safety plans; utility workers notice; etc.), contingency options; and a commitment to mitigating measures such as participation in a regional ground water monitoring or protection program The plan should recommend the monitoring frequency and duration and a timeline for meeting closure criteria.

Category II: Sites for which the Regional Water Board approved cleanup program has not resulted in compliance with water quality objectives.

Sites which fall under Category II typically involve sites with hydrogeologic conditions and chemical characteristics which have resulted in significant plume migration and the resultant environmental and human health risks. The Discharger must provide documentation of the following:

a. An appropriate cleanup program, including adequate source removal and free product removal, has been fully implemented and reliably operated for a period of time which is adequate to understand both the hydrogeology of the site and pollutant dynamics; ***and***

b. Ground water pollutant concentrations have reached an asymptotic level (the mass removed from the groundwater is no longer significant) using appropriate technology; *and*

c. Best available technologies are not technically or economically feasible to achieve further significant reduction in pollutant concentrations; *and*

d. An acceptable plan is submitted and implemented for containing and managing the remaining human health, water quality, and environmental risks posed by residual soil and ground water pollution. This plan should include an assessment of human health and environmental risks; management measures (e.g., deed notifications/ restrictions; indemnification agreements; site operation, maintenance, health and safety plans; utility workers notice, etc.); contingency options; and a commitment to mitigating measures such as participation in a regional ground water monitoring or protection program. The plan should recommend monitoring frequency and duration and a timeline for meeting closure criteria.

In assessing technical feasibility, the Discharger should consider the availability of technologies which have been shown to be effective in reducing the concentrations of constituents of concern to the established cleanup levels. Bench-scale and/or pilot-scale studies may be necessary to make this feasibility assessment. In assessing economic feasibility the Discharger should evaluate the incremental benefit of attaining further reductions in constituents of concern as compared with the incremental cost of achieving those levels. Economic feasibility is not determined by the economic resources available to a particular discharger or responsible party.

III. Implementation Assistance for Use of Non-Attainment Areas

The language of the Basin Plan non-attainment provisions, the assistance provided in this memorandum and Best Professional Judgement should guide the approval process. Other sections of the Basin Plan, provisions of Chapter 15 and Chapter 16 [CCR, Title 23, Division 3] and other Board policies should not be used to inappropriately limit the applicability of non-attainment areas.

Non-attainment areas require "containment" and "no significant migration". These terms should be interpreted such that "containment" means "no significant migration" past the designated monitoring point[s].

For qualifying sites where Chapter 16 UST regulations apply, the required Article 11, Section 2725[f][2] feasibility study and corrective action plan objectives of "*restoring or protecting these beneficial uses*" would be achieved by compliance with cleanup levels [pursuant to section 2725[g]] established at the containment monitoring points.

The Regional Board has determined that leaks from UST's classified as Residential or Farm heating oil tanks represent, as a class, limited risks to water quality, environment, and human health. The Board has specified the acceptable cleanup criteria in a letter dated June 21,1994[copy attached]. Due to the limited risks from any residual pollution, residual risk management plans are not required for this class of sites.

The following is general assistance to help determine if a site qualifies for a non-attainment option and to assist in determining if the Basin Plan criteria have been met. It is my intent that Best Professional Judgement be applied when using this assistance. While the Basin Plan describes two categories of sites, in practice a site may fall along a continuum from lower to higher risk. Therefore, one should not think of attaching a fixed category to a site, but of using the categories and the related criteria to form the basis for selecting the most appropriate combination of cleanup and plume management options to provide reasonable protection of beneficial uses.

Category I. [Limited Risk]

Generally these sites occur in areas where there are no plans for use and limited probability of actual use of the affected ground water for drinking purposes. This may be due to: limited yield, shallow ground water depth, hydrogeologic characteristics, land use restrictions, local ordinance restrictions on installation of water wells, other issues identified by the local water district, poor quality water, etc.

Generally these sites have pollutants that are not very toxic or not very mobile in the environment and/or are subject to natural attenuation mechanisms. Petroleum hydrocarbons generally fit this class of pollutants whereas chlorinated hydrocarbons generally do not; However site specific existing or probable water use conditions or other factors listed below may play a more significant role in determining the risk at a particular site.

Basin Plan Criteria a.

The discharger has demonstrated [e.g. pump tests,ground water monitoring, transport modeling] and will verify [e.g. ground water monitoring] that no significant pollutant migration will occur due to hydrogeologic or chemical characteristics;

Implementation assistance

- Best Professional Judgement must be used in evaluating the level of effort required to satisfy the term "demonstrated".

- The pollution plume is slow-moving or stable due to low permeability geologic materials or such factors as sorption, biodegradation or other natural attenuation mechanisms. Engineered containment features may provide acceptable migration control.

- "No significant migration" means that the established cleanup levels have not been exceeded at the containment monitoring points. When establishing locations for the containment monitoring points, provision for natural attenuation distance should be included where appropriate.

- No significant horizontal migration pathways should exist unless pumping or other engineered features could maintain plume boundary control, if necessary.

- The pollution plume should be of limited horizontal extent [generally less than 500 feet] and generally limited to the upper waterbearing zone[s].

- No significant vertical conduits should exist within the plume area or the area between the plume and the containment monitoring points. Best Professional Judgement must be used in determining the level of effort in searching for conduits to provide a reasonable degree of certainty.

Basin Plan Criteria b.

Adequate source removal and/or isolation is undertaken to limit future migration of pollutants to ground water;

Implementation assistance

- Separate phase hydrocarbons floating on the water table must be removed to the maximum extent practicable [Section 2655, Article 5, Chapter 16]

- Highly polluted soils in the vadose zone and the capillary fringe should be removed, treated or contained to the maximum extent practicable to minimize continued leaching to ground water, unless leachability studies or modeling show little threat of leaching or no impact on the attainment of cleanup levels at the containment monitoring points.

- Vapor extraction, air sparging or other in-situ technology should be considered for source removal, as an alternative to soil excavation, where soil conditions are appropriate and adequate monitoring of effectiveness can be proposed.

- Capping, slurry walls or other engineered containment methods may be proposed by the discharger to isolate the source area and limit migration of pollutants. A plan for demonstration of effectiveness must be submitted.

- Unsaturated zone pollutant removal or treatment must also be to a level that adequately protects public health.

Basin Plan Criteria c.

Dissolved phase cleanup is not cost-effective due to limited water quality, environmental, and human health risks and separate phases have been or are actively being removed;

Implementation assistance

- The question is ***not***: Is dissolved phase cleanup feasible? Or which cleanup technology is best? ***but***: Do the limited benefits justify the likely cost and time of cleanup? ***or***: Is cleanup costly in relation to the impact of the site on the "reasonable protection of beneficial uses"?

- For dissolved plumes, in shallow water bearing zones, with low probability of drinking water use, active dissolved phase cleanup is generally not cost-effective due to the limited effectiveness of pump and treat in achieving cleanup levels for dissolved constituents and due to limited risk and limited benefits [in terms of risk reduction or reduction in dissolved concentrations].

- It may be cost-effective in some cases to initiate short term dissolved phase cleanup to achieve a significant reduction in residual dissolved concentrations. This could be undertaken to maximize the likelihood of achieving the established cleanup levels at the containment monitoring points. The Discharger may wish to evaluate this option in connection with proposal for containment monitoring points.

- The Discharger shall provide information on the limited benefits including the type of factors contained in the discussion under the heading **Category I. [Limited Risk]**, above.

- The Discharger may have initiated some degree of dissolved phase cleanup. This would not by itself disqualify the site as limited risk.

Basin Plan Criteria d.

An acceptable plan is submitted and implemented for containing and managing the remaining human health, water quality, and environmental risks,if any, posed by residual soil and ground water pollution. This plan should include an assessment of human health and environmental risks; management measures [e.g. deed notification/restrictions; indemnification agreements; site operation, maintenance, health and safety plans; utility worker notice; etc.] contingency options and a commitment to mitigating measures such as participation in a regional ground water monitoring or protection program. The plan should recommend monitoring frequency and duration and a timeline for meeting closure criteria.

Implementation assistance

- The plan must contain information on site specific conditions such as the current and anticipated land and water uses and the type of activity at the site and surrounding area.

- The term "assessment of human health and environmental risks" means a qualitative assessment for most sites. In some cases, the qualitative assessment will indicate a sufficient concern to warrant a more detailed risk

evaluation. The term "qualitative" means the common sense review of pertinent information on existing and probable exposure pathways and receptors.

- The management measures should be selected to match the appropriate site specific conditions and residual risks based upon plausible land and water uses.

- "Contingency options" means a plan to implement if the agreed upon levels are exceeded at the containment monitoring points or other critical provisions of the management plan are not met.

- For areas zoned commercial or industrial with numerous separate but contributing sources, an acceptable plan may consider containing the residual groundwater pollution at the perimeter of the area in accordance with this policy.

- Management measures and mitigation for plume areas that cross property boundaries will require a more detailed evaluation by the Discharger and shall involve notification to all affected property owners and/or operators.

- The plan will include a monitoring program. Based upon a demonstration of stable or decreasing trends in plume chemical concentration, the Board or local agency will review requests to discontinue monitoring after five years of data, or less depending upon the site specific conditions.

- Upon acceptance of the management plan and completion of the other criteria, no further action beyond implementation of that plan will be required. Future use of new technology or additional cleanup would be at the option of the discharger unless the terms of the management plan or changing risk factors [e.g. land use change] warrant additional cleanup.

- As an ultimate goal, I envision the development of local agency programs to provide long term monitoring/tracking of these residual plume locations, as necessary.

- Dischargers may consider contributing a lump sum to future regional mitigation fund[s], to provide necessary resources for appropriate regional remedial measures, if necessary. Procedures to establish and administer mitigation funds are still in the developmental stages. However, the intent would be to allow a public agency, administering the fund, and not any single Discharger, to assume any future cleanup responsibility.

Category II. [Higher Risk]

Generally these sites occur in areas where ground water is currently used for drinking water or where there is a high probability or potential of future use, AND

where the pollutant plume has a reasonable probability of affecting that use. For these sites, best available technology is generally employed to cleanup soil and ground water in an attempt to achieve the Basin Plan Water Quality Objectives. A non-attainment area could be established if it is determined that these objectives cannot be achieved. The Basin plan criteria [a. thru d.] are generally reviewed on a case by case basis due to the complex nature of this Category of site with the expectation that Best Professional Judgment will be exercised by regulatory staff in applying the criteria.

Attachment:

1.1994 National Research Council Report:Alternatives for Ground Water Cleanup-Abstract presented at conference of National Ground Water Association Oct10-11,1994.
2.Residential or Farm Heating Oil Tanks-memo dated 6/21/94

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ABSTRACT
NATIONAL GROUND WATER ASSOCIATION ANNUAL MEETING

Las Vegas, Nevada
October 10-12, 1994

"CLEAN UP OF CONTAMINATED GROUND WATER: A MAJOR POLICY DILEMMA"

by

Michael C. Kavanaugh,Ph.D., P.E., DEE
Principal
ENVIRON Corporation

Over the past 15 years, evidence has mounted that the nation's ground water resource, which supplies over 50 percent of the drinking water, is threatened by contamination caused by past and present industrial, agricultural and commercial activities. In the US , it is estimated that over 300,000 sites may have contaminated soil or ground water requiring remediation. Estimates of the cost of these remedial activities to be spent over the next 20 to 30 years range from $250 billion to $1 trillion 1993 dollars, depending in part on the clean up levels specified by statutory or regulatory requirements. Clean up levels for ground water are usually set at background levels (based on state non-degradation policies), drinking water standards or lacking these standards, risk based levels representing 10^{-4} to 10^{-6} risk levels.

The technical response to achieve these clean up levels has almost exclusively been the so-called "pump and treat" technology. Pump and treat, using standard water well technology, attempts to flush the contaminated aquifer with a sufficient quantity of clean water to remove all contaminants present in the saturated zone until the aquifer is restored to the target level. The exact number of pump and treat systems currently in the US is unknown, but may exceed 3,000 . Unfortunately, the efficacy of this technology seems quite limited. Whether alternative technologies can significantly improve restoration of contaminated ground water is also uncertain. Thus, many sites may not be restored within a reasonable time frame or at a reasonable cost.

In response to this dilemma , and at the request of the Environmental Protection Agency(EPA) , and the Department of Energy, the NRC established a committee of experts to analyze the major technical and public policy issues arising from apparent technical limits to aquifer remediation. The Committee on Ground Water Cleanup Alternatives was set up under the Water Science and Technology Board, and the Board on

Radioactive Waste Management. The Committee, consisting of 18 nationally recognized experts in the technical, economic, and policy issues, evaluated readily available information on subsurface remediation. The Committee addressed the performance of existing remediation systems using pump and treat technology, the scientific and technical factors imposing constraints on subsurface remediation, the remediation potential of selected innovative technologies, limitations on subsurface characterization, and factors to be considered in setting alternative goals if complete restoration is not technically feasible. Finally the Committee assessed the effectiveness of the current policy framework within which remediation decisions are made and identified specific policy issues needing modifications, or changes. Committee findings are summarized in a report due for release by the National Academy Press in September, 1994.

Although the Committee was able to review data from only a small number of sites (77 sites) where pump and treat systems have been operating, the range of conditions encountered reflect the scientific and technical challenges at most sites. Based on data provided through 1992, health based cleanup levels had reportedly been achieved at only eight of the sites. Given longer time frames, more sites may be restored using pump and treat, but in most cases, steady state levels had been achieved that exceeded the target levels.

The Committee concluded that although there are no theoretical reasons why contaminants cannot be removed completely from an aquifer, there are significant constraints that limit the effectiveness of properly designed pump and treat as well as alternative technologies. Constraints include strongly adsorbed compounds, contaminants in low permeable zones, slow mass transfer of contaminants from aquifer solids to the mobile ground water, the presence of non-aqueous phase liquids (NAPLs),particularly dense non-aqueous phase liquids (DNAPLs), and the difficulties of characterizing and remediating highly heterogeneous geologic environments. Contrary to popular belief, pump and treat is not a failed technology. Rather, this technology has been asked to perform beyond its capabilities. Pump and treat is effective at containment of ground water, can significantly reduce the size of contaminant plumes, and in some cases can remove an adequate amount of contaminant mass to meet cleanup targets. However, pump and treat is a poor technical solution for remediation of source areas containing NAPLs, strongly adsorbed contaminants, or contaminants trapped in low permeable zones.

Although contaminated ground water sites are diverse and complex, sites can be categorized based on two dominant characteristics, the complexity of the hydrogeologic structure, and the chemical properties of the contaminants. Other factors that could be considered include the duration and magnitude of the contaminant release. Cleanup to

health based levels appears feasible at sites with homogeneous aquifers, contaminated with highly mobile, weakly adsorbed, and aerobically degradable or volatile compounds. Unfortunately, only a small fraction of the sites falls in this category. On the other hand, a substantial fraction of the sites pose such difficult challenges (e.g. NAPLs in fractured bed rock) that neither existing nor developing technologies appear capable of achieving complete restoration. Finally, the majority of sites fall in a category where complete restoration is improbable but not impossible using current technologies.

The Committee has recommended that EPA use such a new categorization approach to set policies for setting standards and technical strategies for cleanup. EPA's current policies, while generally recognizing technical limitations to complete restoration, nonetheless do not reflect the large number of sites where technical infeasibility may require alternative strategies to achieve the goal of protecting human health and the environment.

Thus, the final technical strategy at many sites will include physical or hydraulic containment. Consequently, contaminants will remain on site for many years, perhaps decades, and EPA has not adequately addressed the issue of long term monitoring and maintenance of such sites. This is a particularly sensitive issue for affected community groups who do not have confidence that the institutional mechanisms are sufficiently robust to provide long term protection.

As a further consequence of the large number of sites facing technical infeasibility, the Committee also recommended that expert panels be used by EPA and other regulatory agencies to provide technical arbitration on complex site characterization, remedy selection, and long term operation issues at selected sites. EPA's current staff resources do not appear sufficient to deal with the anticipated large number of sites where requests for technical infeasibility are likely to be submitted.

The Committee further recommended that EPA make additional efforts to inform the public on the technical limitations to complete restoration of contaminated aquifers, and that EPA should make reviews of ground water remediation systems a regular part of their mission, disseminating the information in a timely manner to all interested parties.

Finally, although complete restoration may be infeasible at many sites, removal, or destruction of hazardous contaminants in the ground water must still be a major goal of all remedial actions. Continued research in understanding the fate and transport of contaminants in subsurface environments is essential as is the continued development of new technologies to achieve more rapid or more complete mass removal or destruction.

The principal focus of the technical program at the National Ground Water Association's annual meeting will be the findings of the NRC report and its implications for site remediation. The four sessions will address performance of existing systems,

challenges in site characterization, the potential for innovative technologies, and the policy implications of the NRC findings. This latter session will provide a unique opportunity for the professional community to discuss policy issues which are still in a state of flux as regulators and the regulated community begin to deal with the problems of technical impracticability.

Biographical Sketch

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Michael C. Kavanaugh is currently a principal with ENVIRON Corporation in Emeryville, California. Before working with ENVIRON, he was senior vice president of the consulting firm Montgomery-Watson, Inc., and director of the Environmental Management Division of Montgomery-Watson, Ltd., located in the United Kingdom. He is a chemical and environmental engineer with more than 23 years of experience in all aspects of environmental engineering, including technical and managerial responsibility for more than 50 sites requiring soil or ground water remediation. He is also a consulting professor of environmental engineering at Stanford University. He received a Ph.D. in sanitary engineering in 1974 from the University of California, Berkeley.

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June 21, 1994

To: San Francisco Bay Area Agencies Overseeing UST Cleanup
(see distribution list)

Subject: Residential or Farm Heating Oil Tanks

Background

The purpose of this letter is to provide you with the Regional Board's views on home and farm heating oil tanks and their impacts on water quality within this region. In the Bay Area, most heating oil tanks are residential, normally buried several feet below the ground surface, and range in capacity from 150 to 1500 gallons. These tanks have generally been out of service for more than 40 years, dating from the time when piped-in natural gas became widely available. Some people in the tank removal business say that there are tens of thousands of such tanks within the Bay Area.

It has been our experience that any leakage from such long abandoned residential (or farm) heating oil tanks and their appurtenant structures have generally had little or no impact on water quality. This appears to be due to the fact that heating oil has a lower migration potential than organic solvents or other fuels, the amount leaked is typically small, and the passage of time has allowed natural attenuation to take place.

Recommendations

No soil or ground water investigation should be required when closing such a tank unless there is some independent information that a water quality problem exists.

In general we believe these tanks may be closed in place. At a minimum, the contents of the tank need to be removed, and the tank filled with an inert material so as to render it unfillable and to assure soil and/or foundation structural integrity.

Although heating oil tanks of less than 1100 gallon capacity are specifically exempted from regulation by Title 23, Chapter 16 of the California Code of Regulations, guidance towards evaluating closure of these smaller buried tanks in place can be found within relevant sections of that regulation.

In cases where tank removal is elected or required, we recommend that over-excavation of contaminated soil be limited to soil which is visibly contaminated to the extent that manmade structures and/or personal safety are not compromised.

For those agencies who are not comfortable with "visible" criteria and who require a cleanup number, we believe a TPH-diesel range limit of approximately 1000 mg/kg with BTEX and PNA at non-detectable levels is reasonable. This TPH-diesel range concentration is based upon published research for cancer risk levels of 1×10^{-5} for adults and children via inhalation, dermal, and ingestion routes of exposure for diesel fuel No. 2. We believe this number is quite conservative as any residual fuels remaining in long abandoned heating oil tanks will probably be an even heavier and less mobile end fuel product

In some instances, which we believe should be rare, more stringent requirements may be appropriate because of your adopted policies or ordinances, or because of an especially sensitive water resource.

Ground Water Impacted Cases

The exception to these views is when there has been a release which is causing a known water quality problem (e.g., impacting a drinking water well, seeping to a surface water, etc.) or nuisance condition (e.g. odor, fire hazard, seeps, etc.). For those cases in which ground water has been impacted, the Regional Board should be properly notified. A judgement will have to be made as to whether additional work is required depending on the degree of ground water contamination. For example, if contamination is found to already be below or at levels expected to be reached after utilizing typical remedial technology no further work should be requested and the case should be closed. Agencies involved in the Local Oversight Program (LOP), or those Local Implementing Agencies (LIA) which have an agreement with the Regional Board to provide oversight of the cleanup of Underground Storage Tanks, should provide appropriate oversight of cleanup.

For additional information as to the Board's rationale for preparing this guidance letter, please see the attachment. In making these recommendations, we acknowledge that certain water resources are especially sensitive, and local agencies may wish to apply more rigorous standards.

If you have any questions on this letter, please call Steve Morse of my staff at (510) 286-0304.

Sincerely,

Steven R. Ritchie
Executive Officer

ATTACHMENT

cc: Distribution list (w/ attachment)
Walt Petit, SWRCB (w/ attachment)

Risk Management

CLEANUP:
Based upon the above and for the situation where the heating oil tank *has not* been:

- in use for many years
- in contact with ground water

and

- available, independent evidence does not indicate water quality problems due to tank leaking,

the Regional Board views the cleanup and closing of home and farm heating oil sites to require no more than source removal (e.g., as a minimum the tank's contents). In the case of a leak, and if the tank and polluted soil must be removed, then removal of the source and polluted soil only "to the extent feasible", should be adequate. "Extent feasible" should be considered as:

- Soil over-excavation generally limited to that which is visibly contaminated. If a soil contamination cleanup level is needed, 1,000mg/kg TPH-diesel range is reasonable where contaminated soil is at least several feet below the surface and not in direct contact with ground water. This is based on an incremental carcinogenic risk level for inhalation, dermal, and ingestion for diesel #2 of $1x10^{-5}$ derived from published data [Millner, et. al., *Human Health-Based Soil Cleanup Guidelines for Diesel Fuel No. 2*, Journal of Soil Contamination, 1(2): 103-157(1992).]
- Excavation is conducted within safe limits of nearby structures or utilities.
- Excavation that extends to the limits of the appropriate excavating equipment's "reach".

Removal of heating oil tanks is not necessary from the Regional Board's view as long as the tank contents have been removed, the tank is filled with inert materials, and it's made unfillable. Although exempt from CCR Title 23, Chapter 16, guidance of the suitability of leaving tanks in place can be found within relevant sections of those Regulations.

From the above, heating oil tanks should be a relatively low priority (or even a non-priority) in the underground tank cleanup program when considering the low magnitude of potential problem, resources needed to cleanup the problem, and regulatory resources and priorities.

EXCEPTIONS
Sites with independent evidence that the home or farm heating oil tank poses a water quality problem and/or nuisance, e.g. pollution of drinking water wells or useable groundwater, direct contact of the leaking tank or significantly contaminated soils to useable ground water, seeps to nearby surface waters

SENSITIVITY ANALYSIS.... WHAT IF?

In considering this kind of broad views on heating tank closures and cleanups, the Board is aware that some uncertainty is involved, as is the case for most of its decisions. This issue involves risk management in which the Board is asked to decide issues on information that can never be complete.

For heating oil tanks, the risk exists that accepting the above views to streamline the case closure process may lead to premature closure for some cases. This would presumably allow the continuation of some long-standing pollution of shallow ground water in the immediate area of the leaking heating oil tank which was previously unknown and would remain unknown without complete investigation. This condition, when found, could be remedied at some later date when the problem is discovered, or it may disappear in time due to natural degradation. In any case, given the record and experience to date, the consequences of an occasional mistaken closure are not likely to be either serious or irreparable to the community or water quality.

SUPPLEMENTARY LOCAL AGENCY ACTIONS

In some rare instances, more stringent requirements may be appropriate because of locally adopted policies or ordinances. This is always the local agency's option, and provided it can establish the requirement to protect an especially sensitive water resource, it may also be able to gain the Regional Board's support.

RELATIONSHIP TO OTHER UST CLOSURES, CLEANUPS

These views relate only to heating oil tanks as described above and do not cover other situations. Specifically, these views do not cover diesel fuel tanks (which are usually lighter, more volatile fuels, eg. diesel #2) or situations not covered above.

Distribution List

ALAMEDA COUNTY
County Board of Supervisors

Alameda County Environmental Health Services
ATTN: Ed Howell, Chief, Hazardous Materials Division

Alameda County Water District
ATTN: Steven Inn, Manager, Groundwater Resources

City of Berkeley
ATTN: Denise Barndt, Manager - Emergency and Toxics

Hayward Fire Department
ATTN: Hugh J. Murphy - Environmental Specialist

City of Pleasanton
ATTN: Battalion Chief Bill Halvorsen / Fire Department

City of San Leandro Fire Department
ATTN: Michael Bakaldin, Hazardous Materials Coordinator

CONTRA COSTA COUNTY
County Board of Supervisors

Contra Costa County Department of Health Services
Hazardous Materials and Occupational Health Division
ATTN: Lew Pascalli, Deputy Director, Environmental Health/Hazardous Materials

MARIN COUNTY
County Board of Supervisors

Marin County Office of Waste Management
ATTN: Dee Johnson, Deputy County Administrator

San Rafael Fire Department
ATTN: Forrest Craig, Hazardous Materials Coordinator

NAPA COUNTY
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County of Napa
Department of Environmental Health Management, Hazardous Materials Division
ATTN: Ralph Hunter, Environmental Health Manager

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Board of Supervisors

City and County of San Francisco,
Department of Public Health
ATTN: Bill Lee, Director, Bureau of Toxics

SAN MATEO COUNTY
County Board of Supervisors

San Mateo County Department of Health Services,
Office of Environmental Health
ATTN, Brian Zamora, Director

SANTA CLARA COUNTY
County Board of Supervisors

Santa Clara Valley Water District
Belinda Allen, Supervising Engineer,
Groundwater Protection Division

SOLANO COUNTY
County Board of Supervisors

Solano County Department of Environmental Management
ATTN.David L. Eubanks Supervisor,
Environmental Health Services Division

SONOMA COUNTY
County Board of Supervisors

Sonoma County Department of Environmental Health,
Hazardous Materials Division
ATTN: Jeff Lewin, Supervisor

Info to Banking and Mortgage Representatives:

Mr. Richard Belyea
Home Savings of America

Mr. Jim Larsson
San Francisco Federal Savings

Mr. Evan Henry
Bank of America

Mr. Thomas Stoflet
Wells Fargo Bank

Mr. Gordon Canepa
Bayview Federal Bank

Mr. Dan Hernandez
First Nationwide Bank

Mr. Jon Reynolds
Reynolds & Brown

Mr. Randell Yim
Parker Milliken

Mr Michael Mulligan
San Francisco Federal Savings

Mr. Michael Herwood
Home Federal Savings & Loan

Mr. Pavel Woloszyn
Union Bank

Ms. Cynthia Hart
Bayview Federal Bank

Ms. Elizabeth Ward
Bank of the West

Mr. James Kessler
The Martin Group

Mr Donald Parker
City of Alameda

Lt Mike Petrouhoff
Cmdg Off (NAS-Alameda)

State Water Resources Control Board
James Giannopoulos SWRCB/CWP (w/ attachment)
Lori Casias SWRCB/CWP (w/ attachment)
Dave Deaner, SWRCB/CWP (w/attachment)

Attachment

Rationale Supporting San Francisco Bay Regional Water Quality Control Board's Views on Closing Sites with Underground Heating Oil Tanks
June 15, 1994

Purpose: This rationale was developed to provide support for the Regional Board's views on closure actions at sites with underground heating oil tanks.

GIVEN:

Risk Assessment

- Heating oil has a high viscosity, relatively low migration potential, and is relatively less soluble in water than organic solvents, gasolines, or even lighter diesel fuels. Heating oils used were mainly No. 2 (primarily residential) and the heavier No. 6 (primarily commercial and industrial, and some apartment buildings, mostly in San Francisco).

- Most home heating oil tanks have typically not been used for over 40 years, when natural gas gained widespread use throughout the region.

- Any amount leaked since use was discontinued would be limited to whatever such tanks contained at the time their use was discontinued.

- Leakage, if any, would usually be at least 3 to 5 feet below ground surface and probably limited to 3 to 5 feet from the tank.

- The long period since tank use was discontinued would allow for most serious impacts of any leak to be detected, for the lighter ends of the heating oil to volatilize, and for natural degradation processes to take place.

- BTEXs and PNAs are usually not found at significant levels at heating oil sites.

- Very high costs for investigation of leaks often lead to a remediation of what is most likely a "potential" problem at considerable cost to the affected parties to include the State Water Board's SB2004 UST Cleanup Fund.

- Impacts, if any, for heating oil tanks that have leaked, are generally localized and relatively small, especially compared to other fuels and solvents.

- In the SWRCB/RWQCB's LUSTIS database for the Bay Area, very few (less than 100) of the 6000+ leaking tanks have been identified as being caused by leaking heating oil tanks. Of these, only a few have been identified as affecting water quality.

- Home heating oil tank owners are eligible for state cleanup funds regardless of tank size.

APPENDIX L

United States
Environmental Protection
Agency

Solid Waste and
Emergency Response
5403W

EPA 510-F-93-030
October 1993

EPA

Groundwater Remediation For UST Sites

Pump And Treat

Pump and treat *is a technique that brings contaminated groundwater above the ground through the use of extraction wells. The water is then treated, normally using one of three processes: granulated activated carbon, air stripping, or bioremediation.*

This technique is most effective in permeable aquifers. It also can be used with in situ vapor extraction (SVE) to enhance removal of volatile contaminants from the zone of water table fluctuation.

A limitation of pump and treat is that it can take a long time to achieve complete remediation, sometimes as long as seven years even for an ideal site. In addition, this method is subject to fluctuations of the water table that can smear contaminants and complicate cleanups.

Petroleum Types And Constituents

- Dissolved gasoline and diesel, jet fuel, and kerosene
- Dissolved constituents such as benzene, toluene, ethylbenzene, and xylene (BTEX)

Pump And Treat	
Advantages	• Controls contaminant plume migration and reduces plume concentration
Limitations	• Not very effective in aquifers with low permeability • Can require expensive and lengthy long-term pumping and treating • High iron content/hardness can affect water treatment • Requires control of water table fluctuation to minimize smearing contaminants • Might require off-site discharge permits
System Components	• Vertical or horizontal extraction wells • Trenches • Water pumps • Aboveground water handling and/or treatment systems

Wastestream Treatment	• Wastestream treatment options:
	  • *Air stripping*
	  • *Granulated activated carbon*
	  • *Bioreactors*

Parameters to Monitor[1]	• Constituent concentrations in groundwater • Influent and effluent concentrations from water treatment system • Water discharge rate • Water levels
Cleanup Levels and Timing[2]	• Might not meet cleanup standards or maximum contaminant levels (MCLs) • For an ideal site[3], 3 to 7 years • For an average site[4], 3 to 10 years or longer
Costs[5]	• For an ideal site[3], $150,000 to $200,000 • For an average site[4], $250,000 to $300,000

[1]"Parameters to monitor" are for performance purposes only; compliance monitoring parameters vary by state.
[2]Cleanup standards are determined by the state.
[3]An "ideal site" assumes no delays in corrective action and a relatively homogenous, permeable subsurface.
[4]An "average site" assumes minimal delays in corrective action and a moderately heterogeneous and permeable subsurface.
[5]Costs include equipment, and operation and maintenance.

United States
Environmental Protection
Agency

Solid Waste and
Emergency Response
5403W

EPA 510-F-93-021
October 1993

EPA

Soil Remediation For UST Sites

In Situ Soil Vapor Extraction

In situ soil vapor extraction (SVE) is a technique for removing contaminants from unsaturated soils. The technique draws fresh air into the ground with a vacuum pump. The air brings the contaminants to the surface, where they can be treated and safely discharged.

In situ soil vapor extraction is most effective in coarse-grained soils such as sand and gravel. It requires a minimum 5-foot-thick unsaturated zone of soil. This technique can be used in conjunction with air sparging, groundwater pumping, or bioremediation systems.

This technique is able to treat large volumes of soil effectively and with minimal disruption to business operations. It also can remove contamination from near or under fixed structures.

Petroleum Types And Constituents

- Fresh and weathered gasoline and diesel
- Volatile organic compounds (VOCs) such as benzene, toluene, ethylbenzene, and xylene (BTEX); and semivolatile organic compounds (SVOCs)

In Situ Soil Vapor Extraction	
Advantages	• Effectively treats large volumes (>1,000 cu yd) of soil • Removes contamination near or under fixed structures • Causes minimal disruption to business operations • Removes volatile contaminants from the zone of water table fluctuation
Limitations	• Effectiveness limited in heterogeneous soils or soils with high clay or organic content • Airflow may not contact all parts of soil • Leaves residual constituents in soil • Might require air discharge permits
System Components	• Vertical or horizontal extraction wells • Trenches • Vacuum blower or pump • Injection and passive inlet wells • Aboveground vapor treatment equipment (optional)

Wastestream Treatment	• Vapor treatment options (if needed):
	  • *Vapor phase biofilter*
	  • *Granulated activated carbon*
	  • *Internal combustion engine*
	  • *Catalytic oxidation unit*
	  • *Thermal incinerator*

Parameters to Monitor[1]	• Vapor concentration • Airflow rate
Cleanup Levels and Timing[2]	• Can remove 90% of volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs) • For an ideal site[3], 90% in 6 months to 1 year • For an average site[4], 90% in 6 months to 3 years • Longer time required for heterogeneous soils and less volatile constituents
Costs[5]	• For an ideal site[3], $40,000 to $120,000 • For an average site[4], $100,000 to $150,000 • Vapor treatment costs can drastically affect total costs

[1]"Parameters to monitor" are for performance purposes only; compliance monitoring parameters vary by state.
[2]Cleanup standards are determined by the state.
[3]An "ideal site" assumes no delays in corrective action and a relatively homogeneous, permeable subsurface.
[4]An "average site" assumes minimal delays in corrective action and a moderately heterogeneous and permeable subsurface.
[5]Costs include equipment, and operation and maintenance.

APPENDIX M

HEALTH AND SAFETY PLAN

FOR

WATSON TRUST PROPERTY
1461 PARK AVENUE
EMERYVILLE, CA

PRESENTED TO:

UNION BANK
TRUST REAL ESTATE
445 S. FIGUEROA STREET
LOS ANGELES, CA 90071

BY:

BLAKELY ENVIRONMENTAL, INC.
320 S. MILLIKEN AVENUE, SUITE A
ONTARIO, CA 91761

FEBRUARY 27, 1995
02-95-262

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1. HEALTH AND SAFETY PLAN

Blakely Environmental, Inc., has established this site-specific Health and Safety Plan (HASP) as part of he work plan for all individuals engaged in field assessment activities at the Watson Trust property located at 1461 Park Avenue, Emeryville. All site work shall be conducted in a safe manner and comply with EPA, state and local regulations, in particular OSHA 29 CFR, part 1910, and California Administrative Code Title 8. In addition, all site work will comply with Blakely Environmental Inc.'s Corporate Health and Safety Program and all supporting Standard Operating Procedures. This HASP may be modified during actual field activities, if necessary, as more information and site-specific data is obtained.

Prior to any work on-site, an approved copy of this HASP (latest edition) shall be provided to all employees and subcontractors by the Project Manager. Each subcontractor will be responsible for providing their own HASP. At a minimum the subcontractors' HASP must meet the requirements of this HASP. Blakely Environmental will review and approve each subcontractor HASP prior to initiation of field work.

1.1 PURPOSE AND OBJECTIVES

The purpose of this site-specific HASP is to provide guidelines and procedures to ensure the health and physical safety of those persons working at the Watson Trust property. While it may be impossible to eliminate all risks associated with site work, the goal is to provide precautionary and responsive measures for the protection of on-site personnel, the general public and the environment.

The HASP objectives are as follows:

* Ensure the safety of all site personnel
* Protect the public and the environment
* Adhere to Blakely Environmental Health and Safety procedures

1.2 IMPLEMENTATION

This site-specific HASP, and any additions included in a subcontractor HASP, will be reviewed and the Field Team Review Form (Attachment 1) will be completed by all site personnel prior to their scheduled field work. Whenever the site-specific HASP is revised or amended, personnel will be instructed in the new procedures and required to complete a new Field Team Review Form. The site-specific HASP will be implemented in the field by Blakely Environmental's Health and Safety Coordinator and/or designated Site Safety Officer.

2. BACKGROUND

2.1 SITE HISTORY

Pic-a-Tune occupied the property from 1968 to 1973. During this time, Pic-a-Tune acted as a distribution center of music. No manufacturing processes occurred on site. Music supplies were only stored until distributed. Stuart Western leased the property from 1973 to 1986. Stuart Radiator and Stuart Auto Parts occupied the property during this time. The Stuart companies were involved in warehousing and distributing auto parts and rebuilding brake shoes. No manufacturing processes occurred on site. Since 1986, the Western Brake Company owned by Modine Southwest Company, has occupied the property. The Western Brake Company warehouses and distributes vehicle brake parts and radiators. No manufacturing processes occurred on site. Subsequently the site was operated as a warehouse until present. Electro Coatings, Inc., located in the groundwater upgradient direction appears to have discharged

sufficient hexavalent chromium contaminants into groundwater to cause contamination levels which have migrated onto this site.

2.2 SCOPE OF WORK

BEI will perform groundwater monitoring at the site on a quarterly basis for eight episodes. Results of this monitoring will be submitted to Region 2 of the CRWQCB.

3. RESPONSIBILITIES

3.1 HEALTH AND SAFETY COORDINATOR

As B.E.I.'s Health and Safety Coordinator (HSC), Toni Lee Blakely is responsible for directing and implementing the HASP and ensuring that all B.E.I. and subcontractor personnel have been trained in HASP procedures. The HSC will coordinate safety activities with subcontractors and serve as liaison with public officials who might wish to monitor health and safety activities on-site. The HSC will also ensure that proper protective equipment is available and used in the correct manner, that decontamination activities are carried out correctly, that specific site hazards are noted and accounted for in the Corrective Action Plan and that employees have knowledge of the local emergency medical system. The HSC may conduct periodic site audits to ensure compliance with the HASP and to note any additional hazards or concerns. The HSC has stop-work authorization which shall be executed upon determination that an imminent health or safety hazard exists.

3.2 DESIGNATED SITE SAFETY OFFICER

As B.E.I.'s Site Safety Officer (SSO), Hiram Garcia is responsible for implementing the site-specific HASP in the absence of the HSC. The SSO shall conduct daily tailgate safety meetings and ensure that only authorized personnel are allowed at the site. In addition, the SSO shall ensure that the daily sign-in logs for site persons and visitors are maintained. The SSO shall report any unsafe acts or conditions to the HSC.

The SSO also has stop-work authorization which shall be executed upon determination that an imminent danger to life or health exists. If a stop-work order is issued, due to safety concerns, the HSC shall be contacted immediately and appropriate steps taken to correct the situation.

3.3 PROJECT MANAGER

B.E.I. Project Manager, David Blakely is the direct link between B.E.I. and the Watson Trust. He is responsible for directing all on-site operations, including the overall implementation of the Health and Safety Program. In addition, the Project Manager is responsible for ensuring that adequate resources and personnel protective equipment are allocated for the health and safety of site personnel. The Project Manager is also responsible for ensuring that the safety personnel (via the HSC) are given free access to all relevant site information that could impact health and safety. He will correct conditions or work practices that could lead to employee exposure to hazardous materials.

3.4 OCCUPATIONAL MEDICAL CONSULTANT

GUASTI MEDICAL CLINIC, INC., BEI's Occupational Medical Consultant, will be available to answer medical questions and provide guidance in unexpected situations. The Medical Consultant will recommend appropriate medical monitoring for the site team members.

3.5 EMPLOYEES

All BEI employees working at the site are responsible for reading and understanding the HASP. They will be held accountable for complying with all aspects of the HASP.

3.6 SUBCONTRACTORS

If they desire, subcontractors on the site may provide their own site Health and Safety Plan that must incorporate, at a minimum, Blakely Environmental's Health and Safety Plan. As described above, Blakely Environmental's HSC and SSO have authority to ensure that subcontractor employees are following the Blakely Environmental and subcontractor HASP provisions.

4. EMERGENCY PLANNING

4.1 EMERGENCY SERVICES

Figure 1 illustrates the location of the Watson Trust site with respect to the Summit Medical Center. If an emergency should occur on-site, the Emergency Medical System (911) should be activated.

4.2 EMERGENCY TELEPHONE NUMBERS

Emergency telephone numbers shall be posted on-site and made immediately available at all times. These numbers shall include the following:

EMERGENCY:

Fire	911
Ambulance	911
Police	911
Emergency Rooms (see Figure 1 for Hospital Routes)	
Summit Medical Center	(510) 655-4000
Guasti Medical Clinic, Inc	(909) 988-9211
Blakely Environmental (Toni-Blakely)	(909) 390-1792
Union Bank Contact - Mary Carr	(818) 810-6530

NON-EMERGENCY:

City Police Department	(510) 596-3700
City Fire Department	(510) 596-3750
U.S. Environmental Protection Agency	(916) 767-7600
Department of Public Health	
Main Office Information	(510) 567-6700
Emergency Spill Response	911

5. HAZARD ASSESSMENT

This hazard assessment is based on available information concerning chemical hazards known or suspected to be present at the Watson Trust property. The potential risks to site workers are evaluated below.

5.1 CHEMICAL EXPOSURE

Site workers may be exposed to the components of gasoline during field activities, including drilling, sampling and treatment operations. Potential exposure is to petroleum hydrocarbon-contaminated soil and water. At present, the major expected site contaminants are benzene, toluene and xylene. A description of these chemicals can be found in Table 1. The routes of exposure for fuel hydrocarbons are ingestion, inhalation, skin absorption and eye or skin contact. Measures shall be taken to eliminate personnel exposure through the use of personal protection equipment when engineering controls are not feasible.

Table 1

Chemical Properties of Suspected Contaminants

Chemical Name	Chemical Formula	CAS#	Description	LEL	VEL	(OSHA)	(OSHA)	(ACGIH)	(NIOSH)	(NIOSH)	IDLH	Carcinogen	Incompatibilities
Benzene	C_6H_6	71432	Clear colorless liquid with aro-chlorine, bromine w/iron 5.51° F bp: 176° F Flash p: 12°F	1.3 1.4%	7.1 8.0%	1 ppM	50 ppM (10 min) matic odor mp:	1 ppM	.1 ppM (8 hrs)	1 ppM (15 min)	CA	Yes	Strong oxidizers,
Toluene	C_7H_8	108883	Colorles liquid, benzoil like odor flammable mp: -95 to -94.5°, bp: 110.5° flash p: 40° Insol in H_2O	1.27%	7%	200 ppM	300 ppM 500 ppM (10 min. peak)	100ppM	100 ppM (10 hr)	200 ppM (10 min)	2,000 ppM	----	Strong oxidizers
Xylene	C_8H_{10}	1330207	Clear Liquid with aromatic colors. bp: 138.5° flash p: 81° F	1.1%	7%	100 ppM	---	---	100 ppM	200 ppM	1,000 ppM	----	Strong oxidizers

Table 1 (Continued)

Chemical Name	Rates of Exposure	Symptoms	Target Organs	Recommended Respirator Selection
Benzene	Inhalation Skin absorbtion Ingestion Skin/eye contact	Irritated eyes, nose respiratory system; giddy; headache; nausea; staggering gait; fatigue; anorexia; lassitude; dermatitis; bone marrow depressant; abdominal pain	Blood, CNS, skin, bone marrow, eyes, respiratory system	Pressure demand SCBA with full face piece at any detectable concentration
Toluene	Inhalation Skin absorption Ingestion Skin/eye contact	Fatigue; weakness; confusion; euphoria; dizziness; headache; diluted pupils; lacrimation; nervousness; muscle fatigue; insomnia; paresthesia; dermatitis; photophobia	CNS, liver kidneys, skin	Full face chemical cartridge respirator with organic vapor cartridge up to 1,000 ppM.
Xylene	Inhalation Skin absorption Ingestion	Dizziness; excitement; drowsiness; incoordination; staggering gait; irritated eyes, nose, throat; corneal vacuolization; anorexia; nausea; vomiting; abdominal pain; dermatitis	CNS, eyes, gastrointestinal tract, blood, liver, kidneys, skin	Full face chemical cartridge respirator with organic vapor cartridge up to 1,000 ppM

5.2 FIRE AND EXPLOSION

The risk of fire or explosion during site activities is present, though minimal. Toluene is considered flammable and is a known contaminant on-site. The lower explosive limits (LEL) for benzene, toluene and xylene are 1.3 to 1.4 percent, 1.2 percent and 1.1 percent, respectively. Their flash points are 12F, 40F and 81F, respectively.

For added security, smoking will not be allowed on the site except in a designated smoking areas (to be determined). "No Smoking" signs will be prominently displayed at numerous locations. A portable combustible gas monitor may be utilized to monitor the LEL. All work will cease if the percent LEL reaches 20 percent.

5.3 OXYGEN DEFICIENCY

It is not expected that an oxygen-depleted atmosphere will be encountered during site activities. Whenever the risk of encountering an oxygen-depleted atmosphere does exist (confined space entry, for example), precautions will be taken to ensure the safety of all employees. Confined space entries are used only as a last resort, when all other means have been exhausted. Blakely Environmental uses a special permit system for confined space entry, entailing additional employee training and atmospheric monitoring.

5.4 BIOLOGIC HAZARDS

It is not anticipated that poisonous plants or hazardous animals will be encountered during site activities.

5.5 SAFETY HAZARDS

Minimal safety hazards are expected onsite. Any encountered would be associated with the monitoring of groundwater wells.

5.6 HEAT/COLD STRESS

Wearing personal protective equipment while conducting site operations puts the individual worker at considerable risk of developing heat-related disorders, collectively called heat stress. Monitoring will be performed to avoid heat stress, using both oral temperatures and radial pulse rate for all workers engaging in heavy labor at ambient temperatures over 70F.

5.7 NOISE

Excess exposure to noise is not anticipated during work at the Watson Trust property, however, if noise levels are encountered above 85 decibels (dBa), hearing protection will be worn. In general, excess noise is "suspected" when people standing next to each other are not audible to one another. In addition, ear plugs will be available on-site at all times for worker comfort as desired. A Hearing Conservation Program has been established by Blakely Environmental and is in effect for all site locations.

5.8 ELECTRICAL HAZARDS

All electrical work, installation and wire capacities shall be in accordance with the provisions of the National electric Code. Power cords will be UL-listed heavy duty and include a grounding plug. All power cords and receptacles shall be inspected before use to ensure that the casings are not cracked, grounding prongs are attached and that there are not other visible defects. If any defects are found, the cord, receptacle or equipment shall be tagged and placed out of use until repaired or disposed of. During equipment maintenance activities, proper lockout procedures will be utilized.

6. HEALTH AND SAFETY TRAINING

This section describes the health and safety training requirements necessary for participating in field operations at the Watson Trust property.

6.1 TRAINING REQUIREMENTS

B.E.I. employees and subcontractors who enter the site will be trained to be able to recognize and understand the potential hazards to health and safety associated with the site operations. All B.E.I. employees potentially exposed to hazardous substances will have participated in 40 hours of health and safety instruction and actual field experience under the direct supervision of a trained, experienced supervisor. The objectives of the health and safety training are:

* To make each team member aware of the potential hazards they may encounter;
* To provide the knowledge and skills necessary to perform the work with minimal risk to worker health and safety;
* To make workers aware of the purpose and limitations of safety equipment;
* To ensure that workers can safely avoid or escape from emergency situations.

6.2 ADDITIONAL TRAINING REQUIREMENTS

Workers exposed to special hazards during field operations at the Watson Trust shall receive additional training as determined by the Project Health and Safety Coordinator. On-site managers and supervisors shall receive all training required for employees whom they supervise, plus eight additional hours of specialized training on management and supervision of such operations. Prior work experience or training will be acceptable provided that it is equivalent to the training requirements specified above. Whenever employees are working on-site, at least one person will be currently certified in Standard First Aid/CPR training.

6.3 DAILY SAFETY MEETINGS

Site-specific "tailgate" safety briefings will be conducted daily by the SSO or his designee

to discuss the day's operations, review any modifications to the HASP and ensure that site personnel have the necessary information to conduct their jobs safely. The Tailgate Safety Meeting Form (Attachment 2) will be completed during this briefing and signed by all personnel in attendance. All completed forms shall be maintained on-site. Upon completion of the project, all forms shall be forwarded to the project Health and Safety files.

6.4 TRAINING PROGRAM CONTENT

B.E.I.'s Health and Safety Training Program involves instruction, self-study and field exercises in the following areas:

* Science of Hazardous Materials: Chemical and physical properties of hazardous materials.

* Toxicology: Dose response, routes of exposure, toxic effects and exposure limits.

* Industrial Hygiene: Selection and use of proper protective equipment and clothing to ensure minimal contact with contamination, along with the proper methods to decontaminate non-disposable equipment.

* Decontamination: The methods to don and doff protective equipment and clothing to ensure minimal contact with contamination, along with the proper methods, to decontaminate non-disposable equipment.

* Emergencies: Potential emergency situations, first aid, self-rescue techniques, emergency drills, recordkeeping and investigation.

* B.E.I. Procedures: All aspects of the B.E.I. Health and Safety Program for Hazardous Waste Site Operations, site-specific HASP, the Corrective Action Plan, and company standard operating procedures regarding these areas:

    * Names of personnel and alternates responsible for site safety and health;
    * Known or suspected health and safety hazards;
    * Proper use of personal protective equipment;
    * Work Practices to minimize risks;
    * Safe use of engineering controls and equipment;
    * Medical surveillance requirements;
    * Site control measures;
    * Decontamination procedures.

7. MEDICAL SURVEILLANCE

7.1 GENERAL

A medical surveillance program has been instituted by Blakely Environmental for all employees with potential exposure to hazardous substances. An initial medical examination is given upon initiation of employment, annually thereafter, and upon termination (if the employee has not had an examination within the last six months). In addition, baseline monitoring and job termination monitoring

may be established to document exposure for project personnel. Subcontractors working with hazardous materials or in the site exclusion zones will be required to have their own company medical monitoring plan that meets Blakely Environmental standards at a minimum.

7.2 EXAMINATIONS

Each team member may have a physical examination prior to working on-site to verify that he/she is physically able to use protective equipment (including respirators), work in hot or cold environments and have no predispositions to occupationally-induced disease. The medical program will also consist of periodic follow-up exams and additional exams as needed to evaluate specific exposures of unexplainable illnesses. The exams will be provided by the Guasti Medical Clinic or an equally qualified alternate who is Board-certified in Occupational Medicine.

8. PERSONAL PROTECTIVE EQUIPMENT

This section details the level of personal protection to be used during field operations at the

Watson Trust property. Appropriate levels of protection have been determined for areas on-site through the information detailed in the site hazard assessment.

8.1 GENERAL

During all field operations, personnel shall wear hardhats, safety glasses, and steel toe safety boots. Any coveralls and work boots that are worn on-site should not be worn off-site.

8.2 LEVEL D OPERATIONS

Level D operations will include equipment operators and all site personnel except those working in areas which have been designated as posing a possible benzene exposure hazard. Level D personnel will wear work coveralls and work gloves, and have in their possession an air purifying respirator (half or full-face) with organic vapor cartridges. In addition, benzene badges may be worn during site activities to monitor personnel exposure.

8.3 LEVEL C OPERATIONS

The use of Level C protection at the Watson Trust property is not anticipated. Nevertheless, Level C protection shall be implemented in areas where task-specific air monitoring indicates that the action level is reached. Level C protective clothing will consist of the general protective gear plus air purifying respirators with organic vapor cartridges. Dust filters may be worn over the respirators will be utilized by equipment operators while full-face respirators will be required of ground personnel. in addition, personnel will wear surgical inner gloves, Nitrile outer gloves, nuke booties and tyvek or saran-coated tyvek coveralls (depending on moisture or splash hazard).

In general, air purifying respirators are not recommended for use in environments with expected benzene contamination due to the poor warning properties of benzene. Tests have been performed to document the one percent breakthrough times of various chemicals (at 1000 ppm) through organic vapor cartridges. A 1,000 ppm level of benzene was determined to read breakthrough (10 ppm = 1 percent) at 73 minutes. It is not anticipated that this level of air contamination will be present during remediation activities at the site. To further protect site workers from possible exposure, a rigorous

cartridge exchange program will be enforced. Respirator cartridges shall be change at least daily.

8.4 LEVEL B OPERATIONS

The use of Level B protection at the Watson Trust property is not anticipated. However, Level B protection shall be used in areas where air monitoring for the target compound (benzene) indicates levels above the protection for factor given for air purifying respirators(10 times the TLV). Level B shall consist of all personnel protective equipment described above in Level C operations with the substitution of a pressure demand SCBA with full face piece.

The above levels of protection will be utilized during initial field operations. Upon receiving data from air, soil and water sampling, these levels of protection will be re-evaluated to provide sufficient employee protection while maximizing productivity. A situation may be present in which Level C respiratory protection is utilized while Level D clothing is used. Criteria for downgrading personnel protective equipment during field activities will be laboratory results indicating no potential for exposure above the Threshold Limit Value(TLV) for any site contaminant.

9. SITE CONTROL

9.1 SITE SECURITY

No one will be allowed to enter a site work area unless they have been given permission to do so by the Project Manager and the Site Safety Officer, and otherwise follow applicable portions of this HASP.

9.2 DECONTAMINATION PROCEDURES

In order to assure that contamination is controlled and not spread from the site, decontamination procedures will be employed for both equipment and personnel. All decontamination activity will be monitored to assure compliance with the procedures described below.

Decontamination of personnel and equipment will be required following the monitoring activities. Decontamination procedures will be developed for both equipment and personnel. A distinction will be made between personnel equipment and monitoring equipment for purposes of decontamination.

9.2.1 STANDARD DECONTAMINATION

All field personnel exiting from the site must pass through a personnel contamination reduction corridor (CRC). At a minimum, all personnel exiting the site will remove all protective clothing and wash their face and hands before entering lunch and break areas to eat, drink or smoke. All personnel will perform a field wash (as defined below) before leaving the site.

A temporary CRC will be established by spreading a waterproof ground sheet and using several tubs for personnel decontamination. The area will be established by the SSO in discussion with the HSC and Blakely Project Manager.

On-site showering will not be required as part of the routine decontamination procedure. However, a shower will be taken at the end of the working day after returning from the site to complete the decontamination process before the next meal or retiring for the day.

Disposal equipment, including respirator cartridges, must be placed in heavy plastic bags or directly into 55-gallon drums for off-site disposal in an approved manner. Used decontamination solutions will also be stored in 55-gallon drums.

9.2.2 EMERGENCY DECONTAMINATION

In the event that a seriously injured person is suspected of being contaminated, the SSO or other site worker will wrap the injured individual in clean plastic sheeting to prevent contamination of the ambulance. Less severely injured individuals will have their protective clothing carefully cut off before transport to the hospital.

9.3.5 COVERALLS

If coveralls are sent off-site for cleaning, the cleaner establishment will be notified of any hazards prior to receiving the coveralls.

9.3 WATER AVAILABILITY

Potable water will be available on-site.

9.4 RECORDKEEPING

To assure HASP implementation, many site activities will be documented. These include maintenance of the HASP at the site; employee HASP sign-off; daily safety briefings; site sign-in log; emergency medical data sheets; health and safety log-notes (which include instrument calibration records, sampling data, monitoring results and incident reports); chemical safety data sheets; and other records identified in the HASP. All documents noted are subject to audit and review by the Project Health and Safety Coordinator and/or Certified Industrial Hygienist.

9.5 EMERGENCY RESPONSE PLAN

Emergency response procedures have been developed for extraordinary events that could occur during field operations. These events include accidents and/or injuries, chemical exposure, spills and fires.

In general, the following actions shall be implemented in the event of an emergency:

1. First aid or other appropriate initial action will be administered by those closest to the accident/event. **This assistance will be coordinated by the designated Site Safety Officer and will be conducted so that those rendering assistance are not placed in a situation of unacceptable risk.** The primary concern is to avoid placing a greater number of personnel in jeopardy.

2. The Project Manager, Field Supervisor and Health and Safety Coordinator will be notified immediately. They will in turn notify Union Bank - Watson Trust.

3. An Accident/Incident Report will be completed by the injured individual or witness and Site Supervisor. The Accident Report will then be forwarded to the Project Manager. Upon reviewing and commenting on the accident/incident, the form will be forwarded to the Blakely Environmental Health and Safety Coordinator who in turn will investigate and make comments on the accident/incident. Any necessary changes to the operation will be made to prevent the same accident or near miss situation from occurring in the future.

9.5.1 ACCIDENTS AND INJURIES

The following response procedures should not be considered inflexible. Every accident presents a unique hazard that must be dealt with by trained personnel working in a calm, controlled manner. In the event of an accident/unusual event, the prime consideration is to provide the appropriate initial response to assist those in jeopardy without placing additional personnel at unnecessary risk.

9.5.1.1 ACCIDENT/INJURY IN CONTAMINATED AREA

If a person working in a contaminated area is physically injured, American Red Cross first aid procedures will be followed. Depending on the severity of the injury, emergency medical response may be sought. If the person can be moved, they will be taken to the edge of the site (on a stretcher, if needed) where contaminated clothing will be removed (if possible), emergency first aid administered and transportation to a local emergency medical facility awaited.

9.5.1.2 ACCIDENT/INJURY IN NON-CONTAMINATED AREA

For accidents/injuries in a non-contaminated hazardous area, the procedures above should be followed with the exception that the injured individual should not be moved and the removal of contaminated clothing would not be necessary.

9.5.2 CHEMICAL EXPOSURE

If the injury to the worker is chemical in nature (e.g., overexposure), the following first aid procedures are generally to be instituted as soon as possible.

9.5.2.1 EYE EXPOSURE

If contaminated solids or liquids get into the eyes, they will be washed immediately for 15 to 30 minutes at the emergency eyewash station using large amounts of water and lifting the lower and upper lids occasionally. Medical attention will be obtained immediately. (Use of contact lenses is not permitted in a designated Exclusion Zone).

9.5.2.2 SKIN EXPOSURE

If contaminated solid or liquid gets on the skin, the affected area will be promptly washed with soap or mild detergent and water. If contaminated solids or liquids penetrate through the clothing, clothing will be immediately removed and the skin washed with soap or mild detergent and water. Medical attention will be obtained if symptoms warrant.

9.5.2.3 INHALATION

If a person inhales a large volume of potentially toxic vapors, they will be moved to fresh air at once. If breathing has stopped, artificial respiration will be performed. The affected person will be kept warm and at rest. Medical attention will be obtained immediately.

9.5.2.4 INGESTION

If contaminated soil or liquid is swallowed, medical attention will be obtained immediately. Before first aid is given, the Poison control Center shall be called.

9.5.3 FIRES

Fire extinguisher will be available on-site in support areas and in all vehicles. Fire extinguisher will be 20 lb. ABC's rated. Personnel will be trained in the proper use of fire extinguisher, techniques for smothering fires and emergency evacuation procedures. All personnel will be instructed to summon the local Fire Department if a fire should occur.

9.5.3.1 SMALL FIRES

In the event of a small fire at the site, the following actions shall be taken:

1. Evacuate all unnecessary personnel from the area;
2. Attempt to extinguish fire using portable fire extinguisher or by smothering (personnel protective equipment may be required);
3. Request emergency response assistance (ambulance, local Fire Department, hospital, poison control center) as appropriate for any injuries or exposures to hazardous chemicals which occur during suppression of the fire;
4. Notify the Blakely Environmental Project Manager and Health and Safety Coordinator;
5. Notify Union Bank - Watson Trust.

9.5.3.2 LARGE FIRES

In the event of a large fire, or small fire which cannot be extinguished, the following actions shall be taken:

1. Evacuate all personnel from the area, preferably to an upwind location;
2. Notify the local Fire Department and other emergency response agencies;
3. Notify the Blakely Environmental Project Manager and Health and Safety Coordinator;

4. Notify Union Bank - Watson Trust

9.6 EMERGENCY FOLLOW-UP AND EVALUATION

The Blakely Environmental Field Supervisor will notify the Project Manager and Health and Safety Coordinator as soon as possible after an emergency situation has been stabilized. The Project Manager will then notify the Watson Trust, appropriate agencies and environmental contacts. If an individual is injures, an Accident/Incident Report will be filed with the HSC.

9.7 PROCEDURES FOR REPORTING TO STATE, LOCAL AND FEDERAL AGENCIES

In all cases, The Blakely Environmental Project Manager will be notified. He, in turn, will contact the client and any regulatory agencies.

9.8 EMERGENCY EVACUATION PROCEDURES

In the event of a site emergency, all workers at the site will be notified by the SSO or designee to stop work immediately and offer assistance. Those not needed for immediate assistance will decontaminate per normal procedures and leave the site.

9.9 GENERAL SAFE WORK PRACTICES

9.9.1 MINIMIZATION OF CONTAMINATION

Personnel and equipment used in the contaminated area should be minimized, consistent with effective site operations. Only absolutely required samples will be taken back to the laboratory. Contamination will be avoided wherever possible by not kneeling on contaminated ground, avoiding puddles where possible and using plastic drop cloths and equipment covers.

9.9.2 SAMPLING PROCEDURES

Standard operating procedures will minimize the risk of personnel exposure to hazardous materials during sampling, packaging and shipping, and minimize the risk of exposure of others to spilled or residual waste materials.

9.9.3 SAFETY EQUIPMENT

First aid kits and fire extinguishers will be available on-site whenever work is being performed. First aid kits will contain at a minimum the following equipment: large absorbent gauze, adhesive bandages, bandage compresses, gauze pads, eye dressing, scissors, tweezers, triangular bandages, antiseptic pads, first aid book, activated charcoal, syrup of ipecac, burn spray and roller badges. First aid kits will be portable.

9.9.4 FORBIDDEN ACTIVITIES

a. Eating drinking, chewing gum or tobacco, smoking or any practice that increases the probability of hand-to-mouth transfer and ingestion of

materials in any area designated as contaminated;

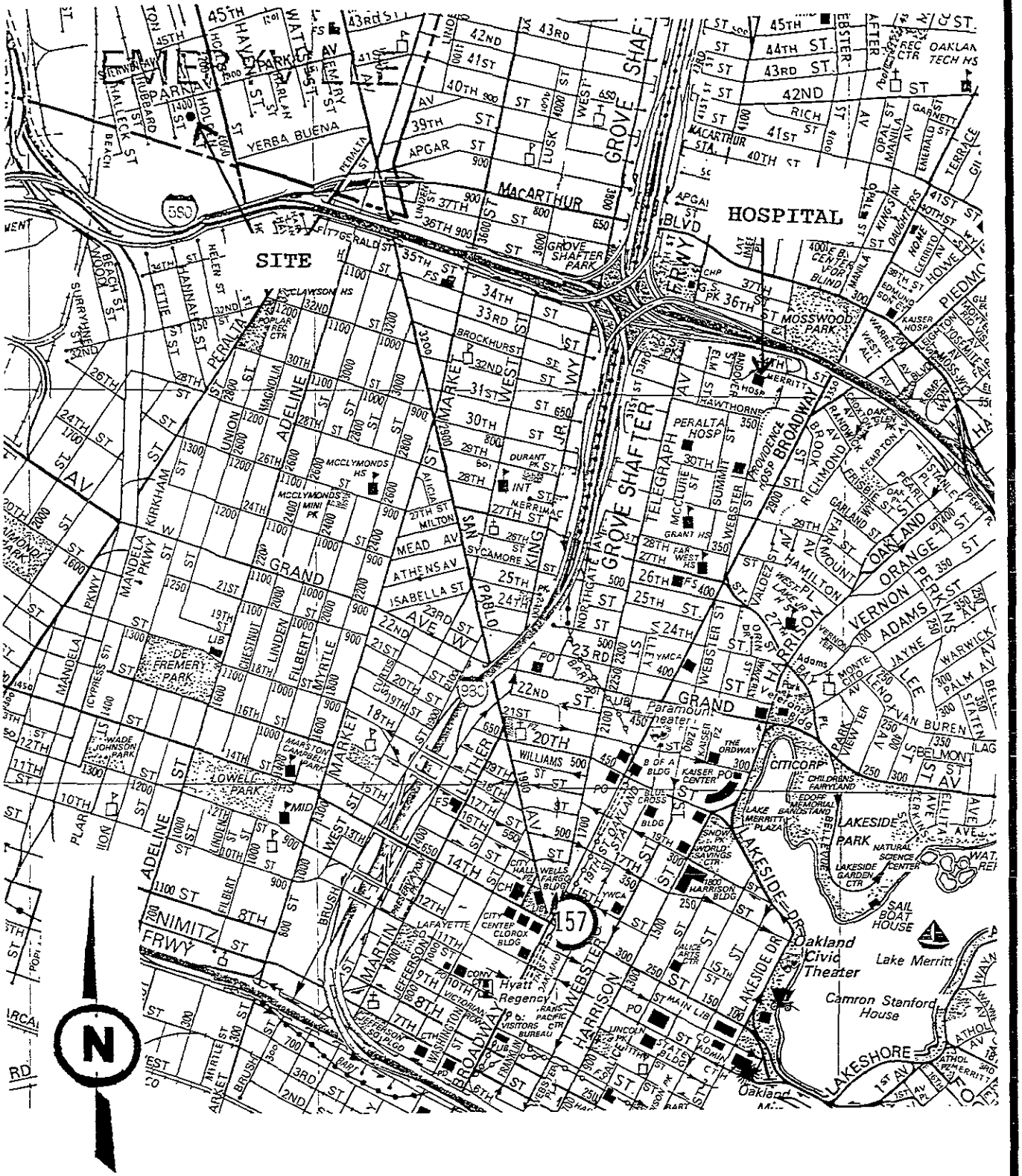
b. Ignition of flammable liquids or starting open flames;

c. Wearing contact lenses on-site;

d. Use of non-prescription controlled substances or alcohol on-site;

e. Site work at night.

Appropriate signs will be posted at the site.



Blakely Environmental Inc. 320 S. Milliken Ave.Suite A Ontario, CA 91761	**Route to Hospital** Watson Trust 1461 Park Ave. Emeryville, California	FIGURE: 1 February 1995

ATTACHMENTS

Field Team Review and Emergency Data

I have read and reviewed the most recent revision _____
Date

of the Health and Safety Plan (HASP) for the _____
Project

_____. I understand the information contained therein and will
Site

comply with all aspects of the HASP.

Name: _____

Signature: _____

Date: _____

This information is in case of emergency only:

Social Security #: _____

Person(s) to notify in case of Emergency:

_____

Relationship: _____

Daytime Phone #: _____

Name of Physician: _____ Phone #: _____

Medical Coverage: _____

_____

Employee Date of Birth: _____

*Known Allergies: _____

_____

*Known Medical Conditions: _____

_____

*any known allergies or medical conditions that physicians should be made aware of before medical attention is given (i.e. allergic to penicillin).

TAILGATE SAFETY MEETING

cility _____

_____ Time _____ Job Number _____

lient _____ Address _____

Specific Location _____

ype of Work _____

Chemicals Used _____

_____

SAFETY TOPICS PRESENTED

Protective Clothing/Equipment _____

_____

Chemical Hazards _____

_____

ysical Hazards _____

_____

nergency Procedures _____

_____

pital/Clinic _____ Phone ( ) _____ Paramedic Phone ( ) _____

pital Address _____

Special Equipment _____

_____

Other _____

_____

_____

_____

ATTENDEES

NAME (printed) SIGNATURE

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

eting Conducted By _____ _____

Supervisor _____ Manager _____