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TO: Ms. Susan Hugo
Alameda County Health Care Agency
Hazardous Materials Division
80 Swan Way, Room 200
Oakland, California 94621

DATE: May 9, 1994
PROJECT #: 7927.17
SUBJECT: Additional Subsurface Investigation and Remedial Action Plan for ARCO Station 2169

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cc: **Mr. Joel Coffman**, GSI
Mr. Michael Whelan, ARCO Products Company
Mr. Richard Hiett, Regional Water Quality Control Board (certified mail)

GeoStrategies Inc.

ADDITIONAL SUBSURFACE INVESTIGATION AND REMEDIAL ACTION PLAN

at

ARCO Station 2169
889 West Grand Avenue
Oakland, California

792717-15

Report prepared for

ARCO Products Company
P.O. Box 5811
San Mateo, California 94402

by

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GeoStrategies Inc.

ADDITIONAL SUBSURFACE INVESTIGATION AND REMEDIAL ACTION PLAN

for ARCO Station 2169,
889 West Grand Avenue, Oakland, California

1. INTRODUCTION

As requested by ARCO Products Company (ARCO), GeoStrategies Inc. (GSI) performed an additional environmental investigation, evaluated remedial alternatives, and prepared this report of the investigation at ARCO Station 2169 located at 889 West Grand Avenue, Oakland, California. The investigation was performed to further evaluate the presence of hydrocarbons in soil and groundwater in the northeastern and northwestern portions of the site, to evaluate the feasibility of vapor extraction/air sparging as a method for remediation of soil and groundwater, to evaluate groundwater usage in the vicinity of the site, and to identify potential secondary sources of hydrocarbons detected in the soil and groundwater, and to provide additional air sparging, and groundwater and vapor extraction points for soil and groundwater remediation system. The results of the investigation were used to prepare the remedial action plan.

The work for this investigation was performed in two phases. Phase I of this investigation was performed in September 1993. This work was performed as specified in the Work Plan (GSI, August 17, 1993) and included: conducting an offsite well research; performing an environmental record research; drilling five on-site soil borings; collecting soil samples from the borings for description and laboratory analyses; constructing two vapor extraction wells (AV-4 and AV-5) and three air sparging wells (AS-1

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through AS-3) in the borings; developing wells AS-1 through AS-3; surveying the newly installed wells; conducting two 8-hour air sparging/vapor extraction tests (AS/VET).

Phase II of this investigation was performed in December 1993, in conjunction with construction of the interim remediation system at the site, and included drilling six on-site soil borings; collecting soil samples from the borings for description and possible laboratory analyses; constructing two vapor extraction wells (AV-6 and AV-7), two air sparging wells (AS-4 and AS-5) and two dual groundwater recovery/vapor extraction wells (ADR-1 and ADR-2) in the borings; developing wells AS-4, AS-5, ADR-1 and ADR-2; surveying all site wells after installation of the interim remediation system had been completed; and preparing the report presenting field procedures, results, and conclusions of this investigation. Included as a part of this report is a description of the interim remedial action plan for the site. Field work was performed to comply with current State of California Water Resources Control Board (SWRCB) and local agency guidelines. GSI Field Methods and Procedures are presented in Appendix A of this report.

2. SITE DESCRIPTION AND BACKGROUND

2.1. General

ARCO Station 2169 is an operating retail gasoline service station and AM/PM minimart located at the southeastern corner of West Grand Avenue and Market Street in Oakland, California, as shown on Plate 1, Vicinity Map. The site is located in an area of commercial and residential development, and is a relatively flat, asphalt- and concrete-covered lot at an elevation of approximately 15 feet above mean sea level. Current site features include a station building, four double-wall 10,000-gallon fiberglass underground storage tanks (USTs) containing unleaded gasoline and diesel, and four service islands. The locations of these features, existing on-site and off-site wells, and former USTs are shown on Plate 2, Site Plan.

2.2. Regional Geology and Hydrogeology

The site is located at the base of the Berkeley Hills approximately 1 mile east of the San Francisco Bay. The site is situated on alluvial-fan deposits of the Temescal Formation comprised of interfingering lenses of clayey gravel, sandy to silty clay, and sand-clay-silt mixtures (Radbruch, D.H., 1957). Local topography suggests groundwater flows to the west toward San Francisco Bay. Groundwater at the subject site was encountered at depths between 12½ to 18 feet below the ground surface. Measured groundwater flow direction beneath the site shows groundwater flows toward the northwest.

3. PREVIOUS ENVIRONMENTAL WORK

3.1. Limited Site Assessment

On May 14, 1991, GSI drilled five exploratory soil borings (A-A through A-E). Four soil borings (A-B through A-E) were drilled adjacent to the 1991 underground storage tank (UST) complex and one soil boring (A-A) was drilled in the proposed replacement UST complex location. The highest concentrations of Total Petroleum Hydrocarbons calculated as Gasoline (TPH-G) were detected in the soil samples collected from the capillary fringe zone (9½ to 11 feet below ground surface) in borings A-C (1,900 parts per million [ppm]), A-B (960 ppm), and A-E (330 ppm) located in the eastern, southern and western vicinity of the UST complex, respectively. Total Petroleum Hydrocarbons calculated as Diesel (TPH-D) were detected in these samples at concentrations ranging from 130 ppm to 300 ppm. Soil samples collected at a depth of 9½ feet in boring A-D located in the northeastern vicinity of the UST complex, contained 10 ppm of TPH-G and 1.6 ppm of TPH-D. The soil sample collected from the capillary fringe zone (9½ feet) in boring A-A drilled in the proposed replacement UST complex location (northern portion of the site) contained 69 ppm of TPH-G and 31 ppm of TPH-D. Soil samples collected at depths

of 4½ to 6½ feet in borings A-A through A-E contained nondetectable (less than 1 ppm) or near nondetectable concentrations of TPH-G and TPH-D, except the sample from boring A-B, which contained 250 ppm TPH-G and 31 ppm TPH-D. Laboratory analyses results for soil samples from borings are summarized in Table 1, Soil Analyses Data. The results of this investigation are presented in the GSI Preliminary Tank Replacement Report dated July 1, 1991.

3.2. Underground Storage Tank Removal

Between January and April 1992, four USTs and associated product lines were replaced: one 12,000 gallon fiberglass tank containing unleaded gasoline (T-1), one 8,000 gallon steel tank containing regular gasoline (T-2), and two 6,000 gallon steel tanks containing super unleaded gasoline (T-3) and diesel (T-4). These tanks were replaced with four double wall fiberglass 10,000 gallon tanks containing unleaded gasoline and diesel products. TPH-G was detected at concentrations ranging from 3 ppm to 1200 ppm in samples collected in the former UST complex. TPH-D concentrations in these samples ranged form nondetectable to 620 ppm. The highest concentrations of TPH-G and TPH-D were detected in soil sample SW-1 collected from the fill end of the removed 6,000-gallon diesel UST.

The highest concentrations of TPH-G in samples from the former product line trenches were detected in sample L-4 (140 ppm) in the vicinity of the westernmost service island, and in sample L-1 (120 ppm) in the vicinity of the service island closest to the store entrance. TPH-G concentrations in the other samples from the former product line trenches ranged from nondetectable (less than 1 ppm) to 4.7 ppm. TPH-D concentration of 450 ppm was detected in sample L-4 collected at a depth of 3 feet from the former product line trench in the vicinity of the diesel dispenser on the westernmost service island. The soil from the product line trench in the vicinity of diesel dispenser was overexcavated and resampled at a depth

of 7 feet. The TPH-G and TPH-D concentrations in this confirmation sample were 4.6 ppm and 54 ppm, respectfully. Laboratory analyses results for soil samples from the former tank pit and former product line trenches are summarized in Table 2, Soil Analyses Data for Former UST Pit and Product Line Trenches. The sample locations are shown on Plate 2. An Underground Storage Tank Removal and Soil Sampling Report documenting the tank removal and soil sampling analytical results was issued by ROUX Associates (ROUX) on July 14, 1992.

3.3. Subsurface Environmental Investigation

Between March 16 and 25, 1992, GSI installed one recovery well (AR-1) and four groundwater monitoring wells (A-1 through A-4) at the site. TPH-G was detected in the soil sample collected at a depth of 10 feet in boring A-1 at a concentration of 2.2 ppm. TPH-G was nondetectable in other samples collected from borings A-1 through A-4. TPH-D was detected in the soil sample collected at a depth of 4 feet in boring A-2 at a concentration of 14 ppm. TPH-D was nondetectable in other samples collected from borings A-1 through A-4. Because well AR-1 was drilled in the former tank pit, no native soil samples could be collected above the groundwater. Results of this investigation are presented in the GSI Well Installation Report dated June 30, 1992.

On June 8, 1992, GSI installed three vapor extraction wells (AV-1 through AV-3) and one groundwater extraction well (AR-2) at the site. TPH-G was detected in the soil samples collected from the capillary fringe zone in borings AV-1 through AV-3 at concentrations 12 ppm, 1,500 ppm and 110 ppm, respectively. TPH-D concentrations were nondetectable in all analyzed samples. Because well AR-2 was drilled through an existing conductor casing, no soil samples were collected above first encountered groundwater. The results of this phase of the investigation are presented in a GSI Continuing Site Assessment/Quarterly Monitoring Report dated November 24, 1992.

On February 4, 1993, GSI installed two offsite groundwater monitoring wells (A-5 and A-6). The soil sample collected from boring A-5 at a depth of 9.5 feet contained 17 ppm of TPH-G. TPH-G was reported as nondetectable for the remaining soil samples (Table 1). Halogenated volatile organics (HVO) were not detected in samples collected from boring A-5. The results of this phase of the investigation are presented in a GSI Quarterly Monitoring/ Well Installation Report dated April 9, 1993.

3.4. Vapor Extraction Test

An eight-hour vapor extraction test, was performed at the site by GSI on June 11, 1992, to evaluate the feasibility of vapor extraction as a soil remediation method. Vapor extraction well AV-2 was used as an extraction well and vapor extraction wells AV-1 and AV-3 were used to monitor vaccum pressure changes during the test. A vacuum pressure map of the test is shown on Plate 3.

Based on the results of the vapor extraction test GSI concluded that vapor extraction is a feasible option for the remediation of gasoline hydrocarbons from onsite soils. The results of vapor extraction test are presented in a GSI Continuing Site Assessment/Quarterly Monitoring Report dated November 24, 1992.

3.5. Aquifer Pumping and Recovery Test

An aquifer pumping and recovery test was performed at the site on July 15 and 16, 1992, by GSI to evaluate the feasibility of groundwater extraction as a groundwater remediation method. Recovery well AR-1 was utilized for pumping. Pressure transducers connected to a Hermit SE2000 data logger were installed in AR-1 and observation wells A-1 and A-4. Water-level changes were measured in additional observation wells A-2 and A-3 using an electonic interface probe. Water-level maps prior

to and after pumping of well AR-1 are shown on Plates 4 and 5, respectively.

Based on aquifer test results, GSI concluded that a pump and treat system is an option for remediating groundwater at the site. The results of aquifer pumping and recovery test are presented in a GSI Continuing Site Assessment/Quarterly Monitoring Report dated November 24, 1992.

3.6. Quarterly Sampling

Quarterly groundwater monitoring and sampling of site wells began in April, 1992. Groundwater samples have been analyzed for TPH-G and TPH-D using EPA Method 8015 (Modified) and BTEX using EPA Method 8020. Groundwater monitoring and sampling data are presented in Table 3, Historical Water-Level Data, and Table 4, Historical Groundwater Quality Database.

The groundwater gradient has ranged from approximately 0.002 to 0.007, with the flow direction varying between west and north. Concentrations of TPH-G and BTEX since quarterly groundwater monitoring was initiated in July 1992 are shown on Table 4.

4. OFFSITE WELL RESEARCH

A ½-mile radius well search was performed by GSI to evaluate groundwater usage in the vicinity of the subject site. Well location data were provided to GSI by Mr. Andreas Godfry of County of Alameda Public Works Agency (CAPWA).

Forty off-site wells are located within ½-mile of the site. These include twenty monitoring wells, eight piezometric wells, eight test wells, two abandoned wells, one industrial well, and one cathodic protection well. The industrial well (C3) belongs to Lane Metal Finishing and is located

approximately 1/8-mile to the southwest of the site. This well is approximately 125 feet deep and DTW is approximately 20 feet. Well survey data are presented in Table 5, Well Survey Data, and locations of the wells are shown on Plate 6, Well Location Map.

5. PRELIMINARY RECORDS RESEARCH

A preliminary records research was conducted by GSI to locate possible secondary sources for hydrocarbons within ½-mile radius of the subject site. The records research included review of aerial photographs obtained from Pacific Aerial Surveys of Oakland, California; Sanborn Maps obtained from Mapping and Geographic Information Service of Pelham, New York; Vista California Radius Detailed Report obtained from Vista Environmental Information, Inc. (VISTA) of San Diego, California; and Report on Releases of Hazardous Substances from Underground Storage Tanks (State Water Resources Control Board, January 1992).

GSI's review of aerial photographs taken in 1940, 1959, 1973 and 1985 indicated that the subject site had been occupied by a commercial building since before 1940 through before 1973. Commercial facilities of an unknown nature were present to the east, north, west and southwest of the site, and residential development was present to the south and southeast of the site. Observations from the photographs indicated that the commercial facilities located at the intersection of West Grand Avenue and Market Street were reconstructed to the gasoline station on the subject site and to the West Grand Shopping Center to the west of the subject site before 1973. Another gasoline station (former Chevron Station 91853) had also been constructed 60 feet east of the site across West Grand Avenue during the same period.

Sanborn Maps from 1902, 1912, 1951, 1952, and 1970, detailing previous buildings and businesses on the subject site and its immediate vicinity were reviewed. These maps indicated that from 1902 to 1951

the subject site and its surroundings had been used for residential and light commercial development. The laundry facility has been present immediately south of the subject site at the southern corner of Market and 22nd Street (previously Lydia Street) since before 1912. In 1951 the subject site appears to have been occupied by a wrapping company, Cardinet Candy Company, and a sheet metal works company. In 1952 Cardinet Candy Company expanded into the sheet metal works. The wrapping company and Cardinet Candy Company existed up until 1970, at which time buildings at the subject site were razed and the lot left vacant. The site was developed as a service station between 1970 and 1973.

The VISTA report with a map showing reported problem risk sites within a 1-mile radius of the site is attached in Appendix B. Refer to Appendix B for a listing of the governmental database covered in this search.

The VISTA report indicates that forty-one listed environmental sites are located within a ½-mile radius of the subject site. Five of them are located less than ¼-mile upgradient. These sites include: a former Chevron Service Station #91853 (presently a vacant lot) located at 850 West Grand Avenue, and Fyne Property located at 774 West Grand Avenue. All five sites are shown as 59 on the Vista map. Six additional sites are located less than ½-mile upgradient of the subject site. One of these sites is the Greyhound Bus Lines Terminal located at 2103 San Pablo Avenue (designated as site 49).

Chevron Service Station 91853, Fyne Property and Greyhound Bus Lines Terminal are listed in the Report on Releases of Hazardous Substances from Underground Storage Tanks as sites with confirmed gasoline (Chevron and Fyne Property) or diesel (Greyhound Bus Lines Terminal) leaks. Based on the proximity to ARCO Station 2169 and the local gradient direction these sites appear to be potential secondary sources of hydrocarbons detected in the soil and groundwater in the vicinity of the

subject site (and may be the source of hydrocarbons detected in offsite well A-5).

6. WELL INSTALLATION ACTIVITIES

6.1. Drilling

Well construction permits were acquired from the Alameda County Flood Control and Water Conservation District, Zone 7 (ACFCWCD) prior to drilling at the site. Copies of the permits are included in Appendix C. Five on-site exploratory soil borings (AS-1 through AS-3, AV-4 and AV-5) were drilled on September 7 and 8, 1993. Six on-site exploratory soil borings (AS-4, AS-5, AV-6, AV-7, ADR-1 and ADR-2) were drilled on December 6 and 7, 1993. The borings were drilled using a truck-mounted drilling rig and hollow-stem augers. A GSI Geologist observed the drilling, described the soil samples collected from borings using the Unified Soil Classification System (ASTM D 2488-84) and Munsell Color Chart, and prepared a lithologic log for each boring.

Borings AV-4 through AV-6, AS-2 and AS-3 were drilled in the northeastern portion of the site, in the vicinity of the northeastern service islands to evaluate the presence of gasoline hydrocarbons at this location and provide air sparging and vapor extraction points for the future interim groundwater and soil remediation system. Boring AS-4 was drilled in the former UST pit and borings AS-1 and AV-7 were drilled in the immediate northern and southern vicinity of the former UST pit, respectively, to provide air sparging and additional vapor extraction points near the hydrocarbon source area. Boring AS-5 was drilled next to the westernmost service island (diesel island) to evaluate the presence of hydrocarbons at this location and to provide an air sparging point for the northwestern portion of the property. Wells ADR-1 and ADR-2 were drilled along the northwestern property line, downgradient of the former UST pit and service islands to provide vapor and/or groundwater

extraction points for the interim groundwater and soil remediation system.

Borings AV-4 through AV-7 were drilled to total depths of 16½ feet and converted to vapor extraction wells. Borings AS-1 and AS-3 were drilled to total depths of 30½ feet, and borings AS-2, AS-4 and AS-5 were drilled to total depths of 24½ feet. Borings AS-1 through AS-5 were converted to air sparging wells. Borings ADR-1 and ADR-2 were drilled to total depths of 23½ and 28 feet, respectively, and converted to dual groundwater recovery/vapor extraction wells. Boring logs and graphic well construction details are presented in Appendix D.

The soil encountered during drilling consisted primarily of silty to sandy clay, silt, and clayey to gravelly sand to the total depth explored of 30½ feet below ground surface. Groundwater was first encountered at depths ranging between 12½ and 18 feet within a layer of clayey to gravelly sand. A stratum of silty to sandy clay, which may act as a local aquitard, was encountered beneath the water bearing zone at depths ranging between 21 and 28 feet in borings AS-1 through AS-5, ADR-1 and ADR-2. Graphic interpretations of soil stratigraphy beneath the site are shown on geologic Cross Sections A-A', B-B', C-C' and D-D' (Plates 7 through 10). Locations of the borings and cross-sections are shown on Plate 2.

Drill cuttings generated during drilling were stored onsite, placed on and covered with visqueen. After drilling was completed on September 8, 1993, four soil samples were collected from the stockpile and submitted for compositing and analyses to the laboratory. The stockpile samples were used to evaluate the soil for disposal purposes. Soil generated during December drilling was stockpiled with soil generated during trenching for a remediation system piping, sampled and properly disposed after trenching had been completed.

6.2. Soil Sampling

Soil samples were collected continuously in boring AS-2 from 5 feet to the total depth of 24½ feet, and at five-foot intervals from borings AV-4 through AV-7, AS-1, AS-3 through AS-5, ADR-1 and ADR-2. The soil samples were collected using a modified California split-spoon sampler fitted with clean stainless steel sample tube liners. Soil samples retained for chemical analyses were sealed on both ends with aluminum foil and plastic end caps. Samples were labeled, entered onto a Chain-of-Custody form, and transported in a cooler with blue ice to the laboratory.

An Organic Vapor Monitor (OVM) photoionization detector was used to perform head-space analyses on soil from each sample interval, as a reconnaissance-level field test to evaluate the presence of hydrocarbons in the soil. OVM readings are presented on each boring log in Appendix D.

6.3. Well Construction

Air sparging wells AS-1 through AS-5 were completed in 8-inch-diameter boreholes using 2-inch diameter Schedule 40 PVC blank well casing and 0.020-inch wide machine-slotted PVC screen. Well screens extend from 27 to 29, 21 to 23, 26 to 29, 20 to 22, and 20½ to 22½ feet below ground surface in wells AS-1 through AS-5, respectively. The annular space of each air sparging well was backfilled with sand to approximately 1 foot above the top of the well screen. A 1-foot bentonite seal was placed above the sandpack in each well. A neat cement seal was placed from the top of the bentonite to approximately 1 foot below ground surface in each well. An underground vault box, set in concrete, was installed over the top of the well. A waterproof locking well cap and lock were placed on the well casing.

Vapor extraction wells AV-4 through AV-7 were constructed in 10-inch diameter boreholes using 4-inch diameter Schedule 40 PVC blank casing and 0.1-inch wide machine-slotted PVC screen. Wells AV-4 through AV-7 were screened from 5 to 15 feet below ground surface. Washed ⅜-inch pea gravel was placed across the entire screened interval in each vapor extraction well and extends 1 foot above the top of the well screen. A 1-foot-thick bentonite seal was placed above the gravel-pack and hydrated with clean water. A neat cement seal was placed from the top of the bentonite to approximately 1 foot below ground surface. An underground vault box, set in concrete, was placed over the top of each well. A waterproof locking cap was placed on each well casing.

Dual groundwater recovery/vapor extraction wells ADR-1 and ADR-2 were drilled through existing well boxes. Wells ADR-1 and ADR-2 were constructed in 10-inch diameter boreholes using 4-inch diameter Schedule 40 PVC blank casing and 0.02-inch wide machine-slotted PVC screen. Well ADR-1 was screened from 5 to 22 feet below a ground surface, and well ADR-2 was screened from 5 to 26½ feet below a ground surface. The annular space of groundwater recovery/vapor extraction well was backfilled with sand to approximately 1 foot above the top of the well screen. A ½-foot bentonite seal was placed above the sandpack in each well and hydrated with clean water. A neat cement (with 5% bentonite) seal was placed from the top of the bentonite to approximately 2½ feet below ground surface (bottom of the well box) in each well. A waterproof locking well cap and lock were placed on the well casing.

Well completion details are presented with the exploratory boring logs in Appendix D.

6.4. Well Development

Air sparging wells and dual groundwater recovery/vapor extraction wells were developed by surging and bailing to remove fine-grained sediments

and allow better communication between the water-bearing zone and the well. Well development was performed by Gettler-Ryan Inc. (G-R). Wells AS-1 through AS-3 were developed on September 13, 1993. Wells AS-4 through AS-5, ADR-1 and ADR-2 were developed on December 29, 1993.

6.5. Wellhead Survey

On September 22, 1993, wells AS-1 through AS-3, AV-4 and AV-5 were surveyed to a local National Geodetic Vertical Datum by John E. Koch, a licensed surveyor. All site wells except well A-6 (which was inaccessible) were surveyed by Virgil Chavez, a licensed land surveyor on February 4, 1994, after installation of the interim groundwater and soil remediation system had been completed. The results of these wellhead surveys are included in Appendix E.

6.6. Well Monitoring and Sampling

On February 9, 1994, newly installed groundwater recovery/vapor extraction wells ADR-1 and ADR-2 were monitored and sampled in conjunction with quarterly monitoring and sampling of pre-existing wells by ARCO contractor, Integrated Wastestream Management, Inc. (IWM) of San Jose, California. Depths-to-water (DTW) were measured in groundwater monitoring and recovery wells, water samples were collected and visually inspected for floating product, wells were purged, and groundwater samples were collected for laboratory analyses. Water level elevations were referenced to Mean Sea Level (MSL) datum and are presented with DTW measurements in Table 3. The IWM report and field data sheets are presented in Appendix F. DTW data collected on February 9, 1994, were used to construct a potentiometric map shown on Plate 11. The shallow groundwater flow is interpreted to be to the northwest with a gradient of approximately 0.007.

7. LABORATORY ANALYSES

Soil and groundwater samples collected during this investigation were preserved as required by the applicable analytical method and delivered with Chain-of-Custody Records to a State-certified laboratory. Soil samples were submitted to Sequoia Analytical (Sequoia), located in Redwood City, California (Hazardous Waste Testing Laboratory #1210). Groundwater samples were submitted to Columbia Analytical Services, Inc. (Columbia), located in San Jose, California (Hazardous Waste Testing Laboratory #1426).

7.1. Soil Samples

Selected soil samples collected from borings AS-1 through AS-5, AV-4 through AV-7, ADR-1 and ADR-2 were analyzed for TPH-G and BTEX using EPA Methods 5030/8015/8020. In addition, soil samples collected from borings AS-1, AS-4, AV-7, (located next to the former UST complex), and from borings AS-5, ADR-1 and ADR-2 (located in the vicinity of the diesel service island) were analyzed for TPH-D according to EPA Methods 5030/8015 Mod./8020.

Soil chemical analytical data for the present and previous investigations are summarized in Table 1.

Laboratory analyses of soil samples collected from borings AS-1, AS-4 and AV-7, located in the former UST pit or in its immediate vicinity, reported up to 190 ppm TPH-G and up to 47 ppm of TPH-D for the samples collected at depths between 10½ and 15½ feet (capillary fringe zone) and nondetectable or near nondetectable concentrations of these compounds in other samples collected from these borings.

Laboratory analyses of soil samples collected from borings AS-2, AS-3, AV-4 and AV-5, drilled in the immediate vicinity of the northeastern

service islands, reported detectable TPH-G concentrations in samples collected at depths ranging from 10½ to 13 feet (capillary fringe zone) and nondetectable TPH-G concentrations for other samples from these borings. Soil samples collected from the capillary fringe zone from borings AS-3 and AV-5, located next to the northernmost service island, indicated 23 ppm and 30 ppm of TPH-G, respectively. Soil samples collected from the capillary fringe zone from borings AS-2 and AV-4, located next to the service island closest to the store entrance, indicated 1,500 ppm and 470 ppm of TPH-G, respectively. Laboratory analyses results indicated 330 ppm and 22 ppm of TPH-G in samples collected at depths 12½ and 16 feet, respectively, from boring AV-6, located east (upgradient) to the northeastern service islands.

Laboratory analyses of soil samples collected from boring AS-5, located next to the westernmost service island (diesel island), and from borings ADR-1 and ADR-2, located downgradient of this island, indicated up to 2,200 ppm TPH-G and 1,000 ppm TPH-D in samples collected at 12 feet (capillary fringe zone) and nondetectable or near nondetectable concentrations of these compounds in the other samples collected from these borings.

Graphic interpretations of TPH-G in soil at depths of 3.0-6.5 feet and 9.0-13.0 feet are shown on Plates 12 and 13, respectively. The soil chemical analytical reports and Chain-of-Custody Forms are presented in Appendix G.

The stockpile samples were composited in the laboratory and analyzed for TPH-G, toxicity characteristic leaching procedure (TCLP) BTEX; soluble threshold limit concentrations (STLC) lead using EPA Method 239.2; and corrosivity, ignitability and reactivity (RCI). Upon receipt of chemical analyses the stockpiles were removed from the site and transported to Hazardous Chemical Waste Management, Kettleman Hills, California, by ARCO's contractor, Dillard Trucking Inc. of Byron, California.

7.2. Groundwater Samples

Groundwater samples collected from wells A-1 through A-6, AR-1, AR-2, ADR-1 and ADR-2 were analyzed for TPH-G and BTEX using EPA Methods 5030/8020/California DHS LUFT Method. In addition, groundwater samples collected from wells A-1, AR-1, AR-2, ADR-1 and ADR-2 were analyzed for TPH-D using EPA Methods 3510/California DHS LUFT Method. Groundwater analytical data are presented in Table 4. The laboratory analytical report and Chain-of-Custody Form for groundwater samples are included in Appendix F.

Laboratory analyses reported nondetectable hydrocarbon concentrations in groundwater samples collected from wells A-2 through A-4 and AR-2, however, samples collected from wells A-2 and AR-2, located in the vicinity of the existing USTs, contained a single non-fuel component eluting in the gasoline range, which has been quantitated as gasoline.

The highest concentrations of TPH-G (83,000 ppb), TPH-D (12,000 ppb) and benzene (6,300 ppb) were detected in groundwater samples collected from well ADR-2, located downgradient of the westernmost (diesel) service island. The groundwater samples collected from wells AR-1, ADR-1 and A-1, located in the western portion of the site (within or downgradient of the former UST pit), contained up to 26,000 ppb of TPH-G, up to 4,200 ppb of non diesel mixture quantitated as diesel, and up to 2,900 ppb of benzene. Laboratory analyses of groundwater samples collected from offsite wells A-5 and A-6 indicated concentrations of TPH-G at 2,200 ppb and 640 ppb, respectively. Benzene was detected at 190 ppb in well A-5 and was nondetectable (detection limit raised to 2.9 ppb due to matrix interference) in well A-6. TPH-G and benzene concentrations in groundwater are shown on Plates 14 and 15.

8. VAPOR EXTRACTION/SPARGING TESTS

On September 15 and 17, 1993, GSI conducted combined sparging and Vapor Extraction (VE) tests at two locations at the above referenced site. The tests were conducted to obtain data to determine the effectiveness of sparging and VE as a remediation method for removing hydrocarbons from the soil at this site. These data were analyzed to determine the hydrocarbon removal rate, the radius of influence, and to estimate the effectiveness of VE in capturing the sparge off-gas. Furthermore, short duration VE tests were conducted at five locations at the site. These short durations tests, described in Phase 5 below, were conducted to determine the variation of VE flow, vacuum pressure, and hydrocarbon concentration across the site.

8.1. Background

Helium was chosen as the sparge gas so that the amount of sparge gas recovered by the VE could be quantified, and the sparge gas capture efficiency calculated. Helium was chosen for three reasons: helium detectors are readily available, helium is an inert gas which will not react with the environment, and the flow of helium through soil is very similar to that of air. The helium molecule (He_2) is a diatomic molecule of the same order of size magnitude as those found in air, approximately 2 Angstroms in size. Nitrogen and Oxygen (N_2 and O_2) which are the predominate gases in air are also diatomic molecules approximately 2 Angstroms in size.

All vapor samples (bag samples) were collected in Tedlar bags and analyzed for TPH-G and BTEX using EPA methods consistent with previous usage. Selected samples were also analyzed for Organic Lead using the National Institute for Occupational Safety and Health (NIOSH) method 2533. Samples were submitted to Sequoia Analytical in Redwood City and GTEL Environmental Laboratories, Inc. in Concord (Hazardous

Waste Testing Laboratory # E1075). Copies of analytical reports and COC forms for samples collected during the vapor extraction/sparging tests are included in Appendix H.

8.2. Equipment

The tests were conducted using an internal combustion (IC) engine as a vapor extraction and hydrocarbon abatement device. The hydrocarbon vapors extracted from the soil were destroyed by the IC engine during the internal combustion process and the subsequent catalytic oxidation of exhaust fumes prior to their release into the atmosphere. Effluent air samples were taken from the engine exhaust during the test to insure that no hydrocarbons were emitted (see Appendix H).

Vapor flow into the engine was measured with a variable area flow meter (rotameter). A Reotemp temperature probe was used to measure the temperature of the extracted vapors. The vacuum applied at the extraction well was measured with a Dwyer Magnehelic differential pressure gauge with sensitivity ranging from 0 to 50 inches of water with a resolution of 2.5 inches. Pressure in observation wells were measured with a set of three Magnehelic gauges with sensitivities ranging from 0 to 1, 0 to 10 and 0 to 20 inches of water with resolutions of 0.010, 0.100 and 0.250 inches of water, respectively. Hydrocarbon (HC) concentrations were monitored with two field instruments: a Horiba infrared (IR) gas analyzer and a Foxboro Flame Ionization Detector (FID). Grab samples were taken periodically using a Gast vacuum sampling pump and Tedlar bags for laboratory analyses to provide quantitative data on extracted hydrocarbon vapors and a reference for the field instruments.

The sparge gas injected into the sparge well was 100% helium. A helium detector was used to monitor the helium concentrations in the vapor extraction flow. Helium was provided in high pressure cylinders containing 292 standard cubic feet (scf) of helium. A pressure regulator connected

to the helium cylinder reduced helium pressure to the desired sparge pressure. The flow rate of the injected helium was determined with a rotameter. A Fluke 51 digital temperature probe was used to monitor the temperature of the injected sparge gas.

Carbon dioxide (CO_2) levels were measured with Draeger tubes. Oxygen (O_2) levels were measured with a Gastech explosion meter. Lead was sampled using a carbon tube, SKC XAD-2. A small fraction of the VE flow was directed through the carbon tube by a sampling pump, flow was measured with a rotameter. The carbon tube was placed prior to the sample pump and rotameter to prevent contamination of the flow prior to the tube. Water levels in the wells were measured with a water level probes.

8.3. Procedure

Two combined VE and sparging tests were conducted at the site. During the first combined test, vapor was extracted from well AV-4, helium was injected into sparge well AS-2 and the following wells were monitored for pressure influence: A-3, AS-2, AV-1, AV-5, and AR-2 (see Plate 2). During the second combined test, vapor was extracted from well AV-2, helium was injected into sparge well AS-1 and the following wells were monitored for pressure influence: A-1, A-4, AR-1, AV-1, AV-3, AS-1. The first and second combined tests were conducted on September 15, and 17, 1993, respectively. The procedure described below was followed for each combined test.

8.3.1. Test Set-Up

At the beginning of the test, initial measurements were taken as each well included in the test was opened. The measurements included concentrations of O_2 and CO_2 in well vapors and water levels. These measurements are presented in Table 6, Initial and Final Observation Well

Conditions, Vapor Extraction and Sparge Test (AV-4 and AS-2), and Table 9, Initial and Final Observation Well Conditions, Vapor Extraction and Sparge Test (AV-2 and AS-1). Test plugs fitted with pressure monitoring ports were then installed in each monitoring well. Magnehelic gauges were set to zero and then connected to the observation wells. The IC engine was plumbed to the extraction well with an in-line knockout tank for the removal of entrained moisture and particulates. The sparge manifold was connected to the appropriate sparge well. Once all the necessary connections were completed, the IC engine was started and allowed to warm-up on dilution air. Vapor was not extracted from the extraction well during the warm-up period.

8.3.2. Phase 1

During Phase 1, vapor was extracted from the extraction well for approximately 1 hour to allow the HC concentration in the VE flow to stabilize. Vapor extraction flow rate, temperature, pressure and concentrations of HC, O_2 and CO_2 were recorded on 15 minute intervals, and are presented in Table 7, Vapor Extraction and Sparge Well Data, Vapor Extraction and Sparge Test (AV-4 and AS-2), and Table 10, Vapor Extraction and Sparge Well Data, Vapor Extraction and Sparge Test (AV-2 and AS-1). Observation well pressures were also recorded at a similar frequency and are presented in Table 8, Observation Well Data, Vapor Extraction and Sparge Test (AV-4 and AS-2), and Table 11, Observation Well Data, Vapor Extraction and Sparge Test (AV-2 and AS-1). Prior to the commencement of vapor extraction for each test, the observation well pressures were recorded to establish the initial pressures in each well. This data is denoted in the first row of Tables 8 and 11. Once field monitoring of the extracted vapors demonstrated that the hydrocarbon concentrations had stabilized, Phase 2 could begin. A bag sample of the extracted vapor was taken at the end of Phase 1 and submitted for laboratory analyses to obtain extractable hydrocarbon vapor concentrations for soil vapor extraction operation only. Plates 16 and 17,

17, Vacuum Pressure Maps, show the vacuum pressures in the extraction and observation wells at the end of Phase 1 of each test.

8.3.3. Phase 2

After Phase 1 had been completed, the sparge gas was turned on, constituting the beginning of Phase 2. While continuing VE on the extraction well the sparge gas pressure was gradually increased to approximately 6 psi. The sparge gas flow rate, temperature, pressure and mixture were recorded on approximate 15 minute intervals. Vapor extraction flow rate, temperature, pressure and concentration of HC, O_2 and CO_2 continued to be recorded on 15 minute intervals. Additionally helium concentrations in the VE flow were measured and recorded at 15 minute intervals. The sparge gas was allowed to flow for approximately 1 hour. A bag sample of extracted vapors was taken at the end of Phase 2 and submitted for laboratory analyses to determine the concentration of hydrocarbons resulting from the combined vapor extraction and sparging operations.

8.3.4. Phase 3

Phase 3 began when the sparge gas flow was turned off. Vapor extraction continued without sparging for approximately another hour to an hour and a half. Extraction well, observation well and vapor flow monitoring continued on 15 minute intervals. A bag sample of extracted vapor was taken for laboratory analyses at the end of Phase 3.

8.3.5. Phase 4

Phase 4 consisted of turning off the vapor extraction system and allowing the pressures in the wells to return to near normal. After this, the pressure gauges were disconnected, and any zero drift in the gauges was

noted. Water levels in all the wells were once again measured and recorded (see Tables 8 and 11).

8.3.6. Phase 5

During Phase 5, individual short duration VE tests were performed on wells A-1, A-3, A-4, AR-2, AV-1 AV-3 and AV-5. The purpose of these tests was to evaluate how the vapor extraction flow, vacuum pressure and extractable hydrocarbon concentrations varied across the site. The protocol for Phase 5 followed that outlined in Phase 1 above, except for a compressed time scale. The tests were conducted in such a manner so as to provide only enough data for the determination of the parameters listed above. The reduced duration did not allow for the collection of sufficient data to calculate radius of influence for these tests. The data for these tests are presented in Table 12.

8.4. Results

The results of the two combined sparge and five VE tests are summarized in Table 12 of this report. Vapor extraction flow rates varied from 5 to 12 standard cubic feet per minute (scfm) with applied vacuum pressures of 18 to 76 inches of water (H_2O). The exception was well AR-2 which is located in the existing tank pit. For AR-2, the flow rate averaged 30.5 scfm with an extraction vacuum of 26.8 inches H_2O. This flow rate is rather high in comparison to the other wells for which an extraction test was conducted. One possible explanation may be the location of this well in the former tank pit which was backfilled with pea-gravel.

TPH-G concentrations as determined by laboratory analyses of bag samples of the extracted vapors varied from 90 parts per million by volume (ppmv) (AR-2) to 11,000 ppmv (AV-3 VE only and AV-4 VE with sparging). Sparging increased the HC concentrations in the VE flow approximately 39%, from 7,900 ppmv to 11,000 ppmv, for the first

combined test using AV-4 and AS-2. The HC removal rate for this combined sparging and VE operation increased from 22 pounds per day (lb/day) to 31 lb/day, approximately 41% (see Table 12). These results indicate that sparging has a positive effect on the HC removal rate accomplished with VE in the northeastern portion of the site.

The second combined VE and sparging test, which used AV-2 and AS-1, was not as successful. No increase in extractable HC concentrations was accomplished by the injection of sparge gas. The analytical data actually shows a decrease in TPH-G concentrations during Phase 2 of approximately 15% (see Table 12). The corresponding decrease in HC removal rate is approximately 33%, from 9.8 lb/day to 6.6 lb/day. It is not likely that the observed decrease in TPH-G concentrations is actually attributable to the sparging. Previous vapor extraction tests at other sites demonstrate that HC concentrations in extracted vapors will decrease as the VE continues. However, it does appear that sparging did not have an effect on VE operations in the southwestern portion of the site.

The radii of influence for VE on wells AV-4 and AV-2 were estimated using a steady-state radial flow model derived by Paul C. Johnson at Shell Development, Westhollow Research Center (Johnson C.P. et al, 1993, Soil Remediation Workshop). With an average VE pressure of 69 inches of water (vacuum) in well AV-4 and a response of 0.5 inches H_2O in the observation well AV-5, the approximate radius of influence was determined to be 35 feet. For well AV-2, an average VE pressure of 17.5 inches H_2O and responses of 0.330 inches H_2O in wells AV-3 yielded an radius of influence of approximately 31 feet. The radius of influence calculations are included in Appendix I.

Two cylinders of helium, each containing 292 standard cubic feet each, were injected into sparge well AS-2. The VE flow rate containing the helium concentrations denoted in Table 7 indicate that 568 standard cubic feet of helium were recovered from AV-4.

One cylinder of helium, containing 292 scf, was injected into sparge well AS-1. The VE flow rate containing helium concentrations denoted in Table 10 indicate that 11 scf of helium were recovered from the VE well AV-2. Sparge well AS-1 behaved as if the screened section of the casing was set in a confined soil lens, precluding flow of the sparge gas into the soils within the extraction well's radius of influence. Very little of the sparge gas made its way to the VE well. When sparging was discontinued, the sparge well off gassed helium for 2 hours or more indicating that the helium was contained in a confined porous medium, a soil lens, which was temporarily pressurized by the injection of sparge gas. The soil lens depressurized after the sparging was discontinued as evidenced by the helium off gas observed upon disconnection of the sparging manifold.

8.5. Summary and Conclusions

The results of the combined sparge and VE test conducted on Sept. 15 and 17, 1993 are summarized in Table 12 of this report. Based on this test the estimated radius of influence for vapor extraction is approximately 31 to 35 feet across most of the site. Vapor extraction flow rates ranged from less than 5.0 to 11.5 scfm with applied vacuum of 17.6 to 76.0 inches of water. TPH-G concentrations in the vapor extraction flow varied from 90 to 11,000 ppmv. Initial hydrocarbon removal rates ranged from 0.2 to 31 lb/day. Laboratory results indicate that lead was present in the VE flow in the range from 3.0 to 9.6 mg/kg. The sparge gas capture efficiency for the first combined test was 97%, for the second test it was 4%. The results of the test indicate that sparging can increase the hydrocarbon removal rates initially by as much as 39% in the vapor extraction flow but by a substantially lower amount over a longer period of time. Based on the observed behavior of AS-1 during sparging operations, the sparge well appears to be set in a confined soil leyer and was ineffectual in enhancing the performance of vapor extraction from AV-2.

9. SUMMARY OF INVESTIGATION

The results of this investigation are presented below:

- Five exploratory borings were drilled onsite on September 7 and 8, 1993, and completed as air sparging wells AS-1 through AS-3 and vapor extraction wells AV-4 and AV-5. Six exploratory borings were drilled on-site on December 6 and 7, 1993, and completed as air sparging wells AS-4 and AS-5, vapor extraction wells AV-6 and AV-7, and dual groundwater recovery/vapor extraction wells ADR-1 and ADR-2.

- The lithology of the borings consisted primarily of silty to sandy clay, silt, and clayey to gravelly sand to the total depth explored of 30½ feet. Groundwater was first encountered in the borings at depths ranging between 12½ and 18 feet.

- The concentrations of hydrocarbons in soil samples collected from borings AS-1 through AS-5, AV-4 through AV-7, ADR-1 and ADR-2 at depths between 9 to 13 feet (capillary fringe zone) were up to 190 ppm TPH-G and 47 ppm TPH-D in borings located in the vicinity of the former UST pit; up to 2,200 ppm TPH-G and 1,000 ppm TPH-D in borings located in the northwestern portion of the site; up to 1,500 ppm TPH-G in borings adjacent to the service island closest to the store entrance; up to 30 ppm TPH-G in borings adjacent to the northernmost service island; and 330 ppm TPH-G in boring AV-6, located east (upgradient) of the northeastern service islands. The other samples collected from the above borings from the vadose and saturated zones contained nondetectable or low concentrations of hydrocarbons.

- The groundwater gradient of the first encountered water bearing zone beneath the site interpreted for February 1994 is approximately 0.007 with gradient direction toward northwest.

- Laboratory analyses of groundwater samples indicated that the groundwater beneath the western portion of the site and in the downgradient (western) vicinity of the site is impacted by hydrocarbons. The highest concentrations of TPH-G (89,000 ppb), TPH-D (12,000 ppb), and benzene (6,300 ppb) were detected in the groundwater samples collected from well ADR-2 located downgradient to the westernmost (diesel) service island.

- The well research indicated that forty wells are located within a ½-mile radius of the subject site. These wells include: twenty monitoring wells, eight piezometric wells, eight test wells, two abandoned wells, one industrial well, and one cathodic protection well.

- The environmental record research indicated that there are forty-one reported environmental problem sites situated within ½-mile radius of ARCO Station 2169. Eleven of them are situated upgradient of the subject site. Three of the sites located within ½-mile radius upgradient of the ARCO site are listed in the Report on Releases of Hazardous Substances from Underground Storage Tanks as the sites with confirmed gasoline leaks. These sites are: former Chevron Service Station 91853 (presently a vacant lot) located at 850 West Grand Avenue; Fyne Property located at 774 West Grand Avenue; and Greyhound Bus Lines Terminal located at 2103 San Pablo Avenue. Based on the proximity to ARCO Station 2169 and the local gradient direction it appears that these sites might be potential secondary sources of hydrocarbons detected in the soil and groundwater at the subject site and in offsite wells near the subject site.

- Combined air sparging/vapor extraction appears to be a viable remediation alternative for the remediation of gasoline hydrocarbons from onsite soils and groundwater. In addition, air sparging will enhance in situ biodegradation of diesel hydrocarbons by introducing more oxygen into the aquifer. Based on the results of the combined vapor extraction/air sparging tests, the vapor extraction radius of influence is estimated to be approximately 31 feet for AV-2 (at an applied vaccum of 17.6 inches H_2O and an air flow of approximately 7.5 scfm) and 35 feet for AV-4 (at an applied vaccum of 69 inches H_2O and an air flow of approximately 9 scfm). The results of the test indicate that sparging can initially increase the hydrocarbon removal rates by as much as 39% in the vapor extraction flow. These hydrocarbon removal rates decrease substantially with time, however, sparging may be most effectively implemented by pulsing or using sparge on an interval basis.

10. REMEDIAL ACTION PLAN

The RAP presents recommended interim remedial measures for onsite hydrocarbon-impacted soil and groundwater, including construction of a vapor extraction and air sparging system to address impacted soils and groundwater.

11. SUMMARY OF SOIL AND GROUNDWATER IMPACT

11.1. Extent of Hydrocarbon Impacted Soil

The lateral extent of hydrocarbon impacted soil beneath the site is presented on the geologic cross sections, Plates 7 through 10, and on TPH-G isoconcentration maps, Plates 12 and 13. The majority of hydrocarbon impacted soil at concentrations greater than 100 ppm of TPH-G appear to be in the vicinity of the former UST pit, the service island closest to the store entrance, and the westernmost service island, directly

above the local water table, within capillary fringe (9 to 13 feet). Hydrocarbons appear to have migrated laterally in the capillary fringe zone above the first encountered groundwater. The lateral extent of gasoline hydrocarbons in the soil at the subject site appears to be delineated to nondetectable TPH-G with the exception of the southwestern (crossgradient) vicinity of the site. The presence of hydrocarbons in soil in the southwestern vicinity of the site (17 ppm TPH-G in boring A-5) may be related to the potential secondary source. The vertical extent of hydrocarbons in the soil at the site appears to have been delineated to nondetectable or less than 10 ppm (AS-1) at depths ranging from 23 to 30 feet.

11.2. Extent of Hydrocarbon Impacted Groundwater

The lateral extent of gasoline hydrocarbons in the groundwater has been delineated to nondetectable concentrations of TPH-G (less than 50 ppb) except in the western and southwestern vicinity of the site (see Plates 14 and 15).

11.3. Groundwater Gradient

The local groundwater gradient appears to range between 0.002 to 0.007 with the flow direction varying between west and north. 0.007. The groundwater gradient interpreted based on the most recent data collected in February 1994 was approximately 0.007 toward the northwest (see Plate 11).

12. DESCRIPTION OF PROPOSED INTERIM SOIL AND GROUNDWATER REMEDIATION SYSTEMS

The proposed vapor extraction and groundwater remediation systems will function as an interim remedial measure for onsite hydrocarbon-impacted soils and groundwater beneath the site. Air sparging, vapor extraction,

and dual groundwater recovery/vapor extraction wells will be connected to the vapor extraction unit to enhance the removal of hydrocarbons from both the adsorbed-phase (saturated soils) and dissolved-phase (groundwater). Once sources are remediated onsite, hydrocarbon concentrations in offsite wells A-5 and A-6 should decrease naturally.

In December 1993 and January 1994 the interim remediation system has been installed at the site. This work included: construction of utility trenches to contain all necessary gas and electrical lines; connection to the sanitary sewer; installation of necessary underground pipes and electrical conduits to and from the proposed treatment compound; pressure testing of lines; construction of the remediation compound; electrical service hookup; and the installation and plumbing of all soil and groundwater remediation equipment. In March 1994, the Bay Area Air Quality Management District (BAAQMD) Authority to Construct the system was received. In April 1994, PG&E installed 3-phase power and gas service for the remediation system. The interim remediation system start-up is planned for the second week of May 1994.

Upon start-up and operation of the systems, the adequacy of the systems to remediate hydrocarbon-impacted soils and groundwater beneath the subject site to acceptable regulatory levels for closure will be reassessed. The installation of additional air sparging, vapor extraction, and dual groundwater recovery/vapor extraction wells may be necessary in the future, depending on site-specific conditions.

12.1. Interim Vapor Extraction System

Vapor-extraction will be performed in two phases. The first phase will consist of a vacuum blower which routes extracted soil gas to a Thermtech Vac 25 thermal-catalytic oxidizer. The vacuum blower will be connected to wells AV-1, AV-2, AV-3, AV-6, and dual groundwater recovery/vapor extraction wells ADR-1 and ADR-2. The blower will

provide the vacuum source and the oxidizer will destroy the hydrocarbons. The second phase will consist of a vacuum blower connection to the same wells discharging to three granular activated carbon vessels in series. The change to carbon treatment will take place when the hydrocarbon concentrations decline to a level which makes activated carbon more economical for hydrocarbon removal than the oxidizer. Due to the number of vapor extraction wells at the site, the vapor extraction system may be operated using individual wells or sets of vapor wells in sequence, rather than operating all wells concurrently as per the BAAQMD permit. This approach should minimize the size and inherent operating costs for the off-gas abatement unit, while still allowing the air flow from individual wells to be maximized. The design approach is also consistent with the relatively high vapor-phase TPH-G concentrations observed during the vapor extraction tests.

12.1.1. Vapor Wellheads

Wellhead piping will be equipped with a sample port. Well vaults with traffic rated covers will be installed at each vapor well and junction boxes for protection. To allow for future expansion of the vapor extraction system, a limited number of additional vapor extraction pipe stub-out connections may be installed subgrade to facilitate the connection of future vapor extraction or air sparging points, if needed.

12.1.2. Vapor Extraction System Treatment Processes

Subsurface piping will direct extracted vapor from the wells to an off-gas abatement unit located at the remediation compound. Extracted vapor will flow through a manifold where individual well flows can be controlled, pressure monitored, and samples obtained. A condensate separator, with a high level switch, will be provided to remove entrained droplets of moisture from the airstream. A Thermtech VAC 25 thermal/catalytic oxidation unit will be used to destroy the extracted hydrocarbon vapors.

The unit is equipped with a blower that will provide the vacuum to induce air flow from the VE wells.

Carbon treatment will replace the Thermtech unit when vapor concentrations of TPH-G fall below 200 ppm. The extracted vapors will pass through a 5 h.p. positive displacement blower and then pass through three 2,000 lb. granular activated carbon vessels connected in series before discharge to the atmosphere. The carbon vessels have been sized to provide a minimum 30 days each of treatment at a maximum anticipated flowrate of 120 scfm and an initial TPH-G concentration of 200 ppm. Long term TPH-G concentrations are expected to fall below 100 ppm. At these concentrations, a 2,000 pound carbon vessel will provide up to six months of treatment.

12.2. Interim Groundwater Remediation System

The proposed interim groundwater remediation system will consist of an air sparging system coupled with a groundwater extraction system.

12.2.1. Air Sparging and Groundwater Extraction (Optional)

Air sparging involves the injection of compressed air into groundwater through air sparging wells which contain a 1 to 2 foot section of slotted screen, installed near the bottom of the water-bearing zone of concern. The injected air forms both bubbles and transient air pockets which rise up through the saturated soils to enhance the volatilization of both dissolved-phase hydrocarbons [in groundwater] and adsorbed-phase hydrocarbons [in saturated soils]. The hydrocarbon-bearing vapors exit the groundwater surface and rise into the vadose zone soils where they are captured by an operating vapor-extraction system. The water-bearing unit will be subjected to air-sparging through air sparging wells AS-1 through AS-5.

Groundwater extraction, if deemed necessary, will be performed by pumping from groundwater recovery wells AR-1, AR-2, and dual groundwater recovery/vapor extraction wells ADR-1 and ADR-2 to effectively depress the water table, exposing more soil to be treated through vapor-extraction. Subsurface piping will direct extracted groundwater from the wells to the remediation compound for above-ground treatment to reduce dissolved hydrocarbon constituents, prior to discharge to the sanitary sewer. At the remediation compound, extracted groundwater will be filtered through a bag filter unit to remove particulate. The extracted groundwater will then be treated using three 400-pound liquid-phase carbon canisters in series to meet discharge requirements of the East Bay Municipal Utilities District (EBMUD). As an option, an equalization (surge) tank with transfer pump may be used to promote more uniform flow through the carbon canisters and reduce the required pressure head of the submersible well pump. If the EBMUD sewer treatment plant does not accept the treated groundwater, a National Pollutant Discharge Elimination System (NPDES) permit will be obtained to discharge treated water to a storm drain.

12.3. Spill Prevention and Safety Plan

Spill prevention measures for the groundwater treatment system (if installed) will include pressure switches or pressure relief valves on the carbon canisters to prevent overpressuring; double containment for the liquid-phase carbon canisters and equalization tank; and a remote autodialer system to report alarm or shut-down conditions. When any alarm conditions are triggered the remote monitoring system will notify GSI's field personnel so the condition can be rectified prior to system restart. A fire extinguisher and no smoking signs will also be installed in the remediation compound.

13. PROPOSED SCOPE OF WORK

Based on the results of previous subsurface investigations, GSI proposes the following project Tasks 1 and 2 listed below for interim remedial measures for soil and groundwater. These tasks outlined below are described in detail in ensuing sections:

- Task 1. System Start-up and Operation
- Task 2. System Performance Evaluation

A preliminary time schedule to perform the above tasks is shown on Plate 18.

13.1. Task 1. System Start-up and Operation

This section and the ensuing sections detail a monitoring plan to verify the effectiveness of the proposed interim vapor extraction and groundwater remediation systems at this site.

13.1.1. System Monitoring

After completion of system installation (installation of a gas service) and receipt of BAAQMD permit, operation of the proposed interim vapor extraction and selected groundwater remediation systems will be initiated in compliance with all applicable regulatory agencies. Start-up procedures will include system monitoring, maintenance and sampling within the first five days of operation.

Operation and maintenance of the vapor extraction system as described above typically include: daily site inspections for the first five days of operation, and site visits once every week for the first month. After the first month of operation, site visits will be typically performed once every two weeks, or as needed over the operating life of the remediation

systems. Modifications to this typical schedule will be made if additional requirements are specified by the guidelines set forth by the BAAQMD in the Authority to Construct/Permit to Operate for this site, as necessary. Routine maintenance of the vapor extraction and groundwater systems will be performed during these site visits and as needed.

Site inspections will typically include: monitoring and adjustment of system parameters to optimize the vapor extraction and groundwater treatment system's efficiencies; periodic sampling and field monitoring of influent and effluent as required by the BAAQMD; and other periodic maintenance to promote continued operation of the remediation equipment. Parameters monitored and adjusted in the field will include: field measurement of vapor extraction flow rates, induced vacuum responses at onsite wells if applicable, and hydrocarbon vapor concentrations with an organic vapor monitor approved by the BAAQMD.

13.1.2. System Sampling

Typical BAAQMD guidelines require that during the start-up phase of the soil vapor abatement unit, influent and effluent air samples to the vapor extraction system be collected to evaluate destruction efficiency of the unit. To demonstrate compliance with BAAQMD regulations, the vapor extraction system will likely be bag-sampled and samples will be sent to a laboratory for analyses at least once during the first week of operation, and once per month for the life of the remediation system. With the exception of influent and effluent air samples collected and analyzed as detailed above, during the first two days of operation and later on a biweekly or monthly basis, sampling of the vapor extraction system will be conducted using a field organic vapor monitoring instrument approved by the BAAQMD. If at any time the results of laboratory analyses or field monitoring readings show emission limits to be exceeded, a confirmation air sample will be taken immediately and analyzed on a 24 hour turnaround basis. If emission limits are still exceeded, the system will be

shut down and any necessary corrective action will be performed before repeating the start-up sequence. BAAQMD will be notified that emission limits were exceeded within 24 hours of such indication.

The vapor treatment system will be modified to an activated carbon adsorption system (three, in-series 2000-pound vapor-phase granular activated carbon canisters) when the hydrocarbon concentrations of the vapor approach 200 ppmv, or when it becomes cost-effective. Typical BAAQMD guidelines require that, extracted vapor influent to and effluent from the carbon system will be monitored with a field instrument approved by the BAAQMD on a daily basis until the frequency of carbon change-out can be determined. System monitoring frequency will likely be changed to once every two weeks, or monthly, with a field instrument and monthly verification with bag samples upon receiving BAAQMD approval.

Influent and effluent water samples will be collected for laboratory analyses during the first week of start-up of the groundwater treatment system. All water compliance sampling will be conducted in accordance with the EBMUD sewer discharge or NPDES permit requirements if a groundwater extraction system is installed.

13.2. Task 2. System Performance Evaluation

Following continued operation of the interim vapor extraction and groundwater remediation systems, a system performance evaluation will be conducted to monitor the effectiveness of the interim soil and groundwater remediation systems. This evaluation will be performed in conjunction with continued groundwater monitoring and sampling at the subject site, and will be submitted together with the regularly scheduled quarterly monitoring and sampling reports. This report may include the following: hours of operation; system influent and effluent field monitoring readings collected; laboratory results of influent and effluent

air and water samples collected and analyzed; total and individual vapor extraction well and groundwater extraction well flow rates; induced vacuum responses recorded in observation wells; all other relevant field data collected; and results obtained such as observed radius of influence, system destruction efficiency, groundwater treatment system efficiency, etc.

Recommendations will then be made to further optimize system performance and to further enhance remediation of subsurface impacted soils and groundwater. Recommendations may include tie-in of additional vapor extraction wells, air sparging wells, or groundwater extraction wells (if applicable) to the remediation system, upgrading of the vapor abatement unit, etc.

14. LIMITATIONS

This report was prepared in accordance with generally accepted standards of environmental geological and engineering practice in California at the time this investigation was performed. This assessment was conducted solely for the purpose of evaluating environmental conditions of the soil and groundwater with respect to gasoline hydrocarbons at the site. No soil engineering or geotechnical references are implied or should be inferred. Evaluation of the geologic conditions at the site for the purpose of this assessment is made from a limited number of observation points.

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TABLES

TABLE 1
SOIL ANALYSES DATA
ARCO Station 2169
Oakland, California

SAMPLE I.D.	SAMPLE DATE	ANALYZED DATE	TPH-G (PPM)	BENZENE (PPM)	TOLUENE (PPM)	ETHYLBENZ. (PPM)	XYLENES (PPM)	TPH-D (PPM)
A-A-4.5	14-May-91	22-May-91	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<1.0
A-A-9.5	14-May-91	22-May-91	69	1.0	3.8	1.6	7.8	31
A-B-5.5	14-May-91	22-May-91	250	2.1	6.2	4.5	30	31
A-B-10.5	14-May-91	22-May-91	960	16	61	19	110	280
A-C-6.0	14-May-91	22-May-91	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<1.0
A-C-11.0	14-May-91	22-May-91	1,900	18	64	44	220	300
A-D-6.0	14-May-91	22-May-91	2.3	0.10	0.019	0.11	0.44	1.6
A-D-9.5	14-May-91	22-May-91	10	0.27	0.21	0.47	1.7	1.6
A-E-6.5	14-May-91	22-May-91	<1.0	0.16	<0.0050	0.0070	<0.0050	<1.0
A-E-10.5	14-May-91	22-May-91	330	3.9	17	6.5	39	130
A-1-4.5	16-Mar-92	01-Apr-92	<1.0	0.024	0.014	0.0090	0.034	<1.0
A-1-10.0	16-Mar-92	01-Apr-92	2.2	0.13	0.051	0.023	0.71	<1.0
A-2-4.0	16-Mar-92	01-Apr-92	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	14
A-2-10.0	16-Mar-92	01-Apr-92	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<1.0
A-3-10.0	17-Mar-92	01-Apr-92	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<1.0
A-4-10.0	17-Mar-92	01-Apr-93	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<1.0
AV-1-6.5	08-Jun-92	11-Jun-92	<1.0	0.15	0.019	0.014	0.062	<1.0
AV-1-12.0	08-Jun-92	11-Jun-92	12	0.81	1.3	0.27	1.5	<1.0
AV-2-6.5	08-Jun-92	11-Jun-92	1.8	0.31	0.15	0.036	0.21	<1.0
AV-2-11.5	08-Jun-92	11-Jun-92	1500	21	84	27	170	<1.0
AV-3-6.5	08-Jun-92	11-Jun-92	<1.0	0.037	<0.0050	0.018	0.028	<1.0
AV-3-11.5	08-Jun-92	11-Jun-92	110	2.4	4.6	1.9	10	<1.0
A-5-6.5	04-Feb-93	08-Feb-93	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA
A-5-9.5	04-Feb-93	08-Feb-93	17	0.21	0.076	0.28	0.54	NA
A-6-6.5	04-Feb-93	08-Feb-93	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA
A-6-9.0	04-Feb-93	08-Feb-93	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA
AV-4-5	07-Sep-93	15-Sep-93	<1.0	0.94	<0.0050	<0.0050	0.25	NA
AV-4-10.5	07-Sep-93	16-Sep-93	270	2.2	7.0	4.5	25	NA
AV-4-12.5	07-Sep-93	16-Sep-93	470	1.9	8.7	4.9	27	NA
AV-4-16	07-Sep-93	15-Sep-93	<1.0	0.016	<0.0050	<0.0050	0.014	NA

TABLE 1
SOIL ANALYSES DATA
ARCO Station 2169
Oakland, California

SAMPLE I.D.	SAMPLE DATE	ANALYZED DATE	TPH-G (PPM)	BENZENE (PPM)	TOLUENE (PPM)	ETHYLBENZ. (PPM)	XYLENES (PPM)	TPH-D (PPM)
AV-5-5.5	07-Sep-93	15-Sep-93	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA
AV-5-10.5	07-Sep-93	15-Sep-93	<1.0	0.13	<0.0050	<0.0050	0.0027	NA
AV-5-12.5	07-Sep-93	16-Sep-93	30	0.24	0.058	0.31	0.98	NA
AV-5-15.5	07-Sep-93	15-Sep-93	<100	<0.50	<0.50	<0.50	<0.50	NA
AS-1-6	07-Sep-93	15-Sep-93	<1.0	0.031	<0.0050	<0.0050	0.036	15
AS-1-11	07-Sep-93	16-Sep-93	41	0.18	0.47	0.35	1.9	43*
AS-1-12.5	07-Sep-93	16-Sep-93	160	1.5	4.4	2.6	13	14*
AS-1-15.5	07-Sep-93	16-Sep-93	89	0.77	1.5	0.90	4.8	15*
AS-1-30	07-Sep-93	15-Sep-93	7.5	0.24	0.78	0.22	1.1	2.8*
AS-2-5.5	08-Sep-93	16-Sep-93	<1.0	0.016	0.0060	<0.0050	0.011	NA
AS-2-10	08-Sep-93	16-Sep-93	<1.0	0.010	0.011	<0.0050	0.023	NA
AS-2-13	08-Sep-93	16-Sep-93	1,500	5.7	31	25	130	NA
AS-2-16	08-Sep-93	16-Sep-93	<1.0	0.018	0.031	0.0090	0.048	NA
AS-2-24	08-Sep-93	16-Sep-93	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA
AS-3-5.5	08-Sep-93	16-Sep-93	<1.0	0.016	<0.0050	<0.0050	<0.0050	NA
AS-3-10.5	08-Sep-93	16-Sep-93	23	0.45	0.73	0.36	2.0	NA
AS-3-30	08-Sep-93	16-Sep-93	<1.0	0.0060	0.013	<0.0050	0.013	NA
AS-4-15.5	07-Dec-93	16-Dec-93	58	0.21	0.10	0.73	3.0	37*
AS-4-24	07-Dec-93	16-Dec-93	<1.0	0.011	0.011	<0.0050	0.019	<1.0
AS-5-5.5	07-Dec-93	16-Dec-93	9.6	0.093	0.022	0.10	0.28	2.3*
AS-5-12	07-Dec-93	16-Dec-93	320	2.0	7.5	5.9	31	230
AS-5-24	07-Dec-93	16-Dec-93	<1.0	0.0087	<0.0050	<0.0050	<0.0050	3.2
AV-6-5.5	06-Dec-93	16-Dec-93	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA
AV-6-12.5	06-Dec-93	16-Dec-93	330	1.1	4.4	5.8	29	NA
AV-6-16	06-Dec-93	16-Dec-93	22	0.13	0.38	0.30	1.6	NA
AV-7-5.5	06-Dec-93	16-Dec-93	<1.0	0.0094	<0.0050	<0.0050	<0.0050	<1.0
AV-7-10.5	06-Dec-93	16-Dec-93	190	1.8	4.8	7.5	17	47
AV-7-15.5	06-Dec-93	16-Dec-93	1.9	0.099	0.019	0.026	0.039	<1.0
ADR-1-5.5	06-Dec-93	15-Dec-93	<1.0	0.16	0.0090	0.026	0.027	<1.0
ADR-1-12	06-Dec-93	17-Dec-93	500	2.4	14	8.0	45	36*

TABLE 1
SOIL ANALYSES DATA
ARCO Station 2169
Oakland, California

SAMPLE I.D.	SAMPLE DATE	ANALYZED DATE	TPH-G (PPM)	BENZENE (PPM)	TOLUENE (PPM)	ETHYLBENZ. (PPM)	XYLENES (PPM)	TPH-D (PPM)
ADR-1-23	06-Dec-93	15-Dec-93	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<1.0
ADR-2-5.5	06-Dec-93	15-Dec-93	<1.0	0.018	<0.0050	<0.0050	<0.0050	9.7*
ADR-2-12	06-Dec-93	17-Dec-93	2,200	11	64	34	180	1,000
ADR-2-15.5	06-Dec-93	16-Dec-93	4.4	0.81	0.055	0.11	0.20	<1.0
ADR-2-27.5	06-Dec-93	16-Dec-93	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<1.0

TPH-G = Total Petroleum Hydrocarbons calculated as Gasoline.
TPH-D = Total Petroleum Hydrocarbons calculated as Diesel.
PPM = Parts Per Million.
* = Reported as a non-diesel mix.
Note: All data shown as <x are reported as ND (none detected).

Sample Identification:

ADR-2-17.5
- Depth in feet
- Well ID

TABLE 2
SOIL ANALYSES DATA FOR FORMER UST PIT
AND PRODUCT LINE TRENCHES
ARCO Station 2169
Oakland, California

SAMPLE DESIGNATION	SAMPLE DATE	DEPTH (feet)	TPH-G (PPM)	BENZENE (PPM)	TOLUENE (PPM)	ETHYLBENZ. (PPM)	XYLENES (PPM)	TPH-D (PPM)
Former UST Pit								
SW-1	16-Jan-92	12	1200	6.8	47	22	140	620
SW-2	16-Jan-92	12	81	0.98	2.9	1.9	9.1	19
SW-3	16-Jan-92	12	200	3.0	10	4.6	25	7.1
SW-4	16-Jan-92	12	170	3.2	11	3.9	22	3.4
SW-5	16-Jan-92	12	3.0	1.1	0.022	0.21	0.11	<1.0
SW-6	16-Jan-92	12	100	0.88	3.9	2.1	15	2.8
SW-7	16-Jan-92	12	420	4.2	16	8.0	53	10
SW-8	16-Jan-92	12	180	2.5	2.7	3.7	23	4.4
SW-9	16-Jan-92	12	200	2	4.5	4.7	29	17
Product Line Trenches								
L-1	19-Feb-92	3	120	0.36	0.81	0.56	3.8	NA
L-2	19-Feb-92	3	4.7	0.32	0.097	0.088	0.18	NA
L-3	19-Feb-92	4	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA
L-4	19-Feb-92	3	140	2.2	0.28	2.2	5.1	450
L-5	19-Feb-92	3	2.8	0.19	0.005	0.024	0.088	6.0
L-4A	03-Mar-92	7	4.6	0.054	0.059	0.14	0.64	54

TPH-G = Total Petroleum Hydrocarbons calculated as Gasoline.
TPH-D = Total Petroleum Hydrocarbons calculated as Diesel.
PPM = Parts Per Million.
NA = Not Analyzed.

Note: All data shown as <x are reported as ND (none detected).

TABLE 3

HISTORICAL WATER-LEVEL DATA
ARCO Station 2169
Oakland, California

MONITORING DATE	WELL NUMBER	DEPTH TO WATER (ft)	WELL ELEVATION (FT)	STATIC WATER ELEVATION (FT)	FLOATING PRODUCT THICKNESS (FT)
03-Apr-92	A-1	10.35	14.75	4.40	0.00
20-May-92	A-1	11.66	14.75	3.09	0.00
16-Jun-92	A-1	11.95	14.75	2.80	0.00
17-Jul-92	A-1	12.23	14.75	2.52	0.00
07-Aug-92	A-1	12.16	14.75	2.59	0.00
22-Sep-92	A-1	12.42	14.75	2.33	0.00
13-Oct-92	A-1	12.47	14.75	2.28	0.00
23-Nov-92	A-1	11.83	14.75	2.92	0.00
16-Dec-92	A-1	11.03	14.75	3.72	0.00
28-Jan-93	A-1	9.08	14.75	5.67	0.00
22-Feb-93	A-1	9.46	14.75	5.29	0.00
25-Mar-93	A-1	10.02	14.75	4.73	0.00
15-Apr-93	A-1	10.50	14.75	4.25	0.00
22-May-93	A-1	11.33	14.75	3.42	0.00
16-Jun-93	A-1	11.51	14.75	3.24	0.00
27-Jul-93	A-1	11.91	14.75	2.84	0.00
26-Aug-93	A-1	12.11	14.75	2.64	0.00
27-Sep-93	A-1	12.21	14.75	2.54	0.00
08-Oct-93	A-1	12.21	14.75	2.54	0.00
09-Feb-94	A-1	10.09	14.16	4.07	0.00
03-Apr-92	A-2	10.97	15.16	4.19	0.00
20-May-92	A-2	12.17	15.16	2.99	0.00
16-Jun-92	A-2	12.43	15.16	2.73	0.00
17-Jul-92	A-2	12.64	15.16	2.52	0.00
07-Aug-92	A-2	12.75	15.16	2.41	0.00
22-Sep-92	A-2	12.88	15.16	2.28	0.00
13-Oct-92	A-2	12.92	15.16	2.24	0.00
23-Nov-92	A-2	12.18	15.16	2.98	0.00
16-Dec-92	A-2	11.52	15.16	3.64	0.00
28-Jan-93	A-2	9.73	15.16	5.43	0.00
22-Feb-93	A-2	9.28	15.16	5.88	0.00
25-Mar-93	A-2	10.57	15.16	4.59	0.00
15-Apr-93	A-2	11.20	15.16	3.96	0.00

TABLE 3

HISTORICAL WATER-LEVEL DATA
ARCO Station 2169
Oakland, California

MONITORING DATE	WELL NUMBER	DEPTH TO WATER (ft)	WELL ELEVATION (FT)	STATIC WATER ELEVATION (FT)	FLOATING PRODUCT THICKNESS (FT)
22-May-93	A-2	11.91	15.16	3.25	0.00
16-Jun-93	A-2	12.04	15.16	3.12	0.00
27-Jul-93	A-2	12.41	15.16	2.75	0.00
25-Aug-93	A-2	12.54	15.16	2.62	0.00
27-Sep-93	A-2	12.66	15.16	2.50	0.00
08-Oct-93	A-2	12.65	15.16	2.51	0.00
09-Feb-94	A-2	10.67	14.55	3.88	0.00
03-Apr-92	A-3	11.70	16.38	4.68	0.00
20-May-92	A-3	13.00	16.38	3.38	0.00
16-Jun-92	A-3	13.46	16.38	2.92	0.00
17-Jul-92	A-3	13.45	16.38	2.93	0.00
07-Aug-92	A-3	12.37	16.38	4.01	0.00
22-Sep-92	A-3	13.71	16.38	2.67	0.00
13-Oct-92	A-3	13.76	16.38	2.62	0.00
23-Nov-92	A-3	13.60	16.38	2.78	0.00
16-Dec-92	A-3	12.31	16.38	4.07	0.00
28-Jan-93	A-3	10.33	16.38	6.05	0.00
22-Feb-93	A-3	10.44	16.38	5.94	0.00
25-Mar-93	A-3	11.27	16.38	5.11	0.00
15-Apr-93	A-3	11.98	16.38	4.40	0.00
22-May-93	A-3	12.70	16.38	3.68	0.00
16-Jun-93	A-3	12.84	16.38	3.54	0.00
27-Jul-93	A-3	13.22	16.38	3.16	0.00
25-Aug-93	A-3	13.35	16.38	3.03	0.00
27-Sep-93	A-3	13.50	16.38	2.88	0.00
08-Oct-93	A-3	13.48	16.38	2.90	0.00
09-Feb-94	A-3	11.32	15.75	4.43	0.00
03-Apr-92	A-4	10.84	15.89	5.05	0.00
20-May-92	A-4	12.13	15.89	3.76	0.00
16-Jun-92	A-4	12.33	15.89	3.56	0.00
17-Jul-92	A-4	12.60	15.89	3.29	0.00
07-Aug-92	A-4	12.56	15.89	3.33	0.00
22-Sep-92	A-4	12.87	15.89	3.02	0.00
13-Oct-92	A-4	12.87	15.89	3.02	0.00

TABLE 3

HISTORICAL WATER-LEVEL DATA
ARCO Station 2169
Oakland, California

MONITORING DATE	WELL NUMBER	DEPTH TO WATER (ft)	WELL ELEVATION (FT)	STATIC WATER ELEVATION (FT)	FLOATING PRODUCT THICKNESS (FT)
23-Nov-92	A-4	12.63	15.89	3.26	0.00
16-Dec-92	A-4	11.34	15.89	4.55	0.00
28-Jan-93	A-4	9.40	15.89	6.49	0.00
22-Feb-93	A-4	9.35	15.89	6.54	0.00
25-Mar-93	A-4	10.32	15.89	5.57	0.00
15-Apr-93	A-4	11.15	15.89	4.74	0.00
22-May-93	A-4	11.84	15.89	4.05	0.00
16-Jun-93	A-4	12.01	15.89	3.88	0.00
27-Jul-93	A-4	12.33	15.89	3.56	0.00
25-Aug-93	A-4	12.48	15.89	3.41	0.00
27-Sep-93	A-4	12.60	15.89	3.29	0.00
08-Oct-93	A-4	12.57	15.89	3.32	0.00
09-Feb-94	A-4	10.01	15.25	5.24	0.00
11-Feb-93	A-5	9.15	14.14	4.99	0.00
25-Mar-93	A-5	9.33	14.14	4.81	0.00
15-Apr-93	A-5	10.11	14.14	4.03	0.00
22-May-93	A-5	10.71	14.14	3.43	0.00
16-Jun-93	A-5	10.84	14.14	3.30	0.00
27-Jul-93	A-5	11.22	14.14	2.92	0.00
26-Aug-93	A-5	11.44	14.14	2.70	0.00
27-Sep-93	A-5	11.51	14.14	2.63	0.00
08-Oct-93	A-5	11.68	14.14	2.46	0.00
09-Feb-94	A-5	9.44	13.51	4.07	0.00
11-Feb-93	A-6	9.35	14.17	4.82	0.00
25-Mar-93	A-6	Not measured			
16-Apr-93	A-6	9.36	14.17	4.81	0.00
22-May-93	A-6	10.86	14.17	3.31	0.00
16-Jun-93	A-6	10.98	14.17	3.19	0.00
27-Jul-93	A-6	Not measured			
25-Aug-93	A-6	Not measured			
27-Sep-93	A-6	11.65	14.17	2.52	0.00
08-Oct-93	A-6	11.80	14.17	2.37	0.00
09-Feb-94	A-6	9.48	13.51	4.03	0.00
03-Apr-92	AR-1	11.07	15.71	4.64	0.00

TABLE 3

HISTORICAL WATER-LEVEL DATA
ARCO Station 2169
Oakland, California

MONITORING DATE	WELL NUMBER	DEPTH TO WATER (ft)	WELL ELEVATION (FT)	STATIC WATER ELEVATION (FT)	FLOATING PRODUCT THICKNESS (FT)
20-May-92	AR-1	12.37	15.71	3.34	0.00
16-Jun-92	AR-1	12.47	15.71	3.24	0.00
17-Jul-92	AR-1	13.00	15.71	2.71	0.00
07-Aug-92	AR-1	12.87	15.71	2.84	0.00
22-Sep-92	AR-1	12.99	15.71	2.72	0.00
13-Oct-92	AR-1	13.05	15.71	2.66	0.00
23-Nov-92	AR-1	12.80	15.71	2.91	0.00
16-Dec-92	AR-1	11.49	15.71	4.22	0.00
28-Jan-93	AR-1	9.46	15.71	6.25	0.00
22-Feb-93	AR-1	10.05	15.71	5.66	0.00
25-Mar-93	AR-1	10.75	15.71	4.96	0.00
15-Apr-93	AR-1	11.26	15.71	4.45	0.00
22-May-93	AR-1	12.07	15.71	3.64	0.00
16-Jun-93	AR-1	12.21	15.71	3.50	0.00
27-Jul-93	AR-1	12.60	15.71	3.11	0.00
25-Aug-93	AR-1	12.78	15.71	2.93	0.00
27-Sep-93	AR-1	12.89	15.71	2.82	0.00
08-Oct-93	AR-1	12.84	15.71	2.87	0.00
09-Feb-94	AR-1	11.08	15.61	4.53	0.00
17-Jul-92	AR-2	13.14	15.79	2.65	0.00
07-Aug-92	AR-2	13.25	15.79	2.54	0.00
22-Sep-92	AR-2	13.58	15.79	2.21	0.00
13-Oct-92	AR-2	13.65	15.79	2.14	0.00
23-Nov-92	AR-2	Not measured			
16-Dec-92	AR-2	12.16	15.79	3.63	0.00
28-Jan-93	AR-2	10.26	15.79	5.53	0.00
22-Feb-93	AR-2	10.52	15.79	5.27	0.00
25-Mar-93	AR-2	11.18	15.79	4.61	0.00
15-Apr-93	AR-2	11.81	15.79	3.98	0.00
22-May-93	AR-2	12.46	15.79	3.33	0.00
16-Jun-93	AR-2	12.53	15.79	3.26	0.00
27-Jul-93	AR-2	12.77	15.79	3.02	0.00
26-Aug-93	AR-2	13.23	15.79	2.56	0.00
27-Sep-93	AR-2	13.16	15.79	2.63	0.00

TABLE 3

HISTORICAL WATER-LEVEL DATA
ARCO Station 2169
Oakland, California

MONITORING DATE	WELL NUMBER	DEPTH TO WATER (ft)	WELL ELEVATION (FT)	STATIC WATER ELEVATION (FT)	FLOATING PRODUCT THICKNESS (FT)
08-Oct-93	AR-2	13.32	15.79	2.47	0.00
09-Feb-94	AR-2	11.33	15.28	3.95	0.00
09-Feb-94	ADR-1	9.90	13.95	4.05	0.00
09-Feb-94	ADR-2	10.73	14.64	3.91	0.00

Notes:
1. Static water elevations referenced to Mean Sea Level (MSL).
2. Well elevations and depths-to-water were referenced to the top of the well box in 1992 and 1993. After installation of a remediation system, site wells except offsite well A-6 were resurveyed by Virgil D. Chavez, licensed land surveyor, on February 11, 1994. Starting first quarter 1994, depths-to-water have been referenced to the top of the well box using February 1994 survey data for wells A-1 through A-5, AR-1, AR-2, ADR-1 and ADR-2, and previous survey data for well A-6 (survey performed by Kier & Wright Civil Engineers & Surveyors, Inc., on February 25, 1993).
3. Well AR-2 could not be located on November 23, 1992.
4. Well A-6 was not accessible on March 25, July 27 and August 25, 1993.

TABLE 4

HISTORICAL GROUNDWATER QUALITY DATABASE
ARCO Station 2169
Oakland, California

SAMPLE DATE	WELL NO.	TPH-G (PPB)	BENZENE (PPB)	TOLUENE (PPB)	ETHYLBENZENE (PPB)	XYLENES (PPB)	TPH-D (PPB)
03-Apr-92	A-1	34000	6200	3900	410	3100	6100
17-Jul-92	A-1	5600	3000	500	<100	<100	N/A
13-Oct-92	A-1	5600	980	590	85	910	N/A
28-Jan-93	A-1	3700	780	360	130	460	620*
15-Apr-93	A-1	210	34	11	7.1	20	420*
26-Aug-93	A-1	2000	370	35	50	220	1500*
08-Oct-93	A-1	2600	430	65	64	99	1200*
09-Feb-94	A-1	3000	560	150	66	190	650*
03-Apr-92	A-2	<30	<0.30	<0.30	<0.30	<0.30	<50
17-Jul-92	A-2	<50	<0.50	<0.50	<0.50	<0.50	N/A
13-Oct-92	A-2	<50	0.57	<0.50	<0.50	<0.50	N/A
28-Jan-93	A-2	<50	<0.50	<0.50	<0.50	<0.50	N/A
15-Apr-93	A-2	<50	<0.50	<0.50	<0.50	<0.50	N/A
25-Aug-93	A-2	<50	<0.50	<0.50	<0.50	<0.50	N/A
08-Oct-93	A-2	<50	<0.50	<0.50	<0.50	<0.50	N/A
09-Feb-94	A-2	260**	<0.6	<0.5	<0.5	<0.5	N/A
03-Apr-92	A-3	200	0.79	0.65	4.4	<0.30	130
17-Jul-92	A-3	<50	<0.50	<0.50	1.3	2.3	N/A
13-Oct-92	A-3	<50	<0.50	<0.50	<0.50	<0.50	N/A
28-Jan-93	A-3	<50	<0.50	<0.50	<0.50	<0.50	N/A
15-Apr-93	A-3	<50	<0.50	<0.50	<0.50	<0.50	N/A
25-Aug-93	A-3	<50	<0.50	<0.50	<0.50	<0.50	N/A
08-Oct-93	A-3	<50	<0.50	<0.50	<0.50	<0.50	N/A
09-Feb-94	A-3	<50	<0.5	<0.5	<0.5	<0.5	N/A
03-Apr-92	A-4	35	<0.30	<0.30	<0.30	<0.30	85
17-Jul-92	A-4	<50	<0.50	<0.50	<0.50	<0.50	N/A
13-Oct-92	A-4	<50	<0.50	<0.50	<0.50	<0.50	N/A
28-Jan-93	A-4	<50	<0.50	<0.50	<0.50	<0.50	N/A
15-Apr-93	A-4	<50	<0.50	<0.50	<0.50	<0.50	N/A
25-Aug-93	A-4	<50	<0.50	<0.50	<0.50	<0.50	N/A
08-Oct-93	A-4	<50	<0.50	<0.50	<0.50	<0.50	N/A
09-Feb-94	A-4	<50	<0.50	<0.50	<0.50	<0.50	N/A
11-Feb-93	A-5	4900	380	640	140	970	N/A
15-Apr-93	A-5	27000	3100	4000	1100	4600	N/A

TABLE 4

HISTORICAL GROUNDWATER QUALITY DATABASE
ARCO Station 2169
Oakland, California

SAMPLE DATE	WELL NO.	TPH-G (PPB)	BENZENE (PPB)	TOLUENE (PPB)	ETHYLBENZENE (PPB)	XYLENES (PPB)	TPH-D (PPB)
26-Aug-93	A-5	13000	1100	1400	480	1800	N/A
08-Oct-93	A-5	6800	490	620	280	980	N/A
09-Feb-93	A-5	2200	190	130	130	310	N/A
11-Feb-93	A-6	990	1.8	5.1	17	7.2	N/A
16-Apr-93	A-6	390	1.3	1.6	1.7	7.7	N/A
25-Aug-93	A-6	Not	Sampled				
08-Oct-93	A-6	220	0.73	<0.50	0.82	0.65	N/A
09-Feb-94	A-6	640	<2.9	<3.7	<2.4	<8.2	N/A
03-Apr-92	AR-1	17000	310	1400	320	3000	12000
17-Jul-92	AR-1	44000	4300	1800	1800	10000	N/A
13-Oct-92	AR-1	32000	310	730	570	3100	22000*
28-Jan-93	AR-1	15000	1200	510	510	2600	5300*
15-Apr-93	AR-1	17000	1800	360	520	1600	5400*
25-Aug-93	AR-1	2900	260	54	80	160	2800*
08-Oct-93	AR-1	3500	200	85	120	290	4100*
09-Feb-94	AR-1	26000	2900	450	920	3000	4200*
17-Jul-92	AR-2	150	6.6	24	6.6	39	N/A
13-Oct-92	AR-2	<50	2.0	0.86	0.51	3.8	58*
28-Jan-93	AR-2	2000	570	13	<10	380	290*
15-Apr-93	AR-2	85	15	<0.50	<0.50	2.4	<50
26-Aug-93	AR-2	<50	<0.50	<0.50	<0.50	<0.50	<50
08-Oct-93	AR-2	<50	<0.50	<0.50	<0.50	<0.50	<50
09-Feb-94	AR-2	82**	<0.5	<0.5	<0.5	<0.5	<50
09-Feb-94	ADR-1	3000	380	140	59	240	110*
09-Feb-94	ADR-2	83000	6300	6100	2000	11000	12000

CURRENT REGIONAL WATER QUALITY CONTROL BOARD MAXIMUM CONTAMINANT LEVELS:
Benzene 1. ppb Xylenes 1750. ppb Ethylbenzene 680 ppb

CURRENT CAL EPA ACTION LEVELS: Toluene 100

TPH-G = Total Petroleum Hydrocarbons calculated as Gasoline.
TPH-D = Total Petroleum Hydrocarbons calculated as Diesel.
PPB = Parts Per Billion.
N/A = Not Analyzed.
* = Reported as a non-diesel mix.
** = Sample contains a single non-fuel component eluting in the gasoline range, and quantitated as gasoline.

Notes: 1. All data shown as <x are reported as ND (not detected above the reporting limit).

TABLE 5
WELL SURVEY DATA
ARCO Station 2169
Oakland, California

Map Section Number	Well Number	Well Type	Well Owner	Well Depth (ft)	DTW (ft)
26	D1	Cathodic Protection	PG&E	120	NA
26	D5	Monitoring	Aratex Service Co.	25	22
26	D6	Monitoring	Aratex Service Co.	30	17
26	D7	Monitoring	Aratex Service Co.	30	18
26	L1	Monitoring	David Fyne	40	13
26	L2	Monitoring	U.S. Postal Service	30	NA
26	M1	Monitoring	Chevron U.S.A.	30	15
26	M2	Monitoring	Chevron U.S.A.	25	14
26	M3	Monitoring	Chevron U.S.A.	24	15
26	M4	Monitoring	Chevron U.S.A.	25	13
26	M5	Monitoring	Chevron U.S.A.	25	13
26	M6	Monitoring	Chevron U.S.A.	27	13
26	M7	Monitoring	Chevron U.S.A.	25	13
27	A3	Monitoring	Tim Williams	30	11
27	A4	Monitoring	Northern Venetian Blind	25	11
27	A5	Monitoring	Northern Venetian Blind	26	14
27	A6	Monitoring	Northern Venetian Blind	26	14
27	C1	Monitoring	Anheuser-Busch	30	9
27	C2	Monitoring	Anheuser-Busch	30	9
27	C3	Monitoring	Anheuser-Busch	30	9
27	H1	Monitoring	Ned Clyde Const.	17	8
26	P9	Test Well	City of Oakland	25	23
26	P10	Test Well	City of Oakland	24	21
26	P11	Test Well	City of Oakland	28	23
26	P12	Test Well	City of Oakland	23	14
26	P14	Test Well	City of Oakland	25	16
26	Q6	Test Well	City of Oakland	24	19
26	Q8	Test Well	City of Oakland	28	21
26	Q10	Test Well	City of Oakland	26	20
27	H2	Piezometric	Ned Clyde Const.	30	NA
27	H3	Piezometric	Ned Clyde Const.	16	NA
27	H4	Piezometric	Ned Clyde Const.	16	NA
27	H5	Piezometric	Ned Clyde Const.	21	7
27	H6	Piezometric	Ned Clyde Const.	15	NA
27	H7	Piezometric	Ned Clyde Const.	20	NA
27	H8	Piezometric	Ned Clyde Const.	20	NA
27	H9	Piezometric	Ned Clyde Const.	18	NA
26	C1	Abandoned	F.L. Brown	180	30
26	C2	Abandoned	Oakland Laundry Co.	136	33
26	C3	Industrial	Lane Metal Finishing	125	20

PG&E: Pacific Gas and Electric. NA: Not available.
Source: Andreas Godfry, County of Alameda Public Works Department.

Table 6
Initial and Final Observation Well Conditions
Vapor Extraction and Sparge Test; (AV-4 and AS-2)
ARCO Service Station No. 2169
889 West Grand Avenue
Oakland, California

Well Number	Start			End
	Water Level (feet)	CO2 (%)	O2 (%)	Water Level (feet)
AV-4	12.30	- -	- -	12.30
AV-5	14.15	2	14	14.12
AS-2	13.92	16	0	Dry
A-3	13.45	0	7	13.38
A-2	13.80	- -	- -	12.57
AR-2	13.20	2	18	13.11
AV-1	Dry	14	2	Dry

Note: Water level from top of casing.

Table 7
Vapor Extraction and Sparge Well Data
Vapor Extraction and Sparge Test; (AV-4 and AS-2)
ARCO Service Station No. 2169
889 West Grand Avenue
Oakland, California

			Extraction Well # AV-4									Sparge Well AS-2					
						HC Concentration		TPH-G				Air Flow	Helium			Helium	
Time (hh:mm)	Elapsed Time (hh:mm)	Engine Speed (RPM)	Flow Rate (scfm)	Temp. (deg F)	Vacuum (in H2O)	IR (ppm)	FID (ppm)	Analysis (ppmv)	O2 (%)	CO2 (%)	He (%)	Rate (scfm)	Flow Rate (scfm)	Pressure (psi)	Temp. (deg F)	Conc. (%)	Event
10:45	0:00																
11:00	0:15	1850	8	68	75	13330	5000		12		0						
11:15	0:30	2000	14	68	86	13900*	100000**		8.5	10	0						Phase 1
11:30	0:45	2000	9	68	68	13900*	100000**		8.5		0						
11:45	1:00	1900	11	68	79	13900*	100000**		7.5		0						
12:00	1:15	1900	12	68	75	13900*	100000**		9.8		0						
12:15	1:30	1900	12	68	75	13900*	100000**	7900	9.5		0						
12:20	1:35	--	Sparge On									0	4	5.7	42	100	Phase 2
12:30	1:45	1750	11	69	62	13900*	100000**		7.5		22	0	4.6	3.5		100	
12:45	2:00	1680	12	69	61	13900*	100000**		7		56	0	6	3.8		100	
13:00	2:15	1650	11	69	65	13900*	100000**	11000	7.5		57	0	2.2	2		100	
13:15	2:30	1800	13	70	58	13900*	52500		12	7	48	0	2	2.2		100	
13:20	2:35		Sparge Off														Phase 3
13:30	2:45	1800	11	70	64	13900*	52000		9.8		42	0					
13:45	3:00	1750	12	70	62	13900*	84000		10		37	0					
14:00	3:15	1750	12	69	62	13900*	97000		10		42	0					
14:15	3:30	1880	12	69	70	13900*	88500		8		33	0					
14:30	3:45	1850	12	68	70	13900*	100000**		8		32	0					
14:45	4:00	1850	12	68	70	13900*	100000**		8		0	0					
15:00	4:15	1825	12	68	70	13900*	100000**	15000	8	10	0						
15:15	4:30																Phase 4

hh:mm = hours:minutes
RPM = revolutions per minute
ppm = parts per million
ppmv = parts per million by volume.
scfm = standard cubic feet per minute.
IR = Infrared detector
FID = Flame ionization detector
deg F = degrees Farenheit
in H2O = inches of water column
psi = pounds per square inch

Notes:
* Maximum display value of 13,900 ppm exceeded
** Maximum display value of 100,000 ppm exceeded

Table 8
Observation Well Data
Vapor Extraction and Sparge Test; (AV-4 and AS-2)
ARCO Service Station No. 2169
889 West Grand Avenue
Oakland, California

Time (hh:mm)	Elapsed Time (hh:mm)	Pressure (in H2O) AV-1	AR-2	AV-5	A-3	Event
10:45	0:00	0.000	0	0	0	Reference
11:00	0:15	0.000	-0.01	-0.04	-0.02	Phase 1
11:15	0:30	-0.005	0	-0.44	-0.05	
11:30	0:45	0.01	-0.01	-0.66	-0.1	
11:45	1:00	0.015	-0.005	-0.8	-0.105	
12:00	1:15	0.065	-0.005	-0.88	-0.11	
12:15	1:30	0.13	-0.005	-0.89	-0.11	
12:20	1:35					Phase 2
12:30	1:45	0.105	-0.005	1.6	0.525	
12:45	2:00	0.145	-0.005	3.62	0.23	
13:00	2:15	0.13	-0.005	2.2	0.2	
13:15	2:30	0.12	-0.005	1.155	0.195	
13:20	2:35					Phase 3
13:30	2:45	0.12	-0.005	-0.47	-0.14	
13:45	3:00	0.205	-0.005	-0.88	-0.14	
14:00	3:15	0.205	-0.005	-1	-0.14	
14:15	3:30	0.22	-0.005	-1	-0.15	
14:30	3:45	0.235	-0.005	-1	-0.17	
14:45	4:00	0.25	-0.005	-1	-0.175	
15:00	4:15	0.3	-0.005	-1.05	-0.155	
15:15	4:30	0	-0.005	-0.01	-0.005	Phase 4 Reference
Distance to AV-4 (ft)		53	62	38	78	
Distance to AS-2 (ft)		60	67	25	73	

hh:mm = hours:minutes
in H2O = inches of water column
ft = feet

Table 9
Initial and Final Observation Well Conditions
Vapor Extraction and Sparge Test; (AV-2 and AS-1)
ARCO Service Station No. 2169
889 West Grand Avenue
Oakland, California

Well Number	Start			End
	Water Level (feet)	CO2 (%)	O2 (%)	Water Level (feet)
AV-2	12.49	- -	- -	11.85
AS-1	13.21	- -	- -	18.98
A-1	13.14	3	1	12.05
AV-1	Dry	1	0	Dry
AR-1	12.85	15	0	13.92
AV-3	13.02	0	0	13.03
A-4	12.59	7	- -	12.61

Note: Water level from top of casing.

Table 10
Vapor Extraction and Sparge Well Data
Vapor Extraction and Sparge Test; (AV-2 and AS-1)
ARCO Service Station No. 2169
889 West Grand Avenue
Oakland, California

			Extraction Well # AV-2									Sparge Well AS-1					
						HC Concentration											
Time	Elapsed Time	Engine Speed	Flow Rate	Temp.	Vacuum	IR	FID	TPH-G Analysis	Oxygen	CO2	He	Air Flow Rate	Helium Flow Rate	Pressure	Temp.	Helium Conc.	Event
(hh:mm)	(hh:mm)	(RPM)	(scfm)	(deg F)	(in H2O)	(ppm)	(ppm)	(ppmv)	(%)	(%)	(%)	(scfm)	(scfm)	(psi)	(deg F)	(%)	
10:45	0:00	1900	6.5	74	12	13900*	100000**		1								
11:00	0:15	1990	7	74	14	13900*	100000**	5300	1	17	0						Phase 1
11:15	0:30	1990	7.5	74	18	13900*	100000**		1		0						
11:30	0:45	1990	7.5	74	18	13900*	100000**		2		0						
11:45	1:00	1990	7.5	76	18	13900*	100000**		2.5		0						
12:00	1:15	1990	8	76	18	13900*	100000**		2.5		0						
12:04	1:30	- -	Sparge On									0	0	5	40	100	Phase 2
12:15	1:35	1950	8	75	18	13900*	14000		2		0	0	1	11.5		100	
12:30	1:45	1950	7.5	75	18	13900*	18000		2		0.4	0	2	13		100	
12:45	2:00	1900	7.5	75	18	13900*	20000		2		0.6	0	2	11		100	
13:00	2:15	1910	7.5	75	19	13900*	16000	4500	2		0.6	0	2	8		100	
13:04	2:30	- -	Sparge Off														Phase 3
13:15	2:35	1900	7.5	75	19	13900*	21000		2		0.5	0					
13:30	2:45	1900	7.5	75	19	13900*	20000		2		2	0					
13:45	3:00	1920	7.5	75	19	13900*	24000		2		4	0					
14:00	3:15	1950	7.5	75	19	13900*	100000**	5300	2	16	4	0					

hh:mm = hours:minutes
RPM = revolutions per minute
ppm = parts per million
ppmv = parts per million by volume.
scfm = standard cubic feet per minute.
IR = Infrared detector
FID = Flame ionization detector
deg F = degrees Farenheit
in H2O = inches of water column
psi = pounds per square inch

Notes:
* Maximum display value of 13,900 ppm exceeded
** Maximum display value of 100,000 ppm exceeded

Table 11
Observation Well Data
Vapor Extraction and Sparge Test; (AV-2 and AS-1)
ARCO Service Station No. 2169
889 West Grand Avenue
Oakland, California

Time (hh:mm)	Elapsed Time (hh:mm)	Pressure (in H2O) A-1	AV-1	AR-1	AV-3	A-4	Event
10:30		0.000	0	0	0	0	Reference
10:45	0:00	0.000	0	0	0	0	Phase 1
11:00	0:15	-0.060	0.04	-0.5	-0.26	0	
11:15	0:30	-0.060	0.03	-0.585	-0.3	0	
11:30	0:45	-0.09	-0.06	-0.62	-0.32	0	
11:45	1:00	-0.07	-0.055	-0.62	-0.32	0	
12:00	1:15	-0.07	-0.045	-0.635	-0.33	0	
12:04	1:19	Sparge On					Phase 2
12:15	1:30	1.5	-0.04	-0.53	-0.26	0.08	
12:30	1:45	4.2	0.025	-0.955	-0.25	0.26	
12:45	2:00	6.6	-0.01	0.5	0.2	0.21	
13:00	2:15	7.35	0.08	0.83	0.3	0.12	
13:04	2:19	Sparge off					Phase 3
13:15	2:30	4.6	0.035	-0.155	-0.13	-0.11	
13:30	2:45	2.6	0.01	-0.37	-0.25	-0.19	
13:45	3:00	2	-0.065	-0.46	-0.285	-0.135	
14:00	3:15	1.2	0	-0.5	-0.305	-0.12	
14:15	3:30	0	0	0	0	0	Phase 4 Reference
Distance to AV-2 (ft)		40	50	30	65	152	
Distance to AS-1 (ft)		70	38	12	40	126	

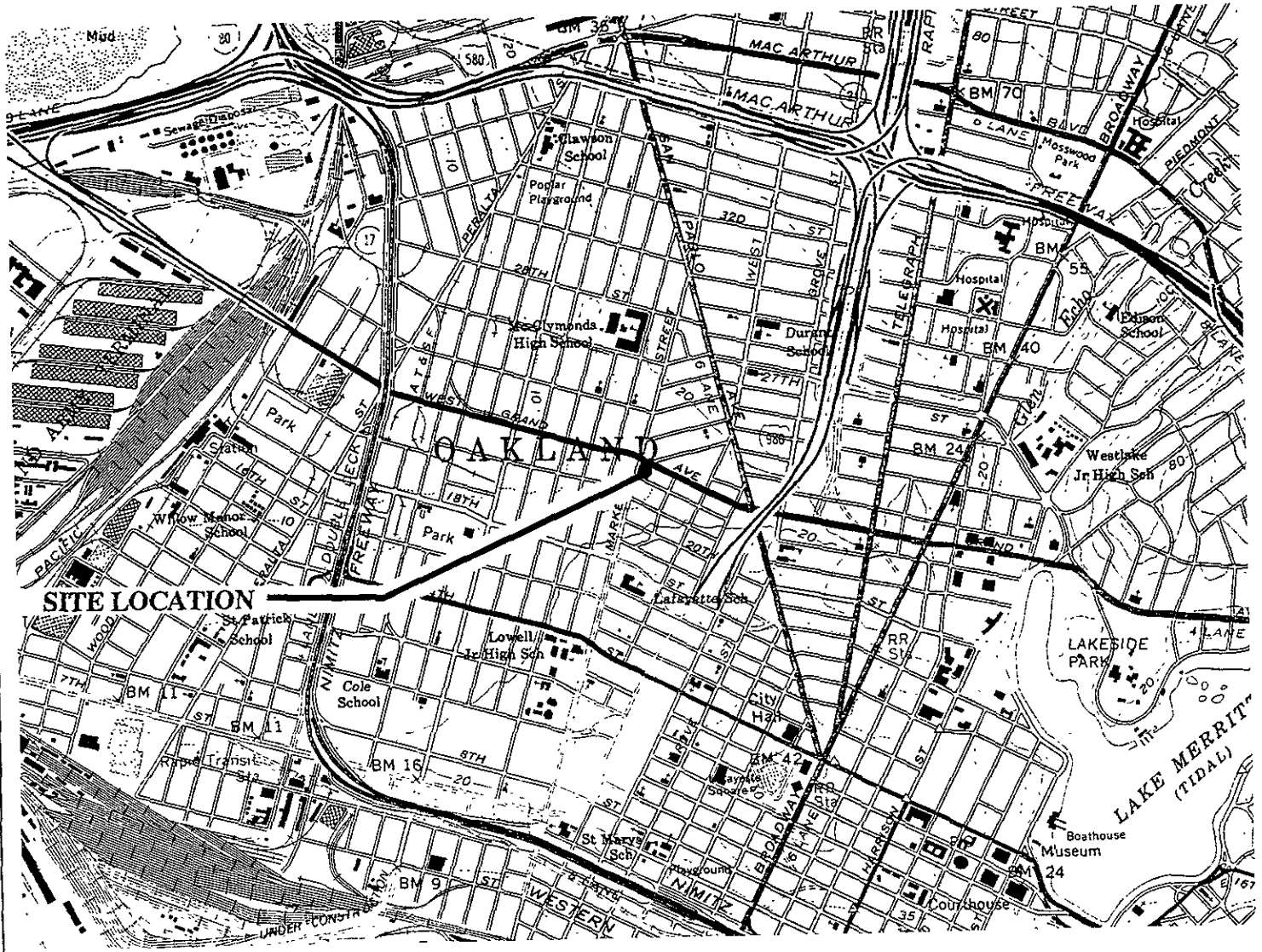
hh:mm = hours:minutes
in H2O = inches of water column
ft = feet

Table 12
Summary of Test Results
Vapor Extraction and Sparge Tests
ARCO Service Station No. 2169
889 West Grand Avenue
Oakland, California

Date	Well No.	Average Flow Rate (scfm)	Average Vacuum (in H2O)	Estimated Radius of Influence (feet)	TPH-G Concentration		TPH-G Removal Rates		Sparge Gas Capture Efficiency (%)
					VE (ppmv)	VE/S (ppmv)	VE (lb/day)	VE/S (lb/day)	
9/15/93	AV-4	11.5	69	35	7,900	11,000	22	31	97
9/15/93	AR-2	30.5	26.8	NC	90	NA	0.7	NA	NA
9/17/93	AV-2	7.5	17.6	31	5,300	4,500	9.8	6.6	4
9/17/93	A-1	<5	58	NC	3,300	NA	<4	NA	NA
9/17/93	A-3	<5	61	NC	750	NA	<0.9	NA	NA
9/17/93	A-4	9	69	NC	110	NA	0.2	NA	NA
9/17/93	AV-1	5	76	NC	2,900	NA	4	NA	NA
9/17/93	AV-3	9	75	NC	11,000	NA	24	NA	NA
9/17/93	AV-5	5	64	NC	200	NA	0.2	NA	NA

NA = Not Applicable
NC = Not Calculated due to insufficient data
ppmv = parts per million by volume
lb/day = pounds per day
TPH-G = total petroleum hydrocarbons calculated as gasoline
scfm = standard cubic feet per minute
in H2O = inches of water column

ILLUSTRATIONS



Base Map: USGS Topographic Map

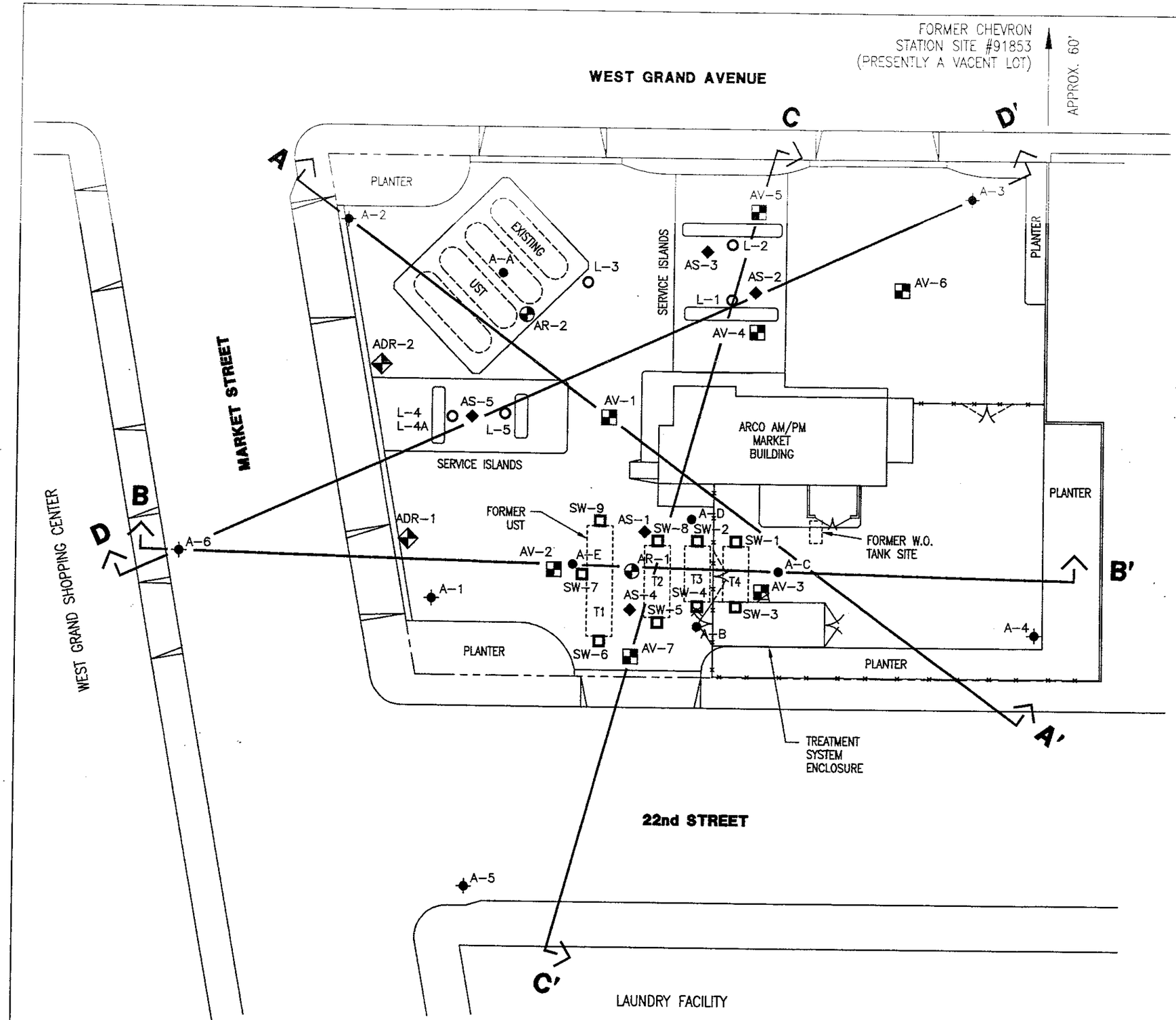
PLATE

1

GeoStrategies Inc.

VICINITY MAP
ARCO Service Station #2169
889 West Grand Avenue
Oakland, California

JOB NUMBER	REVIEWED BY	DATE	REVISED DATE
7927		5/91	



Base Map: ARCO Tank & Line Replacement Site Plan dated 4-22-91 and Field Observations performed on 2-2-93.

PLATE 2

SITE PLAN
ARCO Service Station #2169
889 West Grand Avenue
Oakland, California

DATE 2/94
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JOB NUMBER 792717-15

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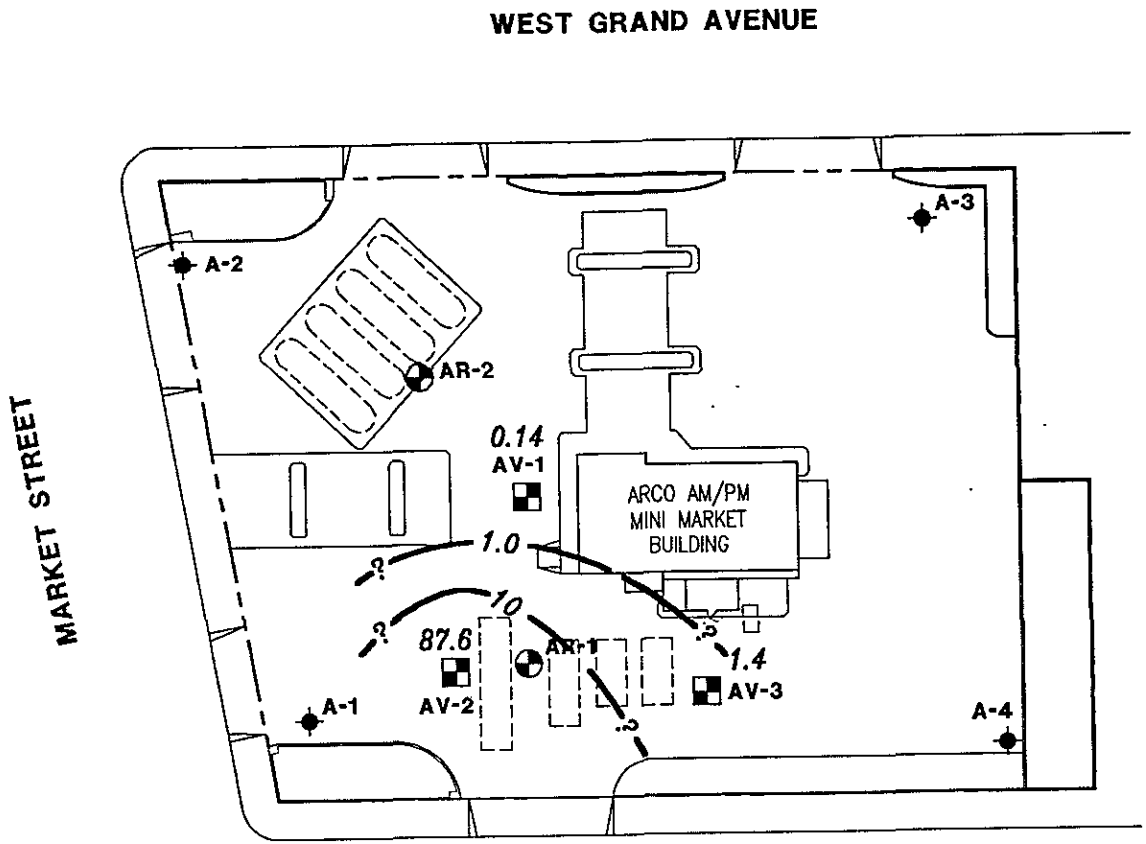


EXPLANATION

- Groundwater monitoring well
- Groundwater recovery well
- Vapor extraction well
- *0.1* Vacuum pressure, in inches of water, relative to atmospheric pressure measured on June 11, 1992
- 0.1 Vacuum pressure contour, in inches of water, relative to atmospheric pressure.

N

0 50

Scale in Feet

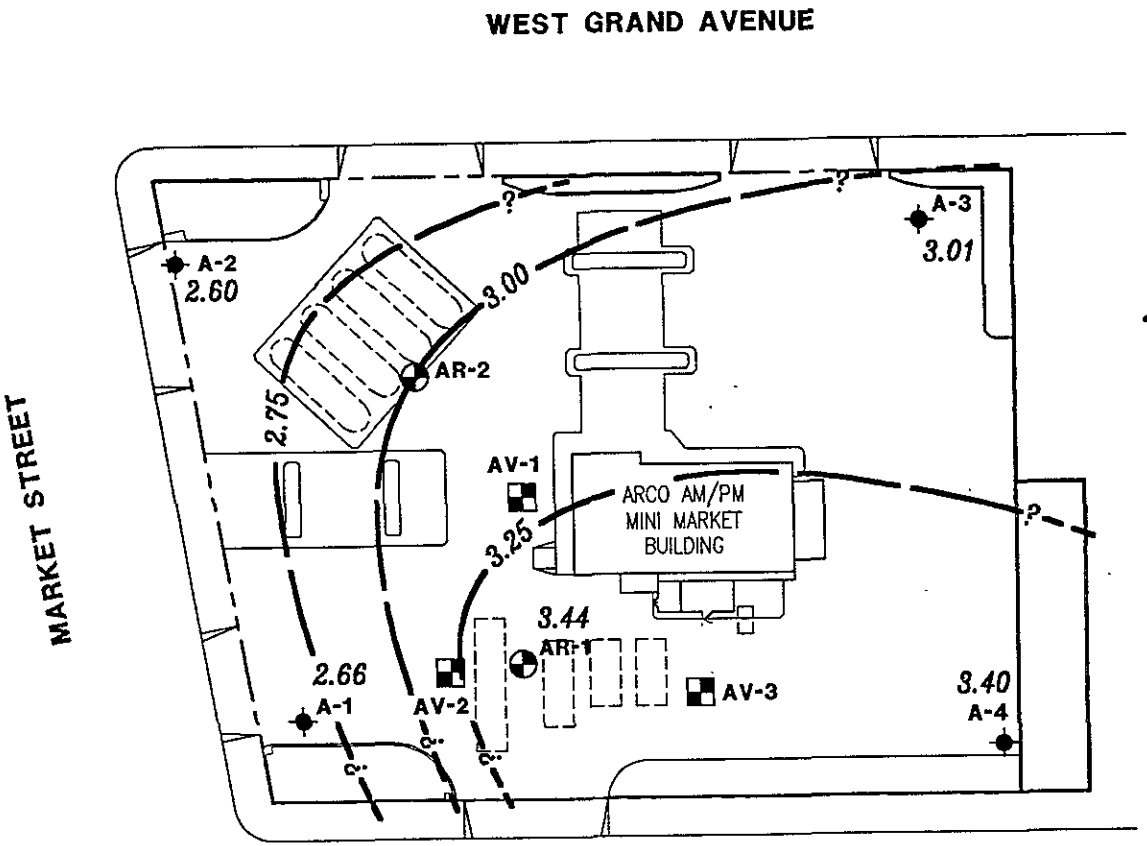
Base Map: ARCO Site Plan dated 6-17-83 and ARCO Tank & Line Replacement Site Plan dated 4-22-91

GeoStrategies Inc.

VACUUM PRESSURE MAP (6/11/92, END OF TEST)
ARCO Service Station #2169
889 West Grand Avenue
Oakland, California

PLATE 3

JOB NUMBER	REVIEWED BY	DATE	REVISED DATE
792717-15		8/92	3/94



EXPLANATION

- Groundwater monitoring well
- Groundwater recovery well
- Vapor extraction well
- 99.99 Groundwater elevation in feet referenced to Mean Sea Level (MSL) measured on July 15, 1992
- 99.99 Groundwater elevation contour. Approximate Gradient = 0.004

NOTES: 1. Contours may be influenced by irrigation practices and/or site construction activities.

N

0 50

Scale in Feet

Base Map: ARCO Site Plan dated 6-17-83 and ARCO Tank & Line Replacement Site Plan dated 4-22-91

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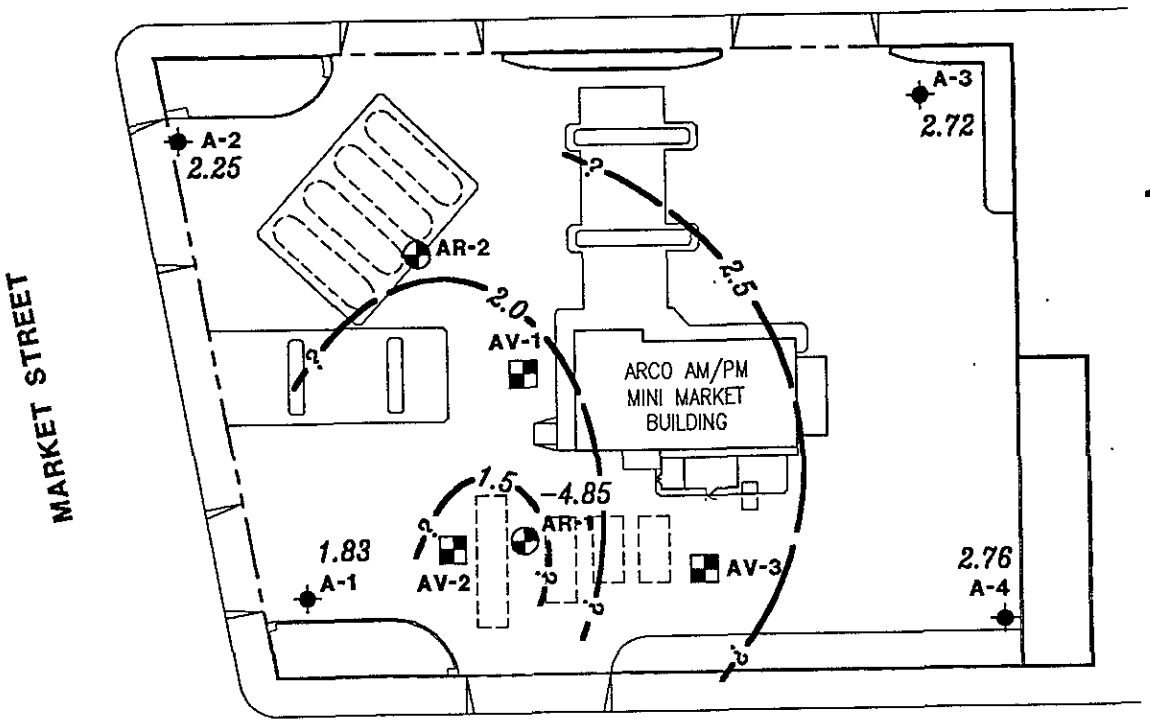
WATER LEVEL MAP PRIOR TO PUMPING WELL AR-1
ARCO Service Station #2169
889 West Grand Avenue
Oakland, California

PLATE 4

JOB NUMBER	REVIEWED BY	DATE	REVISED DATE
792717-15		8/92	3/94



EXPLANATION

- Groundwater monitoring well
- Groundwater recovery well
- Vapor extraction well
- 99.99 Groundwater elevation in feet referenced to Mean Sea Level (MSL) measured on July 16, 1992
- 99.99 Groundwater elevation contour.

NOTES: 1. Contours may be influenced by irrigation practices and/or site construction activities.

N

0 50

Scale in Feet

Base Map: ARCO Site Plan dated 6-17-83 and ARCO Tank & Line Replacement Site Plan dated 4-22-91

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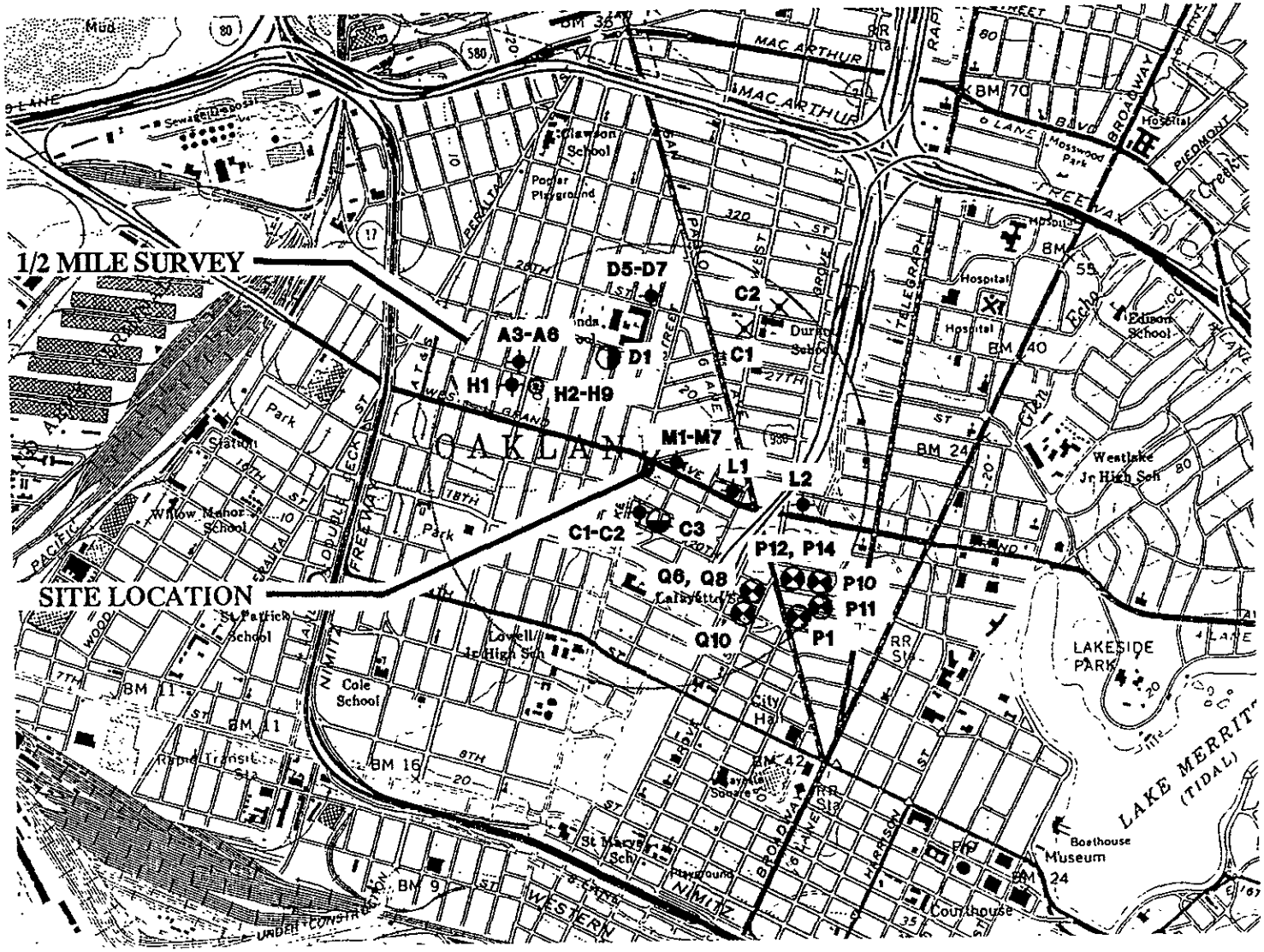
WATER LEVEL MAP AFTER PUMPING WELL AR-1
ARCO Service Station #2169
889 West Grand Avenue
Oakland, California

PLATE 5

JOB NUMBER	REVIEWED BY	DATE	REVISED DATE
792717-15		8/92	3/94



Base Map: USGS Topographic Map

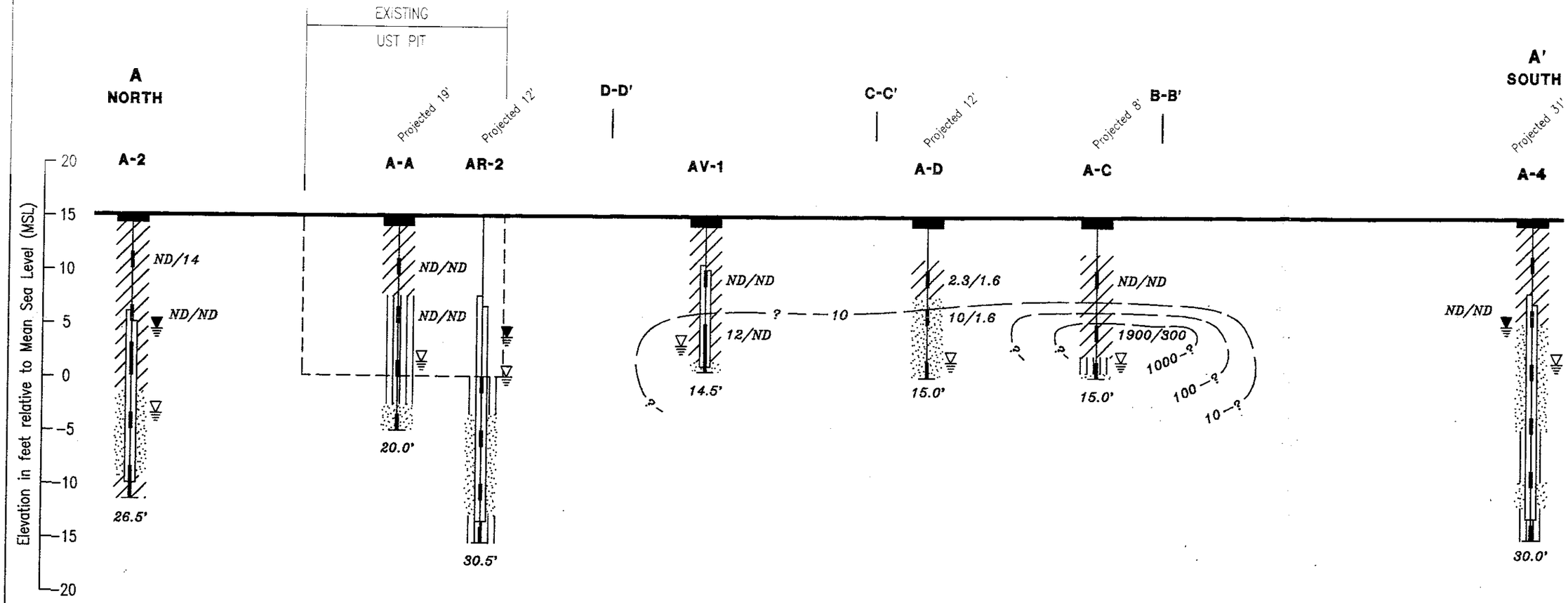
PLATE

6

GeoStrategies Inc.

WELL LOCATION MAP
ARCO Service Station #2169
889 West Grand Avenue
Oakland, California

JOB NUMBER	REVIEWED BY	DATE	REVISED DATE
792717-15		7/93	



NOTES

1. General stratigraphic relationships are displayed. Additional horizontal and vertical variations may exist.

SCALE
Horizontal 1" = 20'
Vertical 1" = 10'

LEGEND

- Sands (SW, SP, SM, SC)
- Silts (ML)
- Clays (CL)
- Fill
- 10 — Line of equal concentration of TPH-G in soil in ppm

EXPLANATION

- TPH-G/-D soil concentrations in ppm
- A/B — Soil sample interval
- Not Detected — ND
- Groundwater level measured on February 9, 1994
- First encountered groundwater
- Sandpack interval — Well screen interval
- 20.0' — Total depth of boring
- Pavement section

PLATE 7

CROSS SECTION A-A'
ARCO Service Station #2169
889 West Grand Avenue
Oakland, California

GeoStrategies Inc.

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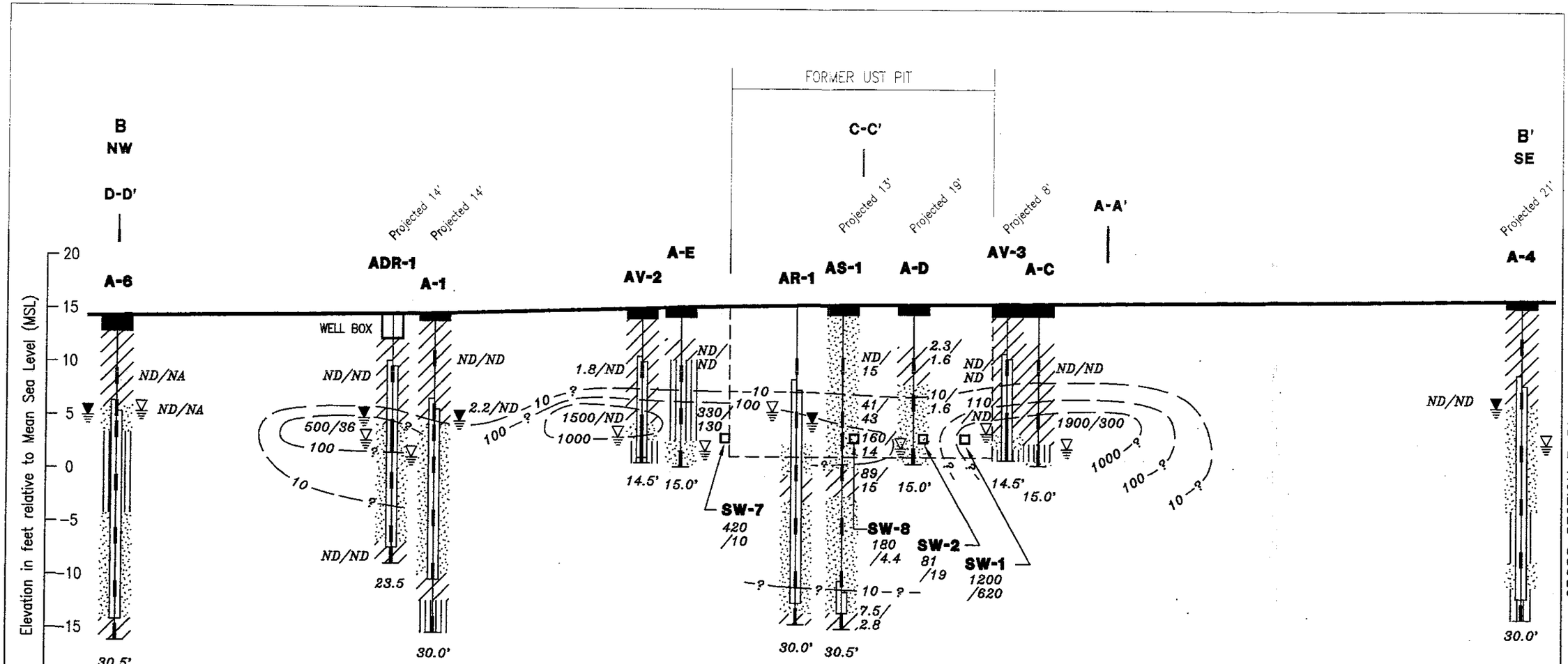
JOB NUMBER 792717-15



NOTES

1. General stratigraphic relationships are displayed. Additional horizontal and vertical variations may exist.

SCALE
Horizontal 1" = 20'
Vertical 1" = 10'

LEGEND

- Sands and Gravels (SW, SP, SM, SC, GW, GC)
- Silts (ML)
- Clays (CL)
- Fill
- 10 — Line of equal concentration of TPH–G in soil in ppm

EXPLANATION

- TPH–G/–D soil concentrations in ppm — A/B
- Not Detected — ND
- Not Analyzed — NA
- Tank pit soil sample
- Sandpack interval
- Pavement section
- Soil sample interval
- Groundwater level measured on February 9, 1994
- First encountered groundwater
- Well screen interval
- 20.0' Total depth of boring

PLATE 8

CROSS SECTION B–B'
ARCO Service Station #2169
889 West Grand Avenue
Oakland, California

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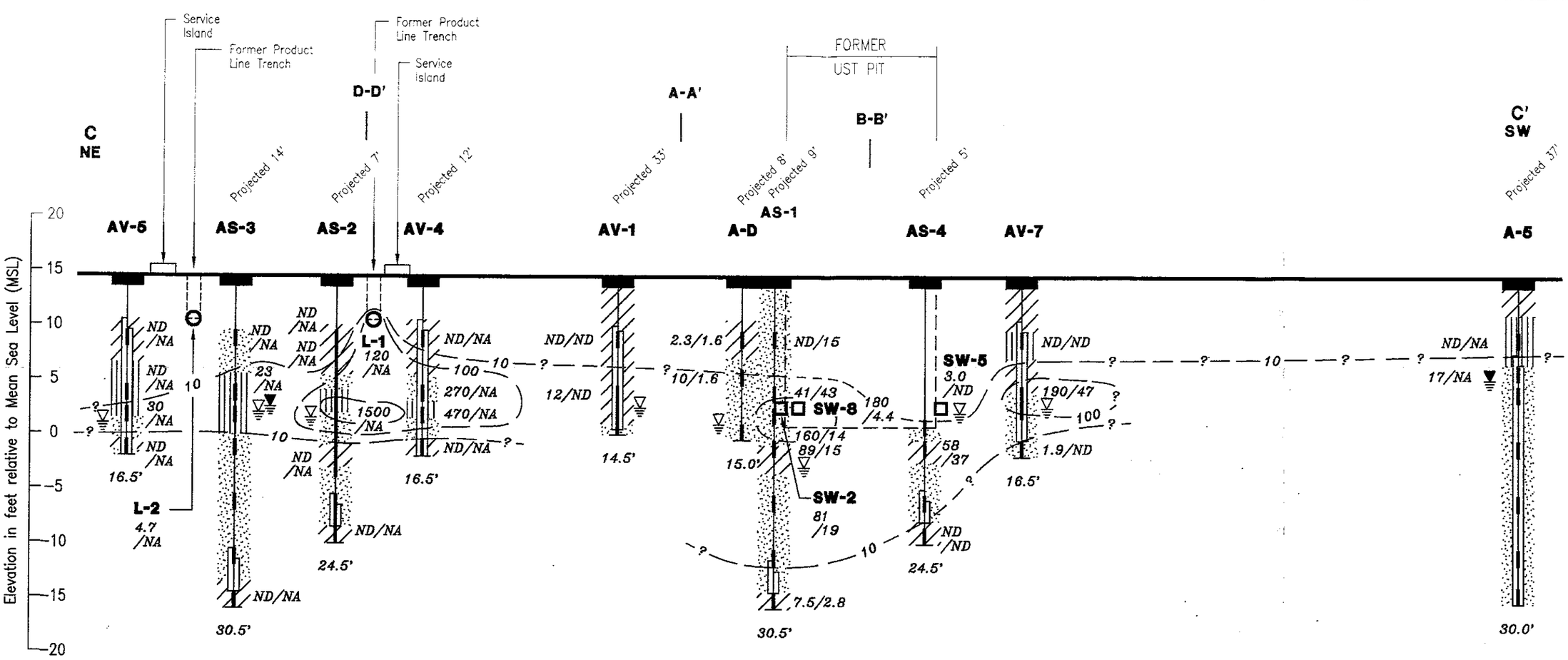
GSI



NOTES

1. General stratigraphic relationships are displayed. Additional horizontal and vertical variations may exist.

SCALE
Horizontal 1" = 20'
Vertical 1" = 10'

LEGEND

- Sands and Gravels (SW, SP, SM, SC, GW, GC)
- Silts (ML)
- Clays (CL)
- Fill
- Line of equal concentration of TPH–G in soil in ppm

EXPLANATION

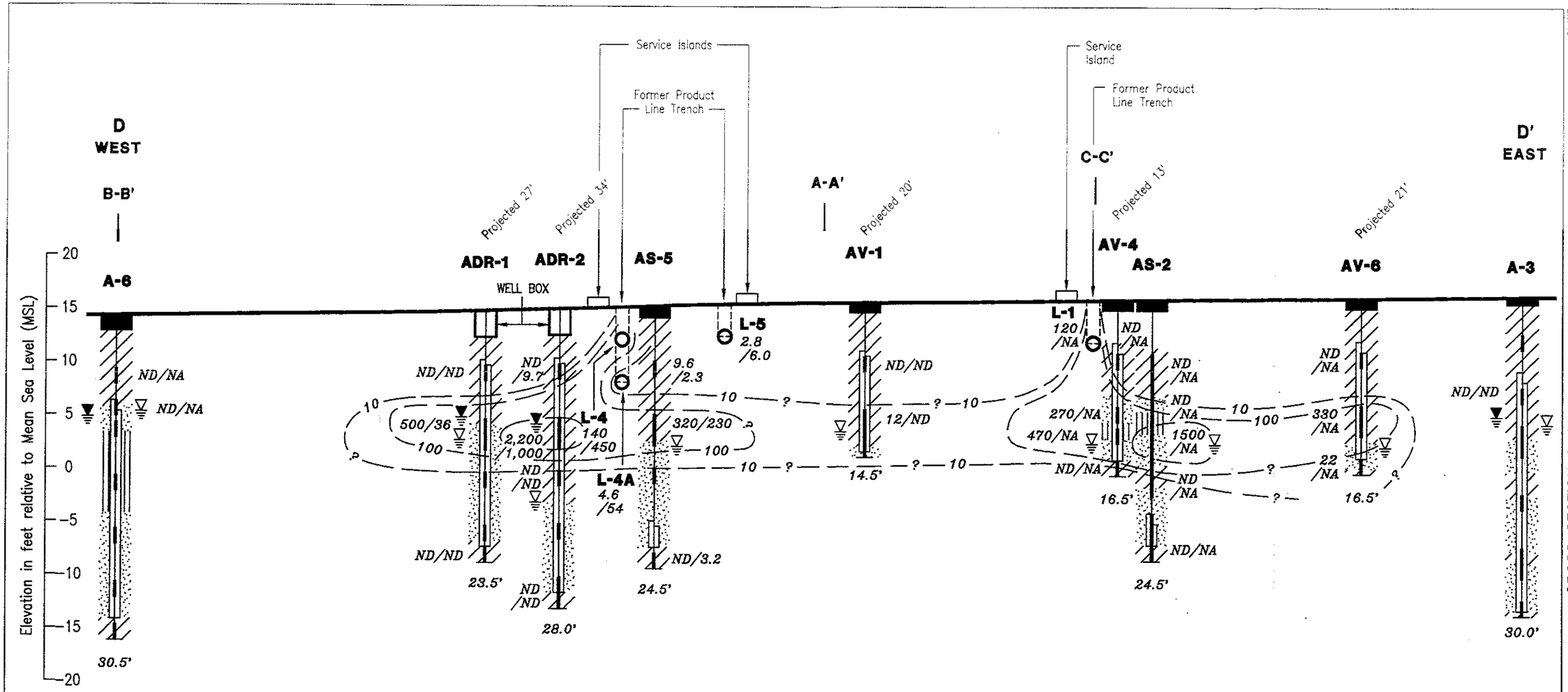
- TPH–G/–D soil concentrations in ppm — A/B
- Not Detected — ND
- Not Analyzed — NA
- Tank pit soil sample
- Product line trench soil sample
- Sandpack interval
- Pavement section
- Soil sample interval
- Groundwater level measured on February 9, 1994
- First encountered groundwater
- Well screen interval
- 20.0' Total depth of boring

PLATE 9

CROSS SECTION C–C'
ARCO Service Station #2169
889 West Grand Avenue
Oakland, California

DATE 2/94
REVISED DATE 3/94
REVIEWED BY
JOB NUMBER 792717–15

GeoStrategies Inc.



NOTES

1. General stratigraphic relationships are displayed. Additional horizontal and vertical variations may exist.

SCALE
Horizontal 1" = 20'
Vertical 1" = 10'

LEGEND

- Sands and Gravels (SW, SP, SM, SC, GW, GC)
- Silts (ML)
- Clays (CL)
- Fill
- Line of equal concentration of TPH-G in soil in ppm

EXPLANATION

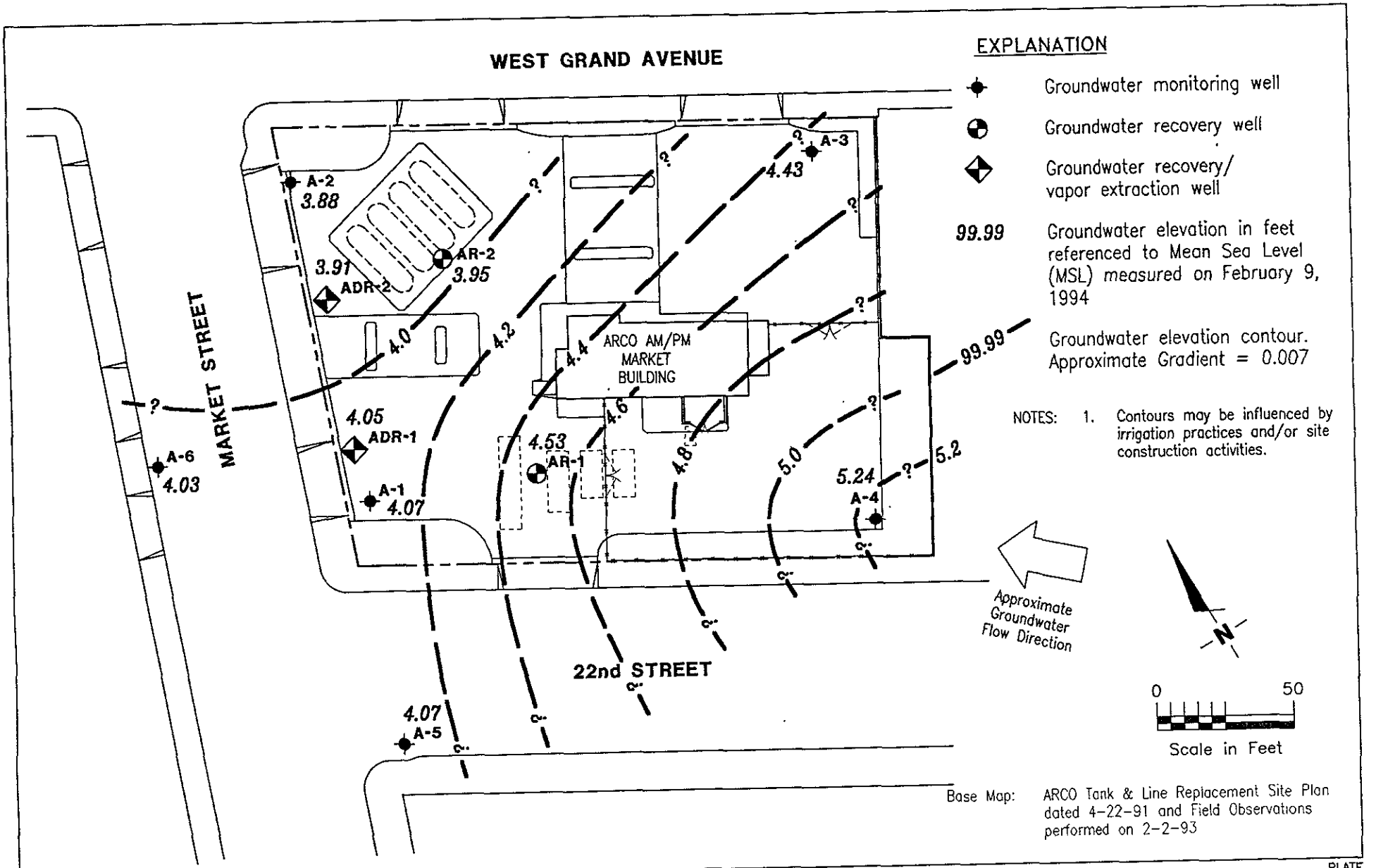
- TPH-G/-D soil concentrations in ppm: A/B
- Not Detected: ND
- Not Analyzed: NA
- Product line trench soil sample
- Sandpack interval
- Pavement section
- Soil sample interval
- Groundwater level measured on February 9, 1994
- First encountered groundwater
- Well screen interval
- 20.0' Total depth of boring

PLATE 10

CROSS SECTION D-D'
ARCO Service Station #2169
889 West Grand Avenue
Oakland, California

REVISED DATE 3/94
DATE 2/94
REVIEWED BY
JOB NUMBER 792717-15

GeoStrategies Inc.



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POTENTIOMETRIC MAP
ARCO Service Station #2169
889 West Grand Avenue
Oakland, California

PLATE **11**

JOB NUMBER 792717-15

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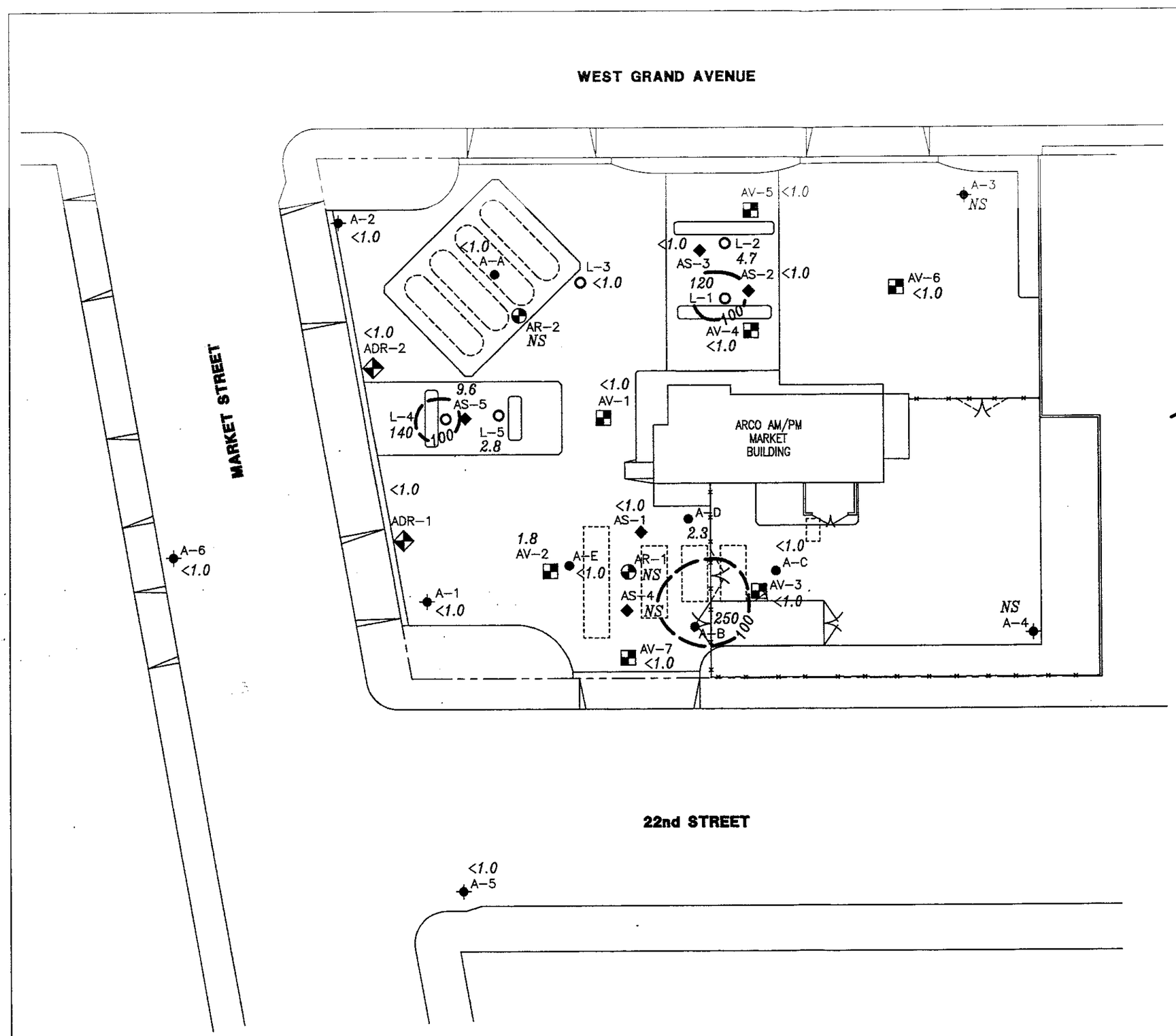
DATE 3/94

REVISED DATE



EXPLANATION

- Groundwater monitoring well
- Groundwater recovery well
- Vapor extraction well
- Groundwater recovery/ vapor extraction well
- Air sparging well
- Soil boring
- Product line trench sample
- 500 — TPH-G (Total Petroleum Hydrocarbons calculated as Gasoline) concentrations in ppm in soil at deoths between 3.0 and 6.5 feet
- 500 — TPH-G isoconcentration contour
- NS — Not Sampled

Base Map: ARCO Tank & Line Replacement Site Plan dated 4-22-91 and Field Observations performed on 2-2-93.

TPH-G ISOCONCENTRATION MAP (IN SOIL 3.0-6.5 FEET)
ARCO Service Station #2169
889 West Grand Avenue
Oakland, California

PLATE 12

REVISED DATE 3/94

DATE 2/94

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JOB NUMBER 792717-15

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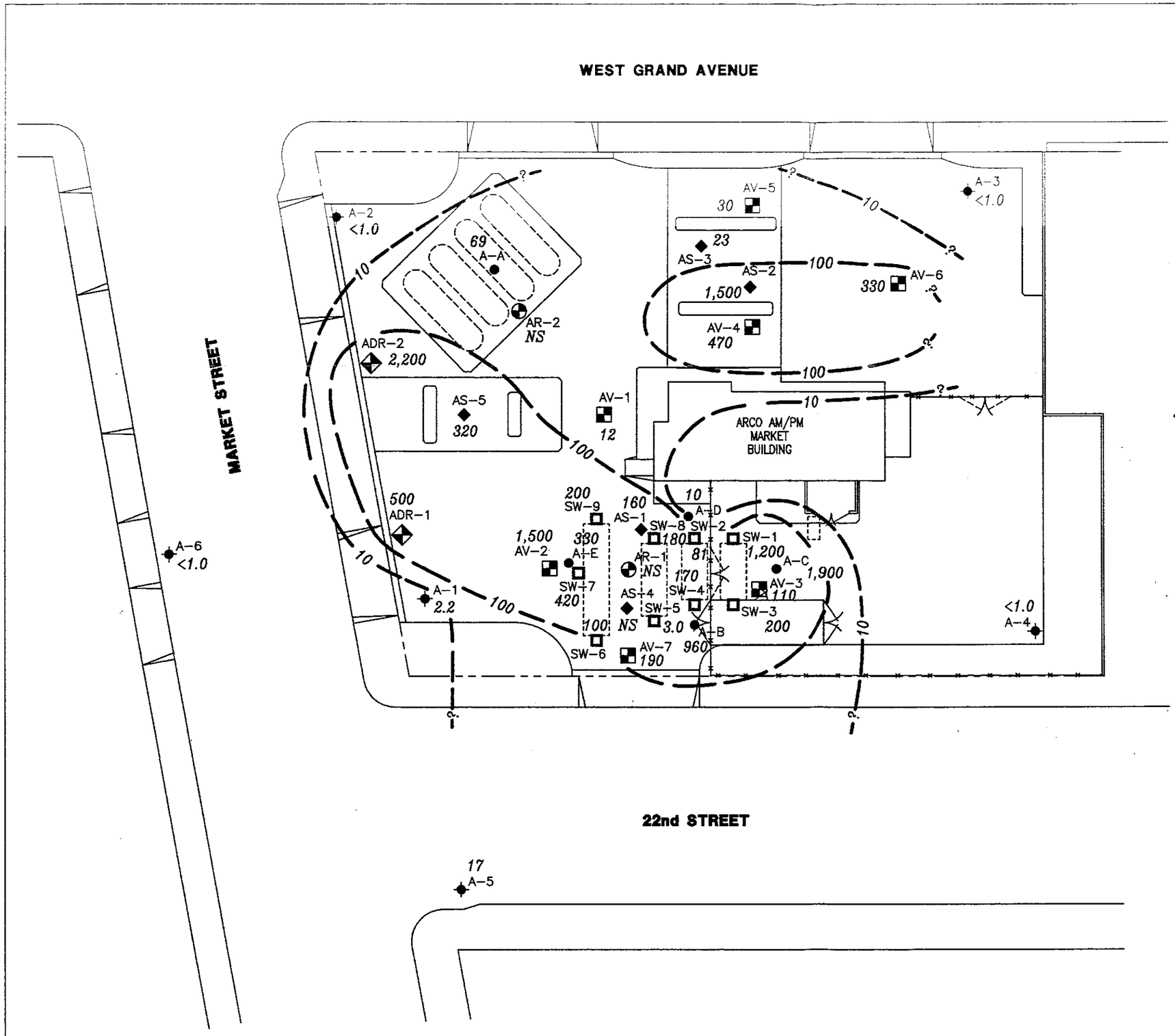
GSI



EXPLANATION

- Groundwater monitoring well
- Groundwater recovery well
- Vapor extraction well
- Groundwater recovery/ vapor extraction well
- Air sparging well
- Soil boring
- Tank pit sample
- *500* TPH-G (Total Petroleum Hydrocarbons calculated as Gasoline) concentrations in ppm in soil at depths between 9.0 and 13.0 feet
- 500 TPH-G isoconcentration contour
- *NS* Not Sampled

0 50

Scale in Feet

Base Map: ARCO Tank & Line Replacement Site Plan dated 4-22-91 and Field Observations performed on 2-2-93.

TPH-G ISOCONCENTRATION MAP (IN SOIL 9.0-13.0 FEET)
ARCO Service Station #2169
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Oakland, California

PLATE 13

DATE 2/94

REVISED DATE 3/94

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JOB NUMBER 792717-15

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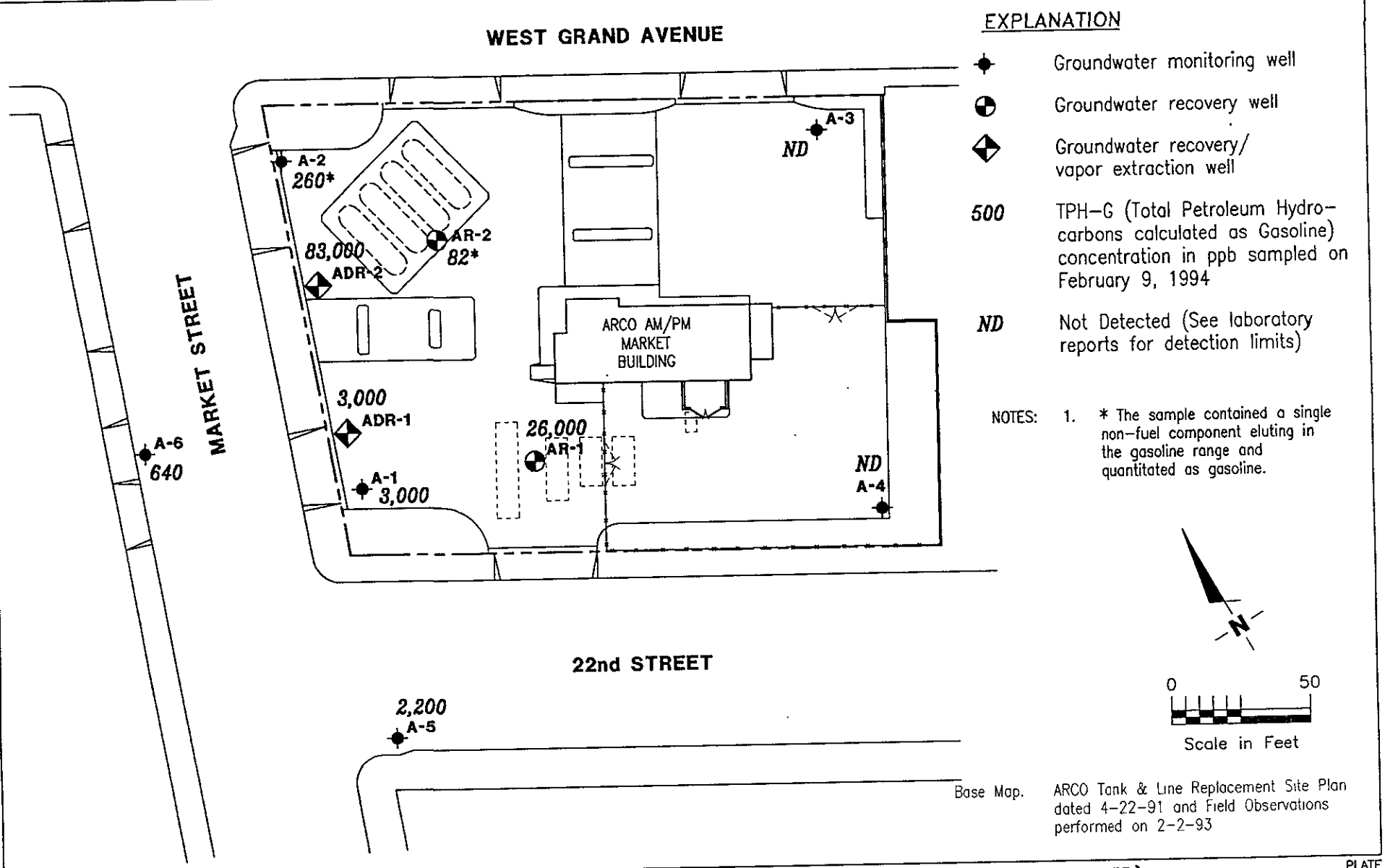
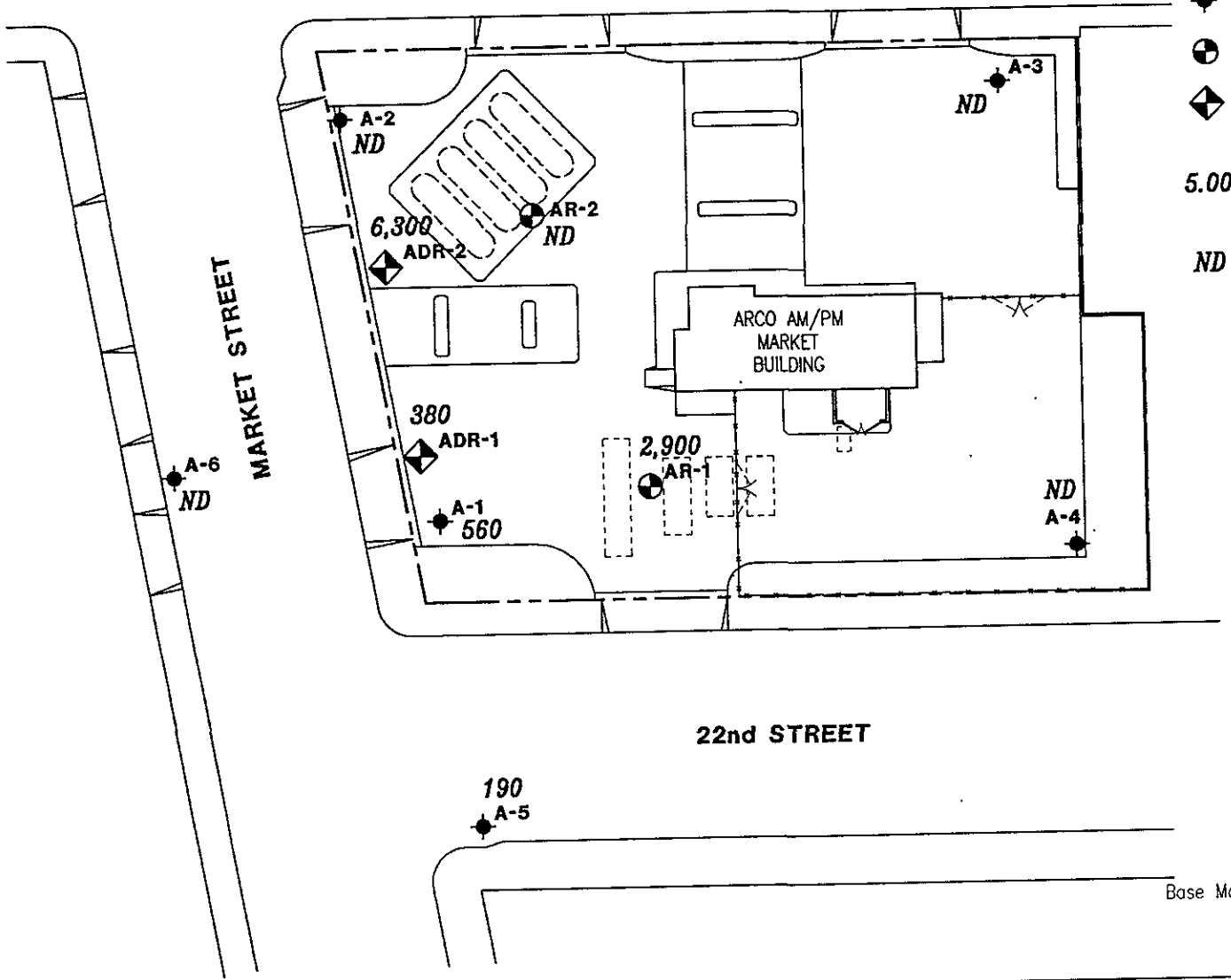


GeoStrategies Inc.

TPH–G CONCENTRATION MAP (IN GROUNDWATER)
ARCO Service Station #2169
889 West Grand Avenue
Oakland, California

PLATE
14

JOB NUMBER	REVIEWED BY	DATE	REVISED DATE
792717–15		11/93	3/94



EXPLANATION

- Groundwater monitoring well
- Groundwater recovery well
- Groundwater recovery/ vapor extraction well
- *5.00* Benzene concentration in ppb sampled on February 9, 1994
- *ND* Not Detected (See laboratory reports for detection limits)

N

0 50

Scale in Feet

Base Map: ARCO Tank & Line Replacement Site Plan dated 4-22-91 and Field Observations performed on 2-2-93

GeoStrategies Inc.

BENZENE CONCENTRATION MAP (IN GROUNDWATER)

ARCO Service Station #2169
889 West Grand Avenue
Oakland, California

PLATE **15**

JOB NUMBER 792717-15

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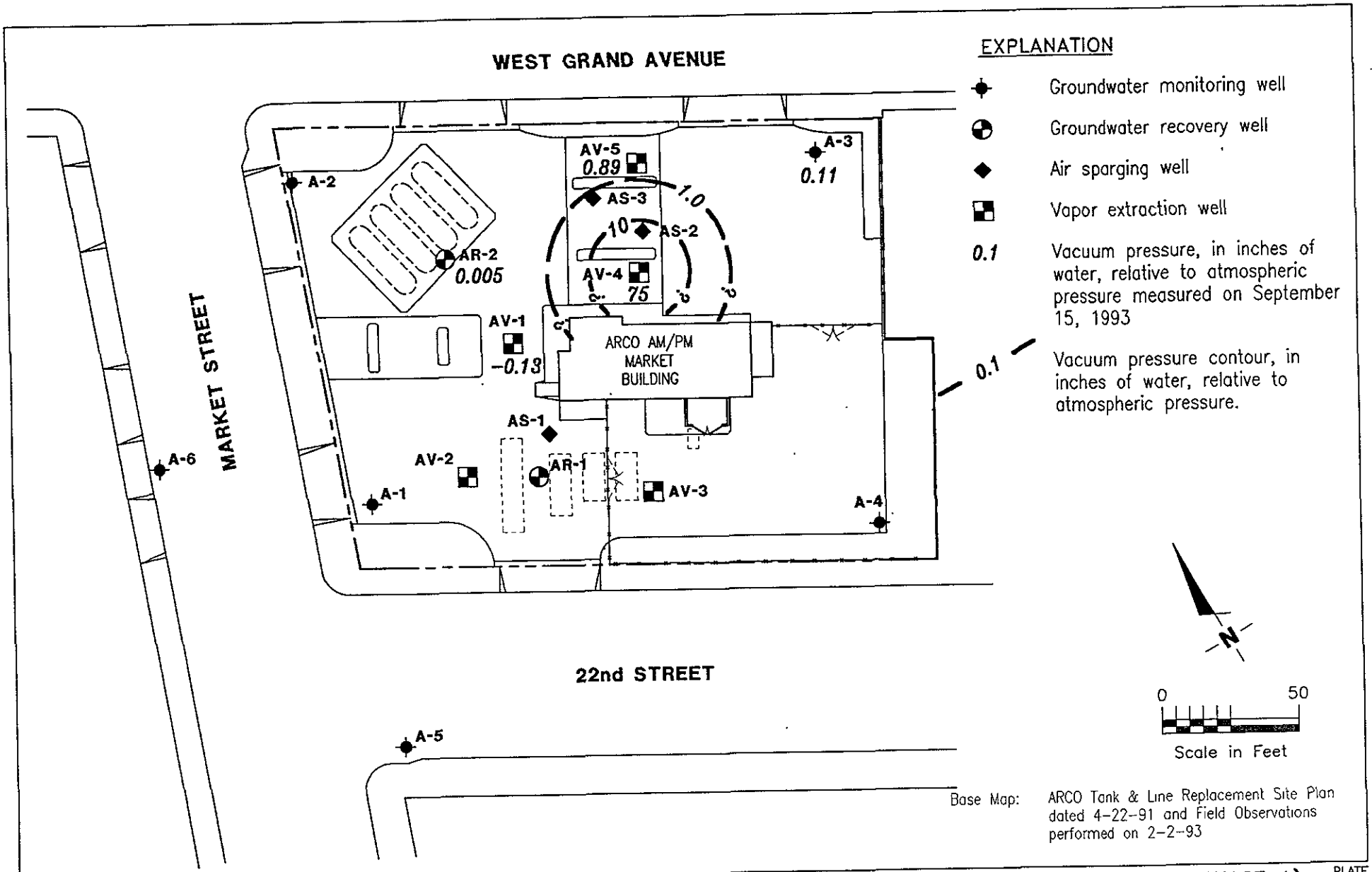
DATE 11/93

REVISED DATE 3/94

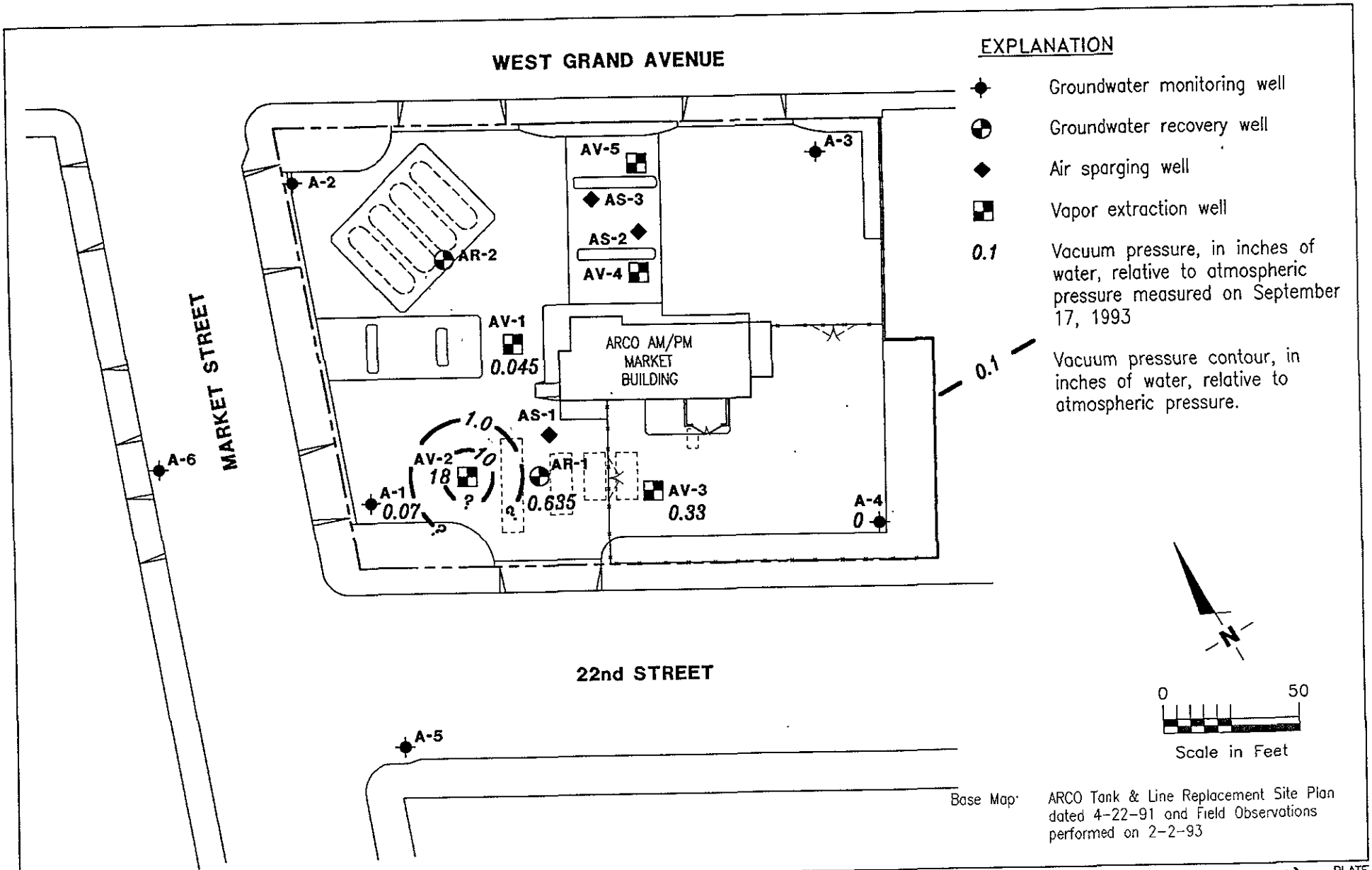


GeoStrategies Inc.

VACUUM PRESSURE MAP (9/15/93, TEST 1, END OF PHASE 1)
ARCO Service Station #2169
889 West Grand Avenue
Oakland, California

PLATE 16

JOB NUMBER	REVIEWED BY	DATE	REVISED DATE
792717-15		3/94	



GeoStrategies Inc.

VACUUM PRESSURE MAP (9/17/93, TEST 2, END OF PHASE 1)
ARCO Service Station #2169
889 West Grand Avenue
Oakland, California

PLATE 17

JOB NUMBER 792717-15

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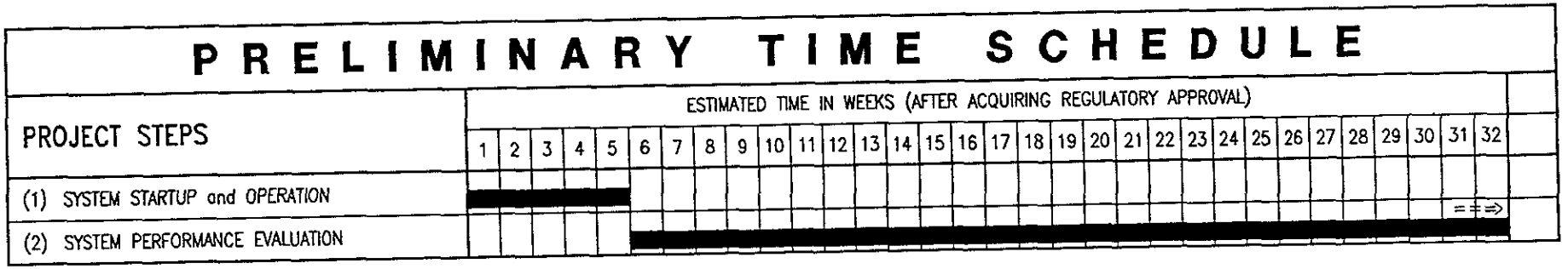
PRELIMINARY TIME SCHEDULE



LEGEND

ESTIMATED SCHEDULE

GeoStrategies Inc.

PRELIMINARY TIME SCHEDULE
ARCO Service Station #2169
889 West Grand Avenue
Oakland, California

PLATE
18

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12/93

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3/94

APPENDIX A

GSI FIELD METHODS AND PROCEDURES

FIELD METHODS AND PROCEDURES

EXPLORATION DRILLING

Mobilization

Prior to any drilling activities, GeoStrategies Inc. (GSI) will verify that necessary drilling permits have been secured.

Utility locations will be located and drilling will be conducted so as not to disrupt activities at a project site. GSI will obtain and review available public data on subsurface geology and if warranted, the location of wells within a half-mile of the project site will be identified. Drillers will be notified in advance so that drilling equipment can be inspected prior to performing work.

Drilling

The subsurface investigations are typically performed to assess the lateral and vertical extent of petroleum hydrocarbons present in soils and groundwater. Drilling methods will be selected to optimize field data requirements as well as be compatible with known or suspected subsurface geologic conditions.

Monitoring wells are installed using a truck-mounted hollow-stem auger drill rig or mud-rotary drill rig. Typically, the hollow-stem rig is used for wells up to 100 feet, if subsurface conditions are favorable. Wells greater than 100-feet deep are typically drilled using mud-rotary techniques. When mud rotary drilling is used, an electric log will be performed for additional lithological information. Also during mud rotary drilling, precautions will be taken to prevent mud from circulating contaminants by using a conductor casing to seal off contaminated zones. Samples will be collected for lithologic logging by continuous chip, and where needed by drive sample or core as specified by the supervising geologist.

Soil Sampling

Shallow soil borings will be drilled using a truck-mounted hollow-stem auger drilling rig, unless site conditions favor a different drilling method. Drilling and sampling methods will be consistent with ASTM Method D-1452-80. The auger size will be a minimum 6-inch nominal outside-diameter (O.D). No drilling fluids will be used during this drilling method. The augers and other tools used in the bore hole will be steam cleaned before use and between borings to minimize the possibilities of cross-contamination between borings.

Soil samples are typically collected at 5-foot intervals as a minimum from ground surface to total depth of boring. Additional soil samples will be collected based on significant lithologic changes and/or potential chemical content. Soil samples from each sampling interval will be lithologically described by a GSI geologist (Figure 1). Soil colors will be described using the Munsell Color Chart. Rock units will be logged using appropriate lithologic terms, and colors described by the G.S.A. Rock Color Chart.

Head-space analyses will be performed to check for the evidence of volatile organic compounds. Head-space analyses will be performed using an organic vapor analyzer; either an OVA, HNU, or OVM. Organic vapor concentrations will be recorded on the GSI field log of boring (Figure 1). The selection of soil samples for chemical analysis are typically based on the following criteria:

1) Soil discoloration
2) Soil odors
3) Visual confirmation of chemical in soil
4) Depth with respect to underground tanks (or existing grade)
5) Depth with respect to ground water
6) OVA reading

Soil samples (full brass liners) selected for chemical analysis are immediately covered with aluminum foil and the liner ends are capped to prevent volatilization. The samples are labeled and entered onto a Chain-of-Custody form, and placed in a cooler on blue ice for transport to a State-certified analytical laboratory.

Soil cuttings are stockpiled on-site. Soils are sampled and analyzed for site-specific chemical parameters. Disposition of soils is dependent of chemical analytical results of the samples.

Soil Sampling - cont.

Soil borings not converted to monitoring wells will be backfilled (sealed) to ground surface using either a neat cement or cement-bentonite grout mixture. Backfilling will be tremied by continuously pumping grout from the bottom to the top of the boring where depth exceeds 20' or as required by local permit requirements.

All field and office work, including exploratory boring logs, are prepared under the direction of a registered geologist.

Monitoring Well Installation

Monitoring well casing and screen will be constructed of Schedule 40, flush-joint threaded polyvinylchloride (PVC). The well screen will be factory mill-slotted unless additional open area is required (eg. conversion to an extraction well in a low-yield aquifer). The screen length will be placed adjacent to the aquifer material to a minimum of 2-feet above encountered water. No screen shall be placed in a borehole that potentially creates hydraulic interconnection of two or more aquifer units. Screen slot size and well sand pack will be compatible with encountered aquifer materials, as confirmed by sieve analysis.

Monitoring wells will be completed below grade (Figure 2) unless special conditions exist that require above-grade completion design. In the event a monitoring well is required in an aquifer unit beneath an existing aquifer, the upper aquifer will be sealed off by installing a steel conductor casing with an annular neat cement or cement-bentonite grout seal. This seal will be continuously tremie pumped from the bottom of the annulus to ground surface.

The monitoring well sand pack will be placed adjacent to the entire screened interval and will extend a recommended minimum distance of 2-feet above the top of the screen. No sand pack will be placed that interconnects two or more aquifer units. A minimum 2-foot bentonite pellet or bentonite slurry seal will be placed above the sand pack. Sand pack, bentonite, and cement seal levels will be confirmed by sounding the annulus with a calibrated weighted tape. The remaining annular space above the bentonite seal will be grouted with a bentonite-cement mixture and will be tremie-pumped from the bottom of the annular space to the ground surface. The bentonite content of the grout will not exceed 5 percent by weight. A field log of boring and a field well completion form will be prepared by GSI for each well installed.

Decontamination of drilling equipment before drilling and between wells will consist of steam cleaning, and/or Alconox wash

Well Development

All newly installed wells will be properly developed within 48 hours of completion. No well will be developed until the well seal has set a minimum of 12 hours. Development procedures will include one or more of the methods described below:

Bailing

Bailing will be used to remove suspended sediments and drilling fluids from the well, where applicable. The bailer will be raised and lowered through the column of water in the well so as to create a gentle surging action in the screened interval. This technique may be used in conjunction with other techniques, such as pumping, and may be used alone if the well is of low yield.

Pumping

Pumping will be used in conjunction with bailing or surging. The pump will be operated in such a manner as to gently surge the entire screened interval of the well. This may involve operating the pump with a packer type mechanism attached and slowly raising and lowering the pump, or by cycling the pump off and on to allow water to move in and out of the screened interval. Care will be used not to overpump a well.

Surging

Surging will be performed on wells that are screened in known or suspected high yield formations and/or on larger diameter (recovery) wells. A surge block will be raised and lowered through the entire screened interval, forcing water in and out of the well screen and sand pack. Pumping or air lifting will be used in conjunction with this method of development to remove any sediment brought into the well during surging.

Air Lifting

Air lifting will be used to remove sediment from wells as an alternative to pumping under certain conditions. When appropriate, a surge block designed for use with air lifting will be used to agitate the entire screened interval and water will be lifted out of the well using forced air. When air lifting is performed, the air source will be either nitrogen or filtered air and the procedure will be performed gently to prevent any damage to the well screen or casing and to insure that discharged water is contained.

Well Development - cont.

All well developing equipment will be thoroughly decontaminated prior to development using a steam cleaner and/or Alconox detergent wash and clean water rinse. During development procedures, field parameters (temperature, specific conductance and pH) will be monitored and recorded on well development forms (Figure 3). Equilibration requirements consist of a minimum of three readings with the following accuracy standards:

pH	± 0.1 pH units
Specific Conductance	± 10% of full scale reading
Temperature	± 0.5 degrees Celsius

The wells will be developed until water is visibly clear and free of sediment, and well purging parameters stabilized. A minimum of 8 to 10 well volumes will be purged from each well, if feasible. If well purging parameters have not stabilized before 10 casing volumes have been removed, well development will continue until purging parameters have stabilized and formation water is being drawn into the well. The adequacy of well development will be judged by the field technician performing the well development and based on known formation conditions.

Well Surveying

Monitoring wells will be surveyed to obtain top of box elevations to the nearest ±0.01 foot. Water level measurements will be recorded to the nearest ±0.01 foot and referenced to Mean Sea Level (MSL). If additional wells are required, then existing and newly installed wells are surveyed relative to MSL.

GROUND-WATER SAMPLING AND ANALYSIS

Quality Assurance/Quality Control Objectives

The sampling and analysis procedures employed by Gettler-Ryan Inc. (G-R) for ground-water sampling and monitoring follow specific Quality Assurance/Quality Control (QA/QC) guidelines. Quality Assurance objectives have been established by G-R to develop and implement procedures for obtaining and evaluating water quality and field data in an accurate, precise, and complete manner so that sampling procedures and field measurements provide information that is comparable and representative of actual field conditions. Quality Control (QC) is maintained by G-R by using specific field protocols and requiring the analytical laboratory to perform internal and external QC checks. It is the goal of G-R to provide data that are accurate, precise, complete, comparable, and representative. The definitions for accuracy, precision, completeness, comparability, and representativeness are as follows:

- Accuracy - the degree of agreement of a measurement with an accepted referenced or true value.

- Precision - a measure of agreement among individual measurements under similar conditions. Usually expressed in terms of the standard deviation.

- Completeness - the amount of valid data obtained from a measurement system compared to the amount that was expected to meet the project data goals.

- Comparability - expresses the confidence with which one data set can be compared to another.

- Representativeness - a sample or group of samples that reflects the characteristics of the media at the sampling point. It also includes how well the sampling point represents the actual parameter variations which are under study.

As part of the G-R QA/QC program, applicable federal, state, and local reference guidance documents are followed. The procedures outlined in these regulations, manuals, handbooks, guidance documents, and journals are incorporated into the G-R sampling procedures to assure that; (1) ground-water samples are properly collected, (2) ground-water samples are identified, preserved, and transported in a manner such that they are representative of field conditions, and (3) chemical analysis of samples are accurate and reproducible.

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general and environmental contractors

Guidance and Reference Documents Used to Collect Groundwater Samples

These documents are used to verify G-R sampling procedures and are consistent with current regulatory guidance. If site specific work and sampling plans are required, those plans will be developed from these documents, and newly received applicable documents.

U.S.E.P.A. - 330/9-51-002	NEIC Manual for Groundwater/Subsurface Investigation at Hazardous Waste Sites
U.S.E.P.A. - 530/SW611	Procedures Manual for Groundwater Monitoring at Solid Waste Disposal Facilities (August, 1977)
U.S.E.P.A. - 600/4-79-020	Methods for Chemical Analysis of Water and Wastes (1983)
U.S.E.P.A. - 600/4-82-029	Handbook for Sampling and Sample Preservation of Water and Wastewater (1982)
U.S.E.P.A. - 600/4-82-057	Test Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater (July, 1982)
U.S.E.P.A. - SW-846#, 3rd Edition	Test Methods for Evaluating Solid Waste - Physical/Chemical Methods (November, 1986)
40 CFR 136.3e,Table II (Code of Federal Regulations)	Required Containers, Preservation Techniques, and Holding Times
Resources Conservation and Recover Act (OSWER 9950.1)	Groundwater Monitoring Technical Enforcement Guidance Document (September, 1986)
California Regional Water Quality Control Board (Central Valley Region)	A Compilation of Water Quality Goals (September, 1988); Updates (October, 1988)
California Regional Water Quality Control Board (North Coast, San Francisco Bay, and Central Valley)	Regional Board Staff Recommendations for Initial Evaluations and Investigation of Underground Tanks: Tri-Regional Recommendations (June, 1988)

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Guidance and Reference Documents Used to Collect Groundwater Samples (cont.)

Regional Water Quality Control Board (Central Valley Region)	Memorandum: Disposal, Treatment, and Refuse of Soils Contaminated with Petroleum Fractions (August, 1986)
State of California Department of Health Services	Hazardous Waste Testing Laboratory Certification List (March, 1987)
State of California Water Resources Control Board	Leaking Underground Fuel Tank (LUFT) Field Manual (May, 1988), and LUFT Field Manual Revision (April, 1989)
State of California Water Resources Control Board	Title 23, (Register #85.#33-8-17-85), Subchapter 16: Underground Tank Regulations; Article 3, Sections 2632 and 2634; Article 4, Sections 2645, 2646, 2647, and 2648; Article 7, Sections 2670, 2671, and 2672 (October, 1986: including 1988 Amendments)
Alameda County Water District	Groundwater Protection Program: Guidelines for Groundwater and Soil Investigations at Leaking Underground Fuel Tank Sites (November, 1988)
American Public Health Association	Standard Methods for the Examination of Water and Wastewaters, 16th Edition
Analytical Chemistry (journal)	Principles of Environmental Analysis, Volume 55, Pages 2212-2218 (December, 1983)
Napa County	Napa County Underground Storage Tank Program: Guidelines for Site Investigations; February 1989.
Santa Clara Valley Water District	Guidelines for Preparing or Reviewing Sampling Plans for Soil and Groundwater Investigation of Fuel Contamination Sites (January, 1989)

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Guidance and Reference Documents Used to Collect Groundwater Samples (cont.)

Santa Clara Valley Water District	Investigation and Remediation at Fuel Leak sites: Guidelines for Investigation and Technical Report Preparation (March 1989)
Santa Clara Valley Water District	Revised Well Standards for Santa Clara County (July 18, 1989)
American Petroleum Institute	Groundwater Monitoring & Sample Bias; API Publication 4367, Environmental Affairs Department, June 1983
American Petroleum Institute	A Guide to the Assessment and Remediation of Underground Petroleum Releases; API Publication 1628, February 1989
American Petroleum Institute	Literature Summary: Hydrocarbon Solubilities and Attenuations Mechanisms, API Publication 4414, August 1985
Site Specific (as needed)	General and specific regulatory documents as required.

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Because ground-water samples collected by G-R are analyzed to the parts per billion (ppb) range for many compounds, extreme care is exercised to prevent contamination of samples. When volatile or semi-volatile organic compounds are included for analysis, G-R sampling crew members will adhere to the following precautions in the field:

1. A clean pair of new, disposable gloves are worn for each well being sampled.

2. When possible, samples are collected from known or suspected wells that are least contaminated (i.e. background) followed by wells in increasing order of contamination.

3. Ambient conditions are continually monitored to maintain sample integrity.

When known or potential organic compounds are being sampled for, the following additional precautions are taken:

1. All sample bottles and equipment are kept away from fuels and solvents. When possible, gasoline (used in generators) is stored away from bailers, sample bottles, purging pumps, etc.

2. Bailers are made of Teflon or Stainless Steel. Other materials such as plastic may contaminate samples with phthalate esters which interfere with many Gas Chromatography (GC) analyses.

3. Volatile organic ground-water samples are collected so that air passage through the sample does not occur or is minimal (to prevent volatiles from being stripped from the samples): sample bottles are filled by slowly running the sample down the side of the bottle until there is a positive convex meniscus over the neck of the bottle; the Teflon side of the septum (in cap) is positioned against the meniscus, and the cap screwed on tightly; the sample is inverted and the bottle lightly tapped. The absence of an air bubble indicates a successful seal; if a bubble is evident, the cap is removed, more sample is added, and the bottle is resealed.

4. Extra Teflon seals are brought into the field in case seals are difficult to handle and/or are dropped. Dropped seals are considered contaminated and are not used. When replacing seals or if seals become flipped, care is taken to assure that the Teflon seal faces down.

Sample analysis methods, containers, preservatives and holding times are shown on Table 1.

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Laboratory and field handling procedures of samples are monitored by including QC samples for analysis with every submitted sample lot from a project site. QC samples may include any combination of the following:

A. Trip Blank: Used for purgeable organic compounds only; QC samples are collected in 40 milliliter (ml) sample vials filled in the analytical laboratory with organic-free water. Trip blanks are sent to the project site, and travel with project site samples. Trip blanks are not opened, and are returned from a project site with the project site samples for analysis.

B. Field Blank: Prepared in the field using organic-free water. These QC samples accompany project site samples to the laboratory and are analyzed for specific chemical parameters unique to the project site where they were prepared.

C. Duplicates: Duplicated samples are collected "second samples" from a selected well and project site. They are collected as either split samples or second-run samples collected from the same well.

D. Equipment Blank: Periodic QC sample collected from field equipment rinsate to verify decontamination procedures.

The number and types of QC samples are determined as follows:

A. Up to 2 wells - Trip Blank Only

B. 2 to 5 Wells - 1 Field Blank and 1 Trip Blank

C. 5 to 10 Wells - 1 Field blank, 1 Trip Blank, and 1 Duplicate

D. More than 10 Wells - 1 Field Blank, 1 Trip Blank, and 1 Duplicate per each 12 wells

E. If sampling extends beyond one day, quality control samples will be collected for each day.

Additional QC is performed through ongoing and random reviews of duplicate samples to evaluate the precision of the field sampling procedures and analytical laboratory. Precision of QC data is accomplished by calculating the Relative Percent Difference (RPD). The RPD is evaluated to assess whether values are within an acceptable range (typically ± 20% of duplicate sample).

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SAMPLE COLLECTION

This section describes the routine procedures followed by G-R while collecting ground-water samples for chemical analysis. These procedures include decontamination, water-level measurements, well purging, physical parameter measurements, sample collection, sample preservation, sample handling, and sample documentation. Critical sampling objectives for G-R are to:

1. Collect ground-water samples that are representative of the sampled matrix and,

2. Maintain sample integrity from the time of sample collection to receipt by the analytical laboratory.

Sample analyses methods, containers, preservation, and holding times are presented in Table 1.

Decontamination Procedures

All physical parameter measuring and sampling equipment are decontaminated prior to sample collection using Alconox or equivalent detergent followed by steam cleaning with deionized water. Any sampling equipment surfaces or parts that might absorb specific contaminants, such as plastic pump valves, impellers, etc., are cleaned in the same manner.

Sample bottles, bottle caps, and septa used for sampling volatile organics are thoroughly cleaned and prepared in the laboratory. Sample bottles, bottle caps, and septa are protected from all potential chemical contact before actual usage at a sample location.

During field sampling, equipment placed in a well are decontaminated before purging or sampling the next well. The equipment are decontaminated by cleaning with Alconox or equivalent detergent followed by steam cleaning with deionized water.

Water-Level Measurements

Prior to purging and sampling a well, the static-water levels are measured in all wells at a project site using an electric sounder and/or calibrated portable oil-water interface probe (Figure 4). Both static water-level and separate-phase product thickness are measured to the nearest ±0.01 foot. The presence of separate-phase product is confirmed using a clean, acrylic or polyvinylchloride (PVC) bailer, measured to the nearest ±0.01 foot with a decimal scale tape.

Water-Level Measurements (continued)

The monofilament line used to lower the bailer is replaced between wells with new line to preclude the possibility of cross-contamination. Field observations (e.g. well integrity, product color, turbidity, water color, odors, etc.) are noted on the G-R Well Sampling Field Data Sheet shown in Figure 4. Before and after each use, the electric sounder, interface probe and bailer are decontaminated by washing with Alconox or equivalent detergent followed by rinsing with deionized water to prevent cross-contamination.

As mentioned previously, water-levels are measured in wells with known or suspected lowest dissolved chemical concentrations to the highest dissolved concentrations.

Well Purging

Before sampling occurs, well casing storage water and interstitial water in the artificial sand pack will be purged using (1) a positive displacement bladder pump constructed of inert, non-wetting, Teflon and stainless steel, (2) a pneumatic-airlift pumping system, (3) a centrifigal pumping system, or (4) a Teflon or Stainless steel bailer (Figure 5). Methods of purging will be assessed based on well size, location, accessibility, and known chemical conditions. Individual well purge volumes are calculated from borehole volumes which take into account the sand packed interval in the well annular space. As a general rule, a minimum of 3 and a maximum of 10 borehole volumes will be purged. Wells which dewater or demonstrate slow recharge periods (i.e. low-yield wells) during purging activities may be sampled after fewer purging cycles. If a low-yield (low recovery) well is to be sampled, sampling will not take place until at least 80 percent of the previously measured water column has been replaced by recharge, or as per local requirements. Physical parameter measurements (temperature, pH, and specific conductance) are closely monitored throughout the well purging process and are used by the G-R sampling crew as indicators for assessing sufficient purging. Purging is continued until all three physical parameters have stabilized. Specific conductance (conductivity) meters are read to the nearest ± 10 umhos/cm, and are calibrated daily. pH meters are read to the nearest ± 0.1 pH units and are calibrated daily. Temperature is read to the nearest 0.1 degree F. Calibration of physical parameter meters will follow manufacturers specifications. Monitoring wells will be purged according to the protocol presented in Figure 5. Collected field data during purging activities will be entered on the G-R Well Sampling Field Data Sheet shown in Figure 4. Copies of the G-R Field Data Sheets will be reviewed by the G-R Sampling Manager for accuracy and completeness.

DOCUMENTATION

Sample Container Labels

Each sample container will be labeled by an adhesive label, noted in permanent ink immediately after the sample is collected. Label information will include:

Sample point designation (i.e. well number or code)

Sampler's identification

Project number

Date and time of collection

Type of preservation used

Well Sampling Data Forms

In the field, the G-R sampling crew will record the following information on the Well Sampling Data Sheet for each sample collected:

Project number

Client

Location

Source (i.e. well number)

Time and date

Well accessibility and integrity

Pertinent well data (e.g. depth, product thickness, static water-level, pH, specific conductance, temperature)

Calculated and actual purge volumes

Chain-of-Custody

A Chain-of-Custody record (Figure 6) shall be completed and accompany every sample and every shipment of samples to the analytical laboratory in order to establish the documentation necessary to trace sample possession from time of collections. The record will contain the following information:

- Sample or station number or sample identification (ID)
- Signature of collector, sampler, or recorder
- Date and time of collection
- Place of collection
- Sample type
- Signatures of persons involved in chain of possession
- Inclusive dates of possession

Samples shall always be accompanied by a Chain-of-Custody record. When transferring the samples, the individual relinquishing and receiving the samples will sign, date, and note the time on the Chain-of-Custody record. G-R will be responsible for notifying the laboratory coordinator when and how many samples will be sent to the laboratory for analysis, and what types of analyses shall be performed.

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FIELD EXPLORATORY BORING LOG

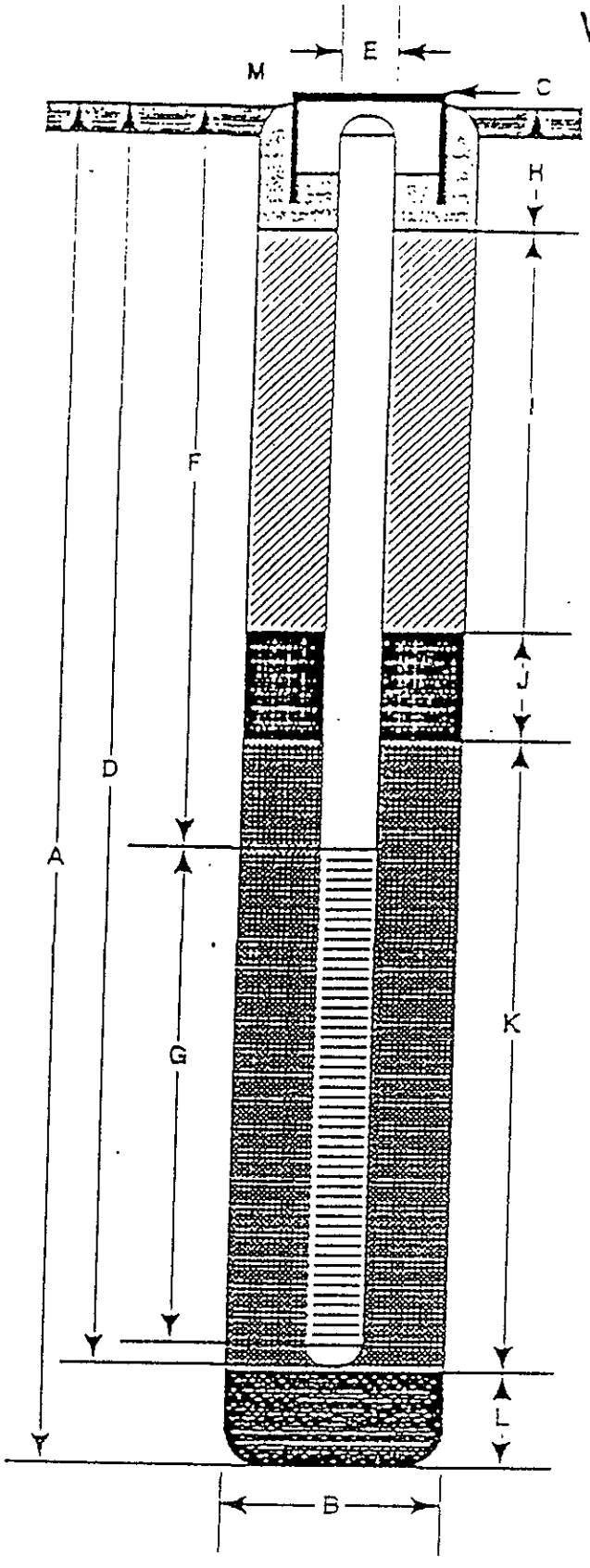
Field location of boring	Project No. / Date	Boring No.
	Client:	
	Location:	
	City:	Sheet:
	Logged by: / Driller:	of
Drilling method:	Casing installation data:	
Hole diameter:	Top of box Elevation: / Datum:	
	Water Level:	
	Time:	
	Date:	

PID (ppm)	Blown or Pressure (psi)	Type of Sample	Sample Number	Depth (ft.)	Sample	Well Detail	Soil Group Symbol (USCS)	Description

Remarks:

WELL CONSTRUCTION DETAIL

FIGURE 2



A Total Depth of Boring _____ ft.

B Diameter of Boring _____ in.
Drilling Method _____

C Top of Box Elevation _____ ft.
☐ Referenced to Mean Sea Level
☐ Referenced to Project Datum

D Casing Length _____ ft.
Material _____

E Casing Diameter _____ in.

F Depth to Top Perforations _____ ft.

G Perforated Length _____ ft.
Perforated Interval from _____ to _____ ft.
Perforation Type _____
Perforation Size _____ in.

H Surface Seal from _____ to _____ ft.
Seal Material _____

I Backfill from _____ to _____ ft.
Backfill Material _____

J Seal from _____ to _____ ft.
Seal Material _____

K Gravel Pack from _____ to _____ ft.
Pack Material _____

L Bottom Seal _____ ft.
Seal Material _____

M _____

Note: Depths measured from initial ground surface

GSI GeoStrategies Inc.

Well Construction Detail

WELL NO

JOB NUMBER | REVIEWED BY RG/CEG | DATE | REVISED DATE | REVISED DATE

WELL DEVELOPMENT FORM

FIGURE 3

Page_____ of_____

(to be filled out in office)

Client_____ SS#_____ Job#_____

Name_____ Location_____

Well#_____ Screened Interval_____ Depth_____

Aquifer Material_____ Installation Date _____

Drilling Method_____ Borehole Diameter_____

Comments regarding well installation:_____

(to be filled out in the field) Name_____

Date_____ Development Method_____

Total Depth_____ - Depth to liquid_____ = WaterColumn_____

Product thickness_____

_____ x _____ x _____ x 0.0408 = _____gals
Water Column Diameter (in.) #Vol

Purge Start_____ Stop_____ Rate_____ gpm

Gallons	Time	Clarity	Temp.	pH	Conductivity
0					

Total gallons removed_____ Development stop time_____

Depth to liquid _____at_____(time)

Odor of water_____ Water discharged to_____

Comments_____

APPENDIX B

VISTA REPORT

CLIENT NAME	: GEO STRATEGIES - HAYWARD
ATTENTION	: ROB CAMPBELL
ADDRESS	: 2140 W WINTON AVE
CITY/STATE/ZIP	: HAYWARD, CA 94545
REF/LOAN #	: ARCO STATION 2169/GSI #92770
VISTA REPORT NUMBER	: 1/019352-001
DATE OF REPORT	: 6/14/1993
SUBJECT PROPERTY	: 889 GRAND AVE
CITY/COUNTY/STATE/ZIP	: OAKLAND, ALAMEDA, CA 94607

Dear Client:

In response to your recent order for services, we enclose your *Vista California Radius Detailed Report*. We hope you find the information helpful in your investigation. In the event you require additional information about any site identified in this report, please contact our *Customer Service Department* at (619) 450-6100.

Please remember that this report represents only a search of the specific government records listed in the table of contents. Vista is aware of additional government record sources that have not been included in this report and Vista makes no representations of adequacy for Client's purposes. Please be aware that government environmental records often have incomplete or inaccurate locations and that all reports reflect locations of street addresses and do not necessarily indicate the size or specific location of any site. In addition, please recognize that government agencies do not list all sites of environmental contamination. Therefore, this report should not be used as a substitute for a complete Phase I Assessment.

This report is intended only for the use and benefit of the Client, and their assigns, who shall be the only parties authorized to review this report. This report is provided pursuant to a subscription agreement with Vista Environmental Information, Inc., and is subject to all of the terms and conditions thereof, SPECIFICALLY INCLUDING, BUT NOT LIMITED TO, PROVISIONS REGARDING CLIENTS USE AND LIMITATIONS OF VISTA ENVIRONMENTAL INFORMATION, INC.'S LIABILITY. We appreciate your patronage.

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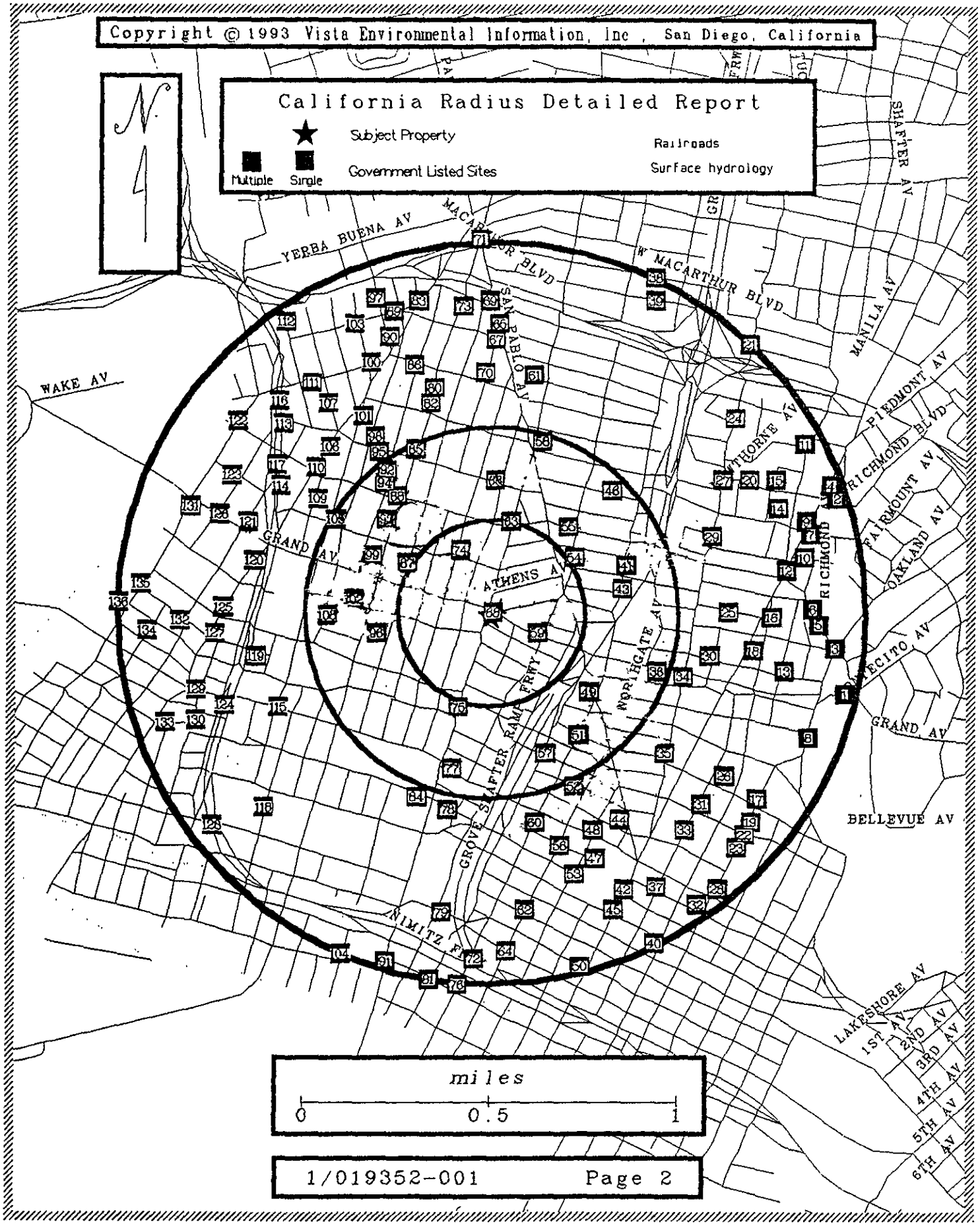

LIST OF RECORDS SEARCHED

This report represents a search of the following government database sources:

DATABASE		*TYPE OF RECORDS*	*AGENCY*
CERCLIS	:	Contaminated Sites Under CERCLA (1980)	U.S. EPA
NPL	:	Federal Superfund Sites	U.S. EPA
LIENS	:	Filed Notices of Superfund Liens	U.S. EPA
CORTESE	:	Hazardous Waste & Substances Site List	CAL-EPA
CAL-SITES/ AWP	:	Contaminated sites listed on the Annual Work Plan, and cleanup sites under the Bond Expenditure Plan	California EPA
BZP	:	Sites designated as Border Zone Properties (Deed Restrictions)	California EPA
CAL-SITES/ ASPIS	:	Actually or potentially contaminated sites under the Abandoned Site Program	California EPA
HWIS	:	Hazardous Waste Generators, Treatment, Storage & Disposal Facilities	California EPA
SWIS	:	Active & Inactive Sanitary Landfills and Disposal Facilities	California Waste Management Board
LUST	:	Leaking Underground Storage Tanks	California Regional Water Resources Control Boards

Due to the scale of the map, red and green squares on the map may represent more than one agency listing or location. For a detailed description of each source, please refer to the legends on the following pages.
For more information please call your VISTA account representative at (619) 450-6100.

CERCLIS

The information presented in this report is updated to November, 1992.

Since 1982, U.S. EPA has developed and maintained lists of contaminated properties under the federal Superfund program pursuant to the Comprehensive Environmental Response Compensation and Liability Act of 1980 (CERCLA), 42 U.S.C. Section 9601 (1985). U.S. EPA discovers these sites from citizen reports, routine inspection of hazardous waste generators, treatment, storage and disposal facilities, and reporting requirements.

MAP ID NO.	SITE NAME STREET ADDRESS, CITY and ZIP	EVENT* TYPES	EPA ID, REGIONAL UTILITY DESCRIPTION*
79	FRANCIS PLATING OF OAKLAND INC 785 7TH ST OAKLAND 94607	DS1 PA1	CAD009206160 N/A
91	SAFETY- KLEEN CORP 7-178-01 404 MARKET ST OAKLAND 94607	N/A	CAD053044053 N/A
100	ZERO WASTE SYSTS INC 1450 32ND ST OAKLAND 94608	DS1 PA1 PA2-N	CAD980637185 ACIDS BASES HEAVY METALS INORGANICS SOLVENTS ORGANICS DRUMS ABOVE GROUND FACILITY CLOSED TAT INSPECTION - CHECKED WITH TOM SEVECI NOTIS 103(C) SITE
105	DONCO INDUSTRIES 2401 UNION ST. OAKLAND 94607	DS1 PA1	CAD983608555 NEW CERCLIS SITE

* See key on last page for definition

NATIONAL PRIORITY LIST (NPL)

The information presented in this report is updated to October, 1992.

U.S. EPA maintains this list under the Comprehensive Environmental Response Compensation and Liability Act of 1980 (CERCLA) 42 U.S.C. Section 9601 (1985). Once sites have been designated on the CERCLIS List, U.S. EPA uses its Hazard Ranking System (HRS) to determine potential risks to human health and the environment. Only those CERCLIS sites which present the greatest risk are added to the NPL, which qualifies the sites to receive CERCLA remedial funding.

MAP ID NO.	SITE NAME, STREET ADDRESS, CITY and ZIP	EPA ID, REGIONAL UTILITY DESCRIPTION*

As of the date listed above, no sites listed in this database are located within a one mile radius of the subject property.

* See key on last page for definition

FEDERAL SUPERFUND LIENS (LIENS)

The information presented in this report is updated to September, 1991.

Under Section 107(L) of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA) 42 U.S.C. Section 9607 (1), US EPA has authority to file liens against real property to recover clean up, response, and any other expenditure made by US EPA under the CERCLA program. US EPA has prepared a listing of filed notices of Superfund liens which is updated quarterly. Because these liens are "statutory liens," they arise when the agency spends money on a site or when notification of potential liability is received by the owner of the property. EPA maintains that these liens can arise without filing, however, and they suggest checking CERCLIS sites for lien status.

MAP ID NO.	SITE NAME	LOCATION	DATE FILED	RELEASE DATE

As of the date listed above, no sites listed in this database are located within a one mile radius of the subject property.

HAZARDOUS WASTE AND SUBSTANCES SITES LIST
CORTESE

The information presented in this report is updated to November, 1992.

The California Environmental Protection Agency (Cal-EPA) publishes a compilation of sites throughout the State of California. Under Government Code Section 65962.5, these sites are submitted to the Cal-EPA by the State Water Resources Control Board, the Integrated Waste Management Board, and the Department of Toxic Substances Control. The sites are extracted from the following databases:

A1025	Regulated Air Emissions at 10-25 tons/day.	IUR	Inventory Update Rule (Chemical Manufacturers)
AGT25	Regulated Air Emissions greater than 25 tons/day.	LTANK	Leaking Tank
ASPIS	Abandoned Sites Program Information System (included in CALSITES)	S1987 - S1990	California TRIS
DTSCD	Department of Toxic Substance Control Docket	SWRCB	State Water Resources Control Board
FINDS	Facility Index System	UTANK	Underground Tank
HWIS	Hazardous Waste Information System	WB-LF	Waste Board - Leaking Facility (site has known migration)
		WDSE	Waste Discharge System - Enforcement Action

MAP ID NO.	SITE	LOCATION	CITY	ZIP	DATABASE	AGENCY ID
1	CHEVRON	210 GRAND AVE	OAKLAND	N/A	HWIS	N/A
1	CHEVRON STATION #90019	210 GRAND AVE	OAKLAND	N/A	HWIS	CAL000030005
1	CHEVRON STATION #90019	210 GRAND AVE	OAKLAND	N/A	HWIS	CAL000041717
3	BILL COX CADILLAC	30 BAY PL	OAKLAND	94604	LTANK	N/A
5	PERFORMANCE ASSOCIATES	255 27TH ST	OAKLAND	94528	LTANK	N/A
5	OAKLAND ACURA	255 27TH ST	OAKLAND	94528	FINDS	CAD982520959
6	MASRI PROPERTY-	290 27TH ST	OAKLAND	94612	LTANK	N/A
6	MARTIN JOHNSON AUDI PORSCHE	290 27TH ST	OAKLAND	94612	HWIS	CAD982328882
6	MARTIN JOHNSON PORCHE	290 27TH ST	OAKLAND	94612	HWIS	CAL000007820
8	LAKE MERRITT TOWERS II	2100 HARRISON ST	OAKLAND	94612	LTANK	N/A
9	EUROPEAN MOTORS LTD	2915 BROADWAY	OAKLAND	94611	FINDS	N/A
9	EUROPEAN MOTORS	2915 BROADWAY	OAKLAND	94611	FINDS	14124
9	EUROPEAN MOTORS	2915 BROADWAY	OAKLAND	94611	FINDS	CAD982486714
11	BROADWAY MEDICAL PLAZA	3300 WEBSTER ST	OAKLAND	94609	LTANK	N/A
11	MERRITT HOSPITAL CARD PULM BDG	365 HAWTHORNE ST	OAKLAND	94609	LTANK	N/A

CORTESE continued...

MAP ID NO.	SITE	LOCATION	CITY	ZIP	DATABASE	AGENCY ID
11	SAMUEL MERRIT HOSPITAL (ALPINE	3300 WEBSTER ST	OAKLAND	94609	ASPIS	01800027
12	BROADWAY VOLKSWAGON	2740 BROADWAY	OAKLAND	94612	HWIS	N/A
12	TRACY BUICK INC.	2735 BROADWAY	OAKLAND	N/A	FINDS	N/A
12	TRACY BUICK	2735 BROADWAY	OAKLAND	N/A	FINDS	2291
12	JACK TRACY BUICK	2735 BROADWAY	OAKLAND	N/A	FINDS	CAD981414014
12	BROADWAY VW	2740 BROADWAY	OAKLAND	94612	HWIS	CAD982011470
12	OAKLAND DODGE INC	2735 BROADWAY	OAKLAND	N/A	HWIS	CAL000038600
12	JOHNSTON PACIFIC CO. INC.	2740 BROADWAY	OAKLAND	94612	HWIS	CAX000061747
13	THE TRIBUNE	2302 VALDEZ ST	OAKLAND	94612	LTANK	N/A
18	NEGERBON AUTO CENTER	2345 BROADWAY	OAKLAND	N/A	HWIS	CAL000009647
18	NEGHERBON LINCON MERCURY	2345 BROADWAY	OAKLAND	N/A	HWIS	CAL000013317
21	CALIFORNIA HIGHWAY PATROL	3601 TELEGRAPH AVE	OAKLAND	94609	HWIS	N/A
21	CALIFORNIA HIGHWAY PATROL OAKL	3601 TELEGRAPH AVE	OAKLAND	94609	HWIS	17964
21	OAKLAND CHP	3601 TELEGRAPH AVE	OAKLAND	94609	HWIS	CAL000021300
21	CALIFORNIA HIGHWAY PATROL	3601 TELEGRAPH AVE	OAKLAND	94609	HWIS	CAL000046137
23	CHEVRON	1633 HARRISON ST	OAKLAND	N/A	LTANK	N/A
26	KAISER REGIONAL PARKING	1901 FRANKLIN ST	OAKLAND	94612	LTANK	N/A
26	PG&E	1919 WEBSTER ST	OAKLAND	94612	FINDS	N/A
26	PG & E EAST BAY REGION	1919 WEBSTER ST	OAKLAND	94612	FINDS	CAD981692296
27	LAURENCE ORTHOPEDIC PROPERTY	3045 TELEGRAPH AVE	OAKLAND	94609	LTANK	N/A
28	HARRISON STREET GARAGE	1432 HARRISON ST	OAKLAND	94612	LTANK	N/A
28	ROYS AUTO BODY	1432 HARRISON ST	OAKLAND	94612	HWIS	CAD982039125
29	PILL HILL SHELL	2800 TELEGRAPH AVE	OAKLAND	N/A	LTANK	N/A
29	SHELL	2800 TELEGRAPH AVE	OAKLAND	N/A	LTANK	1660

MAP ID NO.	SITE	LOCATION	CITY	ZIP	DATABASE	AGENCY ID
32	CHEVRON	301 14TH ST	OAKLAND	94612	HWIS	N/A
32	CHEVRON STATION #94816	301 14TH ST	OAKLAND	94612	HWIS	CAL000041709
34	DAVE'S COMPLETE AUTO SERVICE	2250 TELEGRAPH AVE	OAKLAND	94602	HWIS	N/A
34	TEXACO	2225 TELEGRAPH	OAKLAND	91802	LTANK	N/A
34	TEXACO/EXXON	2225 TELEGRAPH	OAKLAND	91802	LTANK	16114
34	TONY'S BEACON STATION	2250 TELEGRAPH AVE	OAKLAND	94602	UTANK	48862
34	UNOCAL SVC STA #1110	2250 TELEGRAPH AVE	OAKLAND	94602	HWIS	CAD982055303
34	DAVES COMPLETE AUTO SERVICE	2250 TELEGRAPH AVE	OAKLAND	94602	HWIS	CAL000008472
34	DAVES COMPLETE AUTO	2250 TELEGRAPH AVE	OAKLAND	94602	HWIS	CAL000021281
34	TELEGRAPH AUTO REPAIR	2225 TELEGRAPH	OAKLAND	91802	HWIS	CAL000021311
34	EXXON COMPANY USA #70235	2225 TELEGRAPH	OAKLAND	91802	HWIS	CAL000028841
34	DAVE'S COMPLETE AUTO SVC	2250 TELEGRAPH AVE	OAKLAND	94602	HWIS	CAL000064428
35	CHEVRON	1911 TELEGRAPH AVE	OAKLAND	95050	LTANK	N/A
38	ARCO	731 MACARTHUR ST W.	OAKLAND	94610	HWIS	N/A
38	ARCO PRODUCTS CO FAC 4931	731 MACARTHUR ST W.	OAKLAND	94610	HWIS	CAL000048887
39	R.D. MINER CO.	750 37TH ST	OAKLAND	N/A	LTANK	N/A
40	CHINATOWN REDEVELOPMENT PROJ.	11 WEBSTER	OAKLAND	N/A	LTANK	N/A
41	MOSTLY MUSTANGS	2576 MARTIN LUTHER KING	OAKLAND	94612	HWIS	N/A
41	MOSTLY MUSTANGS	2576 MARTIN LUTHER KING	OAKLAND	94612	HWIS	CAL000020172
44	OAKLAND CITY HALL	1 CITY HALL PLAZA	OAKLAND	94612	LTANK	N/A
45	BRAMALEA PACIFIC	1111 BROADWAY	OAKLAND	94607	LTANK	N/A
47	FIVE CITY CENTER	1300 CLAY ST	OAKLAND	N/A	LTANK	N/A
47	OAKLAND FEDERAL BUILDING	1305 CLAY ST	OAKLAND	94612	LTANK	N/A
48	CITY OF OAKLAND	1417 CLAY ST	OAKLAND	N/A	LTANK	N/A

CORTESE continued...

MAP ID NO.	SITE	LOCATION	CITY	ZIP	DATABASE	AGENCY ID
49	GREYHOUND BUS LINES TERMINAL	2103 SAN PABLO	OAKLAND	N/A	LTANK	N/A
50	SHELL	461 8TH ST	OAKLAND	N/A	LTANK	N/A
51	BUDS BODY SHOP	1900 MARTIN LUTHER KING WAY	BERKELEY	00009	HWIS	CAD073948592
52	BLUE PRINT SERVICE CO.	1700 JEFFERSON ST	OAKLAND	N/A	LTANK	N/A
52	OAKLAND COMMUNITY DEVELOPMENT	690 15TH ST	OAKLAND	94612	LTANK	N/A
52	BLUE PRINT SERVICE COMPANY	1700 JEFFERSON ST	OAKLAND	N/A	LTANK	21196
59	CHEVRON	850 GRAND AVE W	OAKLAND	N/A	LTANK	N/A
59	FYNE PROPERTY	774 GRAND AVE W	OAKLAND	94612	LTANK	N/A
59	91853	850 GRAND AVE W	OAKLAND	N/A	UTANK	62153
60	OAKLAND REDEVELOPMENT AGENCY	1330 MARTIN LUTHER KING JR WAY WAY	OAKLAND	94612	LTANK	N/A
61	LOOMIS ARMORED CAR SERVICES IN	936 BROCKHURST ST	OAKLAND	N/A	LTANK	N/A
61	LOOMIS ARMORED INC	936 BROCKHURST ST	OAKLAND	N/A	LTANK	45221
62	BRAMALEA USA INC	901-999 JEFFERSON ST	OAKLAND	94607	LTANK	N/A
65	SHELL	3420 SAN PABLO AVE	OAKLAND	N/A	LTANK	N/A
65	SAN PABLO AVE. SHELL	3420 SAN PABLO AVE	OAKLAND	N/A	UTANK	52586
66	ARATEX SERVICES	958 28TH ST	OAKLAND	N/A	LTANK	N/A
67	THRIFTY OIL STN.#049	3400 SAN PABLO AVE	OAKLAND	94608	LTANK	N/A
67	THRIFTY OIL	3400 SAN PABLO AVE	OAKLAND	94608	LTANK	4715
68	ARCO	889 GRAND AVE W	OAKLAND	94607	LTANK	N/A
68	FALCON ENTERPRISES INC	889 GRAND AVE W	OAKLAND	94607	UTANK	27038

MAP ID NO.	SITE	LOCATION	CITY	ZIP	DATABASE	AGENCY ID
69	CALIFORNIA HOTEL	3501 SAN PABLO AVE	OAKLAND	94612	LTANK	N/A
72	PG&E POWER PLANT	510 MARTIN LUTHER KING	OAKLAND	N/A	LTANK	N/A
72	TEXACO SERVICE STATION	424 MARTIN LUTHER BLVD	OAKLAND	94520	HWIS	CAD982465015
72	GROVES AUTO RPR	424 MARTIN LUTHER BLVD	OAKLAND	94520	HWIS	CAL000062115
73	CITY OF PARIS CLEANERS	3516 ADELINE ST	OAKLAND	94608	LTANK	N/A
74	CAL-WEST PERIODICALS	2400 FILBERT	OAKLAND	N/A	HWIS	N/A
74	CAL WEST PERIODICALS	2400 FILBERT	OAKLAND	N/A	HWIS	CAL000011753
78	J & R USED AUTO PARTS	823 12TH ST E	OAKLAND	94606	LTANK	N/A
79	GREYHOUND	7 BUSH	OAKLAND	N/A	LTANK	N/A
81	GUARANTEE FORKLIFT	699 4TH ST	OAKLAND	94807	FINDS	N/A
81	GUARANTEE FORKLIFT INC	699 4TH ST	OAKLAND	94807	FINDS	CAD982448670
81	GUARANTEE FORKLIFT INCORPORATE	699 4TH ST	OAKLAND	94807	FINDS	CAD982488706
81	GUARANTEE FORKLIFT INC	699 4TH ST	OAKLAND	94807	FINDS	CAL000035961
83	BELOUS PROPERTY	3423 HARLAN	OAKLAND	N/A	LTANK	N/A
89	DRAYAGE PROPERTY	1350 34TH ST	OAKLAND	94608	LTANK	N/A
91	MARINE TERMINALS CORP	333 MARKET ST	OAKLAND	94607	LTANK	N/A
91	SAFETY-KLEEN CORP.	404 MARKET ST	OAKLAND	94607	DTSCD	N/A
91	SAFETY KLEEN CORP 7 178 01	404 MARKET ST	OAKLAND	94607	DTSCD	CAD053044053
91	SAFETY-KLEEN CORP (7-178-01)	404 MARKET ST	OAKLAND	94607	DTSCD	CAD053044053
91	SAFETY-KLEEN ROHNERT PARK	404 MARKET ST	OAKLAND	94607	DTSCD	CAD053044053
93	COLLINS PROPERTY	2452 MAGNOLIA ST	OAKLAND	94607	LTANK	N/A
93	E Z REST PRODUCTS	2528 ADELINE ST	OAKLAND	94578	LTANK	N/A
93	E-Z-EST PRODUCTS COMPANY	2528 ADELINE ST	OAKLAND	94578	ASPIS	01340105
95	ALBERT JOHN PLUTE CO	1229 28TH ST	OAKLAND	N/A	LTANK	N/A
95	ESQUIRE CLEANERS INC	1229 28TH ST	OAKLAND	N/A	AGT25	1029
97	GUITON CHARTER BUSES	3421 HOLLIS ST	OAKLAND	94608	LTANK	N/A

CORTESE continued...

MAP ID NO.	SITE	LOCATION	CITY	ZIP	DATABASE	AGENCY ID
97	GUITON INC	3421 HOLLIS ST	OAKLAND	94608	HWIS	CAL000003077
97	GUITON INC	3421 HOLLIS ST	OAKLAND	94608	HWIS	CAL000018960
99	JOSEPIAN ESTATE	2311 MAGNOLIA ST	OAKLAND	94607	LTANK	N/A
99	NED CLYDE CONSTRUCTION	2311 ADELINE ST	OAKLAND	N/A	LTANK	N/A
99	PACIFIC CRYOGENICS COMPANY	2311 MAGNOLIA ST	OAKLAND	94607	FINDS	CAD990803967
99	PACIFIC OXYGEN SALES COMPANY	2311 MAGNOLIA ST	OAKLAND	94607	HWIS	CAD990803967
99	CUSTOM WOOD FINISHING	2311 ADELINE ST	OAKLAND	N/A	HWIS	CAL000040193
100	ZERO WASTE SYSTEMS INC	1450 32ND ST	OAKLAND	94609	ASPIS	01280073
100	ZERO WASTE SYSTEMS INC.	1450 32ND ST	OAKLAND	94609	FINDS	CAD980637185
100	ZERO WASTE SYSTEMS INC.	1450 32ND ST	OAKLAND	94609	FINDS	CAD980837185
102	EDMUD	2127 ADELINE ST	OAKLAND	94623	LTANK	N/A
102	EAST BAY MUNICIPAL UTILITY DIS	2127 ADELINE ST	OAKLAND	94623	HWIS	CAX000031450
104	EAST BAY FORD TRUCK	333 FILBERT	OAKLAND	N/A	LTANK	N/A
106	CUSTOM ALLOY SCRAP SALES INC	2730 PERALTA ST	OAKLAND	94607	FINDS	N/A
106	CUSTOM ALLOYS SCRAP SALES	2730 PERALTA ST	OAKLAND	94607	FINDS	N/A
106	INDUSTRIAL TURNING PROCESSES	2730 PERALTA ST	OAKLAND	94607	ASPIS	01330003
106	CUSTOM ALLOY SCRAP AND SALES I	2730 PERALTA ST	OAKLAND	94607	FINDS	CAL000027883
107	J.H. FITZMAURICE	2857 HANNAH ST	OAKLAND	94608	LTANK	N/A
109	CLARKE & CRAMER INC	2500 KIRKHAM ST	OAKLAND	N/A	LTANK	N/A
110	C.E. TOLAND & SON	2635 PERALTA ST	OAKLAND	94623	LTANK	N/A
110	OLD NEWARK PLANT	2635 PERALTA ST	OAKLAND	94623	LTANK	N/A
112	TULLUCH CONSTRUCTION	3428 ETTIE ST	OAKLAND	N/A	HWIS	N/A
112	TULLOCH CONSTRUCTION	3428 ETTIE ST	OAKLAND	N/A	HWIS	CAL000007489

CORTESE continued...

MAP ID NO.	SITE	LOCATION	CITY	ZIP	DATABASE	AGENCY ID
113	KALMAR AC	2792 CYPRESS ST	OAKLAND	94607	FINDS	N/A
113	KALMAR AC OF OAKLAND INC	2792 CYPRESS ST	OAKLAND	94607	FINDS	CAD982522583
113	KALMARAC OF OAKLAND INC	2792 CYPRESS ST	OAKLAND	94607	FINDS	CAD982522583
115	CARNATION DAIRY FACILITY	1310 14TH ST	OAKLAND	94607	FINDS	N/A
115	NABISCO BRANDS INC	1267 14TH ST	OAKLAND	N/A	FINDS	N/A
115	NABISCO SHREDDED WHEAT BAKERY	1267 14TH ST	OAKLAND	N/A	FINDS	CAD079088852
115	CARNATION DAIRIES	1310 14TH ST	OAKLAND	94607	HWIS	CAD130171283
115	CARNATION DAIRIES DISTRIB	1310 14TH ST	OAKLAND	94607	FINDS	CAD130171283
115	NABISCO FOODS	1267 14TH ST	OAKLAND	N/A	FINDS	CAL000016133
115	CARNATION DAIRIES CO	1310 14TH ST	OAKLAND	94607	HWIS	CAX000229559
116	WAREHAM PROPERTY	2855 CYPRESS ST	OAKLAND	94608	LTANK	N/A
116	CUSTOM WOODWORKING SHOP	2855 CYPRESS ST	OAKLAND	94608	FINDS	CAD982517948
117	KANTOR'S FURNITURE	2525 CYPRESS AVE	OAKLAND	N/A	LTANK	N/A
118	CITY OF OAKLAND HOUSING AUTH	935 UNION ST	OAKLAND	94612	LTANK	N/A
120	PG&E	2121 PERALTA ST	OAKLAND	94607	FINDS	N/A
120	PG&E OAKLAND SERVICE CENTER	2121 PERALTA ST	OAKLAND	94607	FINDS	CAD981413164
120	PACIFIC GAS & ELECTRIC OAKLAND	2121 PERALTA ST	OAKLAND	94607	HWIS	CAT080011513
120	PG & E GEN CONSTRUCTION OAKLAN	2121 PERALTA ST	OAKLAND	94607	FINDS	CAT080011513
123	PACIFIC SUPPLY	1735 24TH ST	OAKLAND	94807	LTANK	N/A
124	COCA-COLA ENTERPRISES WEST	1340 CYPRESS ST	OAKLAND	94607	FINDS	N/A
124	DALVIN PAINT	1401 14TH ST E.	OAKLAND	94606	FINDS	N/A
124	COCA COLA BOTTLING COMPANY CA	1340 CYPRESS ST	OAKLAND	94607	FINDS	CAD009103748
124	COCA-COLA BOTTLING CO OF CALIF	1340 CYPRESS ST	OAKLAND	94607	FINDS	CAD009103748

CORTESE continued...

MAP ID NO.	SITE	LOCATION	CITY	ZIP	DATABASE	AGENCY ID
124	DAVLIN PAINT CO	1401 14TH ST E.	OAKLAND	94606	FINDS	CAD057407686
124	COCA COLA BOTTLING OAKLAND	1340 CYPRESS ST	OAKLAND	94607	FINDS	CAD982475410
125	CADEMARTORI TRUCKING	1833 PERALTA ST	OAKLAND	94607	LTANK	N/A
126	ZELLERBACH OAKLAND FACILITY	2230 WILLOW ST	OAKLAND	N/A	LTANK	N/A
133	DOYLE PROPERTY	1518 12TH ST E.	OAKLAND	94606	LTANK	N/A
134	BASF CORPORATION	1545 WILLOW ST	OAKLAND	94607	LTANK	N/A
134	BASF CORPORATION INMONT DIVI	1545 WILLOW ST	OAKLAND	94607	HWIS	CAD009122912
134	INMONT CORP	1545 WILLOW ST	OAKLAND	94607	FINDS	CAD009122912

CAL-SITES (AWP)

The information presented in this report is updated to September, 1992.

The Annual Work Plan (AWP) contains a listing of all verified hazardous waste sites that are or will be targeted for abatement by the California Environmental Protection Agency under the Hazardous Substance Cleanup Bond Act of 1984 (Health and Safety Code Section 25356) and the Hazardous Substance Account (HSA). Hazardous waste sites may be discovered by the department directly or referred to the department for confirmation and follow up action by another government agency, such as a local health department, a Regional Water Quality Control Board, a responsible party or a concerned citizen. New sites are added to this database as they are verified and the "Preliminary Assessment, Site Investigation and Hazard Ranking System" processes are completed. This database is updated once annually after approval of the California state legislature and has been incorporated into the CAL-SITES database.

This database currently contains a list of approximately 450 sites in the State of California.

MAP ID NO	SITE NAME	STREET ADDRESS	CITY	ZIP	SITE INFORMATION*

As of the date listed above, no sites listed in this database are located within a one mile radius of the subject property.

* See key on last page for definition

BORDER ZONE PROPERTY ACT SITES
(DEED RESTRICTIONS)

The information provided in this report is updated to September, 1992.

In accordance with Assembly Bill 816, and the Hazardous Waste Property/Border Zone Property Law (Health & Safety Code 25220), the CAL-EPA, Toxic Substances Control Program (TSCP), enters into voluntary deed restriction agreements with owners of property who propose building residences, schools, hopitals or day care centers on property that is "on or within 2,000 feet of a significant disposal of hazardous waste". Restrictions may include "activities on, over, or under the land, including, but not limited to, a prohibition against building, filling, grading, excavating, or mining" without the written permission of the TSCP.

This bill requires the TSCP to "notify the planning and building departments of each city, county, or regional council of governments when a land use restriction has been recorded, and would require the planning and building department to enforce the restriction," although the TSCP has compiled a list of properties subject to environmental deed restrictions which is used to notify various building and planning departments in local jurisdictions.

MAP ID NO.	SITE NAME	ADDRESS	CITY	ZIP
42	CLOROX COMPANY	1221 BROADWAY	OAKLAND	94612

CAL-SITES (ASPIS)

The information presented in this report is updated to September, 1992.

Developed under Section 25359.6 of the Health and Safety Code, the California EPA Toxic Substance Control Program (TSCP) maintains a listing of potential and known hazardous waste sites. TSCP staff have interviewed officials from county health agencies, local fire departments, county agricultural commissioners, and other local agencies that could reasonably be expected to have information regarding potential waste sites. The Regional Water Quality Control Boards, Department of Fish and Game and other state environmental regulatory agencies' TSCP staffs also review historical land use data sources to generate lists of potentially contaminated sites.

This database was formerly known as the Abandoned Site Program Information System, but was integrated into the CAL-SITES database in 1991. Information concerning most of these sites should be considered preliminary although most confirmed sites from this database are merged into the AWP once they have been hazard ranked. This database currently contains more than 26,000 sites in the State of California.

MAP ID NO.	FACILITY NAME	LOCATION	CITY	ZIP	FACILITY NO.	STATUS CODE*
11	SAMUEL MERRIT HOSPITAL (ALPINE LABS)	3300 WEBSTER STREET	OAKLAND	94609	01800027	NFA
14	INSTITUTE OF FORENSIC SCIENCE CRIM L	2945 WEBSTER STREET	OAKLAND	94609	01800010	NFA
14	HISTONEK LABORATORY	2940 SUMMIT STREET	OAKLAND	94609	01800021	NFA
15	ENDOCRINE METABOLIC CENTER	3100 SUMMIT STREET	OAKLAND	94610	01800022	NFA
24	MODEL UPHOLSTERING SHOP	3315 TELEGRAPH	OAKLAND	94612	01760037	NFA
26	C & G DENTAL X-RAY	1904 FRANKLIN STREET, #802	OAKLAND	94612	01800009	NFA
31	EAST BAY BLUEPRINT SUPPLY COMPANY	1742 FRANKLIN	OAKLAND	94612	01730054	NFA
32	LAXAS SEWING COMPANY	337 13TH STREET	OAKLAND	94612	01390017	NFA
32	BARNDOLLAR LETTER SERVICE	325 13TH STREET	OAKLAND	94601	01730045	NFA
37	ART WEEKS INC	1305 FRANKLIN STREET	OAKLAND	94612	01270004	NFA

* See "Key to Terms" on last page of report for definition

CAL-SITES (ASPIS) continued...

MAP ID NO.	FACILITY NAME	LOCATION	CITY	ZIP	FACILITY NO.	STATUS CODE*
39	R J S ENTERPRISES	675 37TH STREET	OAKLAND	94609	01350004	NFA
40	CHINATOWN REDEVELOPMENT - OAKLAND	BOUNDED BY 11TH, 10TH, WEBSTER & FRAN	OAKLAND	94601	01490015	CNTY
42	BATTE RESOURCES INTERNATIONAL	1221 BROADWAY	OAKLAND	94612	01130001	NFA
46	OAKLAND LAUNDRY COMPANY	730 29TH STREET	OAKLAND	94609	01720100	NFA
52	CHAMPION COMPANY, THE	610 16TH STREET	OAKLAND	94612	01500026	NFA
54	MILLER PHOTO SCREEN SERVICE	2578 WEST STREET	OAKLAND	94612	01350072	NFA
55	REPORTER PUBLISHING COMPANY	814 27TH STREET	OAKLAND	94607	01270019	NFA
58	PACIFIC MARINE ELECTRONICS	3040 MARKET STREET	OAKLAND	94607	01760004	NFA
59	WHITEY'S WELDING & STEEL FABRICATION	830 22ND STREET	OAKLAND	94607	01340072	NFA
59	JOHN FREITAS UPHOLSTERING	807 WEST GRAND AVENUE	OAKLAND	94607	01760008	NFA
63	MOLDED FABRIC PRODUCTS	2605 MARKET STREET	OAKLAND	94607	01500019	NFA
70	LINDEN LAUNDRY	3217 LINDEN STREET	OAKLAND	94607	01720095	NFA
76	CLASSIC ILLUMINATION, THE	431 GROVE STREET	OAKLAND	94609	01360023	NFA
77	OAKLAND GRAPHICS	864 14TH STREET	OAKLAND	94612	01730016	NFA
86	OAKLAND SHORT RUN TOOL & DIE	1201 32ND STREET	OAKLAND	94609	01340028	NFA
87	POLYMERIC TECHNOLOGY	2329 CHESTNUT STREET	OAKLAND	94607	01300003	NFA
88	CHAMBLAIN ENTERPRISES	1168 26TH STREET	OAKLAND	94607	01390002	NFA
92	ENERGY GUARD SPA	2725 MAGNOLIA STREET	OAKLAND	94612	01300029	NFA
93	E-Z-EST PRODUCTS COMPANY	2528 ADELINE	OAKLAND	94607	01340105	NFA

* See "Key to Terms" on last page of report for definition

CAL-SITES (ASPIS) continued...

MAP ID NO.	FACILITY NAME	LOCATION	CITY	ZIP	FACILITY NO.	STATUS CODE*
96	GELTZ MACHINERY COMPANY	2015 CHESTNUT STREET	OAKLAND	94607	01500012	NFA
99	CUTOFF COMPANY	2324 ADELINE	OAKLAND	94607	01340078	NFA
100	ZERO WASTE SYSTEMS INC	1450 32ND STREET	OAKLAND	94609	01280073	PEARL
102	CLEO'S PRINTING	1241 21ST	OAKLAND	94607	01730046	NFA
103	MASTER TRANSPORTATION	1451 34TH STREET	OAKLAND	94607	01420100	NFA
105	INDUSTRIAL & FOUNDRY SUPPLY COMPANY	2401 POPLAR STREET	OAKLAND	94607	01500030	NFA
106	INDUSTRIAL TURNING PROCESSES	2730 PERALTA STREET	OAKLAND	94607	01330003	NFA
108	ARCHITECTURAL CERAMICS	1940 UNION STREET	OAKLAND	94607	01360003	NFA
110	BAY CITY DISPOSAL	2601 PERALTA BOULEVARD	OAKLAND	94607	01490007	NFA
111	MCDERMOTTLSEALY	1577 32ND STREET	OAKLAND	94609	01170012	NFA
114	TIPPER BLONCO COMPANY	2450 CYPRESS STREET	OAKLAND	94626	01390013	NFA
119	BAY GRAPHICS	1337 17TH STREET	OAKLAND	94607	01730084	NFA
121	LANGE TRUCKING INC	2226 CAMPBELL STREET	OAKLAND	94607	01420076	NFA
122	RYDER CHEMICAL COMPANY	2601 WOOD STREET	OAKLAND	94607	01280036	NFA
126	JORGENSEN, EARLE M COMPANY	1699 WEST GRAND AVENUE	OAKLAND	94623	01500097	NFA
127	ALTA PLATING AND CHEMICAL CORPORATIO	1732 PERALTA STREET	OAKLAND	94607	01340073	NFA
129	PERSONEL MONTHLY STORAGE	1468 14TH STREET	OAKLAND	94607	01420097	NFA
130	CENTER CLEANERS	1224 CENTER STREET	OAKLAND	94610	01720025	NFA
135	SOUTHERN PACIFIC OAKLAND	1707 WOOD STREET	OAKLAND	94607	01400001	RWQCB
136	DUFFY'S TRUCKING	1791 16TH STREET	OAKLAND	94606	01420042	NFA

* See "Key to Terms" on last page of report for definition

HAZARDOUS WASTE INFORMATION SYSTEMS (HWIS)

The information presented in this report is updated to September, 1992.

The California Department of Health Services, Toxic Substances Control Division, has developed and maintained lists of hazardous waste generators and hazardous waste treatment storage and disposal facilities in the State of California, pursuant to the Hazardous Waste Control Law (Health and Safety Code Section 25100 et seq.), and the Hazardous Waste Management Act of 1976 (Health and Safety Code Section 25179.1 et seq). In addition, this law requires all counties to prepare and submit hazardous waste management plans. To assist the counties,the Toxic Substances Control Division maintains lists containing generation and disposal data within each county. This information has been assembled by the Toxic Substances Control Division from manifest reports required from hazardous waste generators. This database currently lists over 20,000 sites in the state of California.

MAP ID NO.	EPA NO.	FACILITY NAME	ADDRESS	CITY	GEN/TSD*
1	CAL000041717	CHEVRON STATION #90019	210 GRAND AVENUE	OAKLAND	GEN
2	CAD981671506	DOWNTOWN AUTO BODY & FRAME	260 30TH ST	OAKLAND	GEN
3	CAD981416720	PAT PATERSON CADILLAC	230 BAY PLACE	OAKLAND	GEN
4	CAD982036733	ROGERS AUTOWORKS	3022 BROADWAY	OAKLAND	GEN
6	CAL000028276	CENTRAL RADIATOR SERVICE	297 27TH STREET	OAKLAND	GEN
7	CAD981633696	COOPERS AUTO BODY & FRAME	295 29TH ST	OAKLAND	GEN
10	CAD009203811	AUTOMOTIVE EXCHANGE SERVICE INC	288 28TH ST	OAKLAND	GEN
11	CAD982023251	SAMUEL MERRITT HOSPITAL	HAWTHORNE & WEBSTER	OAKLAND	GEN
12	CAD982011470	BROADWAY VW	2740 BROADWAY	OAKLAND	GEN
14	CAD982026338	HISTOPATHOLOGY REFERENCE LAB	2940 SUMMIT ST 2ND FLOOR	OAKLAND	GEN
15	CAX000141184	PROVIDENCE HOSPITAL	3100 SUMMIT ST	OAKLAND	GEN
16	CAD982469355	ATLANTIC GARAGE	2500 WEBSTER ST	OAKLAND	GEN
17	CAD071685606	WORLD SAVINGS & LOAN	1901 HARRISON ST	OAKLAND	GEN
18	CAD982003279	FOREIGN BODY SHOP	2350 WEBSTER ST	OAKLAND	GEN
19	CAL000040907	ICF KAISER ENGINEERS INC	1800 HARRISON STREET	OAKLAND	GEN

* See "Key to Terms" on last page of report for definition

MAP ID NO.	EPA NO.	FACILITY NAME	ADDRESS	CITY	GEN/TSD*
20	CAD981999857	PERALTA HOSPITAL	450 30TH ST	OAKLAND	GEN
22	CAL000041716	CHEVRON STATION #90020	17TH & HARRISON	OAKLAND	GEN
25	CAD981386113	BROADWAY MOTORS	437 25TH ST	OAKLAND	GEN
26	CAD982010910	KAISER FNDN HLTH PLAN OFC BLDG	1950 FRANKLIN ST	OAKLAND	GEN
28	CAD982039125	ROYS AUTO BODY	1432 HARRISON ST	OAKLAND	GEN
29	CAD981402928	SHELL STATION #204-5508-2303	2800 TELEGRAPH/28TH	OAKLAND	GEN
30	CAD981375272	HANZEL AUTO BODY WORKS	456 23RD ST	OAKLAND	GEN
32	CAL000041709	CHEVRON STATION #94816	301 14TH STREET	OAKLAND	GEN
33	CAT080015449	PACIFIC TELEPHONE AND TELEGRAPH CO	1587 FRANKLIN STREET	OAKLAND	GEN
34	CAL000028841	EXXON COMPANY USA #70235	2225 TELEGRAPH	OAKLAND	GEN
35	CAL000013447	EMPO CAP GOODYEAR AUTO SERVICE	1901 TELEGRAPH AVENUE	OAKLAND	GEN
36	CAD981372428	MIRACLE AUTO PAINTING	575 W GRAND AVE	OAKLAND	GEN
38	CAL000048687	ARCO PRODUCTS CO FAC 4931	731 W MACARTHUR BLVD	OAKLAND	GEN
43	CAD982044315	QUALITY BODY & FENDER	2510 MARTIN LUTHER KINGS WAY	OAKLAND	GEN
47	CAD981396963	OAKLAND TRIBUNE INC	409 13TH ST	OAKLAND	GEN
51	CAD073946592	BUDS BODY SHOP	1900 MARTIN LUTHER KING JR WAY	OAKLAND	GEN
57	CAL000032281	CHEVRON STATION #94800	1700 CASTRO STREET	OAKLAND	GEN
59	CAL000041779	CHEVRON STATION #91853	850 W GRAND AVE	OAKLAND	GEN
65	CAD981402688	SHELL STATION #204-5508-5306	3420 SAN PABLO AVE/35TH	OAKLAND	GEN
67	CAD981453475	FRYER INDUSTRIES, INC.	1073 34TH STREET	OAKLAND	GEN
68	CAL000009867	ARCO PRODUCTS FACILITY 2169	889 W GRAND AVENUE	OAKLAND	GEN

* See "Key to Terms" on last page of report for definition

MAP ID NO.	EPA NO.	FACILITY NAME	ADDRESS	CITY	GEN/TSD*
71	CAD040023855	GMC TRUCK & COACH DIVISION	3800 SAN PABLO AVE	OAKLAND	GEN
75	CAD028772457	A&H TRUCK REPAIR	1825 MARKET ST	OAKLAND	GEN
80	CAD982026486	LENNYS AUTO BODY & PAINTING	3116 ADELINE	OAKLAND	GEN
81	CAD009200031	E-D COAT INC	715-21 FOURTH ST	OAKLAND	GEN
81	CAD982486706	GUARANTEE FORKLIFT INC	699 4TH ST	OAKLAND	GEN
82	CAX000077057	SUPERIOR PRESS INC.	3031 ADELINE ST.	OAKLAND	GEN
84	CAD076560507	MOALS BODY SHOP INC	937 E 2TH STREET	OAKLAND	GEN
85	CAD981383847	TESTING ENGINEERS, INC	2811 ADELINE ST	OAKLAND	GEN
90	CAL000033897	ROMAK IRON WORKS	3250 HOLLIS STREET	OAKLAND	GEN
91	CAD053044053	SAFETY-KLEEN CORP (7-178-01)	404 MARKET ST	OAKLAND	GEN
91	CAD053044053	SAFETY-KLEEN CORP (7-178-01)	404 MARKET ST	OAKLAND	TSD
94	CAD981418361	OAKLAND METAL PAINTING	2645 MAGNOLIA STREET	OAKLAND	GEN
96	CAD009132127	MELROSE NAME PLATE CO NO II#	1946 ADELINE ST	OAKLAND	GEN
98	CAL000013314	MODERN MAIL SERVICES	2836 UNION ST	OAKLAND	GEN
99	CAD980638449	ARTESIAN WASTE OIL RECOVERY	2306 MAGNOLIA ST	OAKLAND	GEN
99	CAL000040193	CUSTOM WOOD FINISHING	2311 ADELINE STREET	OAKLAND	GEN
101	CAD071692016	ZERO WASTE SYSTEMS INC	2928 POPLAR ST	OAKLAND	GEN
101	CAD982512600	CHEMICALS FOR RESEARCH & IND	2928 POPLAR ST	OAKLAND	GEN
102	CAD981382559	EAST BAY MUNICIPAL UTIL DIST	1200 21ST ST	OAKLAND	GEN
102	CAD982474652	DHARMA ENTRPRISES	1241 21ST STREET	OAKLAND	GEN
104	CAD981443245	EAST BAY FORD TRUCK	333 FIBERT ST	OAKLAND	GEN
110	CAD006910053	OAKLAND SCAVENGER CO	2601 PERALTA ST	OAKLAND	GEN
110	CAD981448244	OAKLAND SCAVENGER CO	2601 PERALTA ST	OAKLAND\	GEN

* See "Key to Terms" on last page of report for definition

HWIS continued...

MAP ID NO.	EPA NO.	FACILITY NAME	ADDRESS	CITY	GEN/TSD*
112	CAD982029084	CALTRANS DISTRICT 4	3465 ETTIE ST	OAKLAND	GEN
113	CAD982522583	KALMARAC OF OAKLAND INC	2792 CYPRESS STREET	OAKLAND	GEN
115	CAL000016133	NABISCO FOODS	1267 14TH STREET	OAKLAND	GEN
115	CAL000016464	COMMAIR MECHANICAL SERVICES CO	1266-14TH STREET	OAKLAND	GEN
124	CAD982475410	COCA COLA BOTTLING OAKLAND	1340 CYPRESS STREET	OAKLAND	GEN
128	CAD981967391	ARMORED TRANSPORT	1333 8TH ST	OAKLAND	GEN
131	CAL000063548	K S CUSTOM WOODS	2200 WOOD ST	OAKLAND	GEN
132	CAD009108861	ACME GALVANIZING CO#	1655 17TH ST	OAKLAND	GEN
134	CAD009122912	BASF CORPORATION , INMONT DIVISION	1545 WILLOW ST	OAKLAND	GEN

* See "Key to Terms" on last page of report for definition

SOLID WASTE INFORMATION SYSTEM (SWIS)

The information presented in this report is updated to January, 1992.

The California Integrated Waste Management Board maintains an inventory list of both open as well as closed and inactive solid waste disposal facilities and transfer stations pursuant to the Solid Waste Management and Resource Recovery Act of 1972, Government Code Section 2. 66790(b). Generally, the California Integrated Waste Management Board learns of locations of disposal facilities through permit applications and from local enforcement agencies. Since 1977, the SWIS system has grown to track over 1000 solid waste disposal facilities and transfer stations in the State of California.

MAP ID NO.	SWIS ID	FACILITY NAME	ADDRESS	CITY	OPERATIONAL STATUS	WASTE RECEIVED	TONS/DAY

As of the date listed above, no sites listed in this database are located within a one mile radius of the subject property.

See "Key to Terms" on last page of report for definition

LEAKING UNDERGROUND STORAGE TANKS (LUST)

The information presented in this report is updated to:

Region 1 - October 1992: North Coast

Region 2 - January 1993: San Francisco Bay Area

Region 3 - December 1992 : Central Coast

Region 4 - January 1993 : Greater Los Angeles Area

Region 5 - October 1992 : Central Valley

Region 6 - November 1992 : Lahontan Area

Region 7 - October 1992 : Colorado River Basin

Region 8 - October 1992: Santa Ana Area

Region 9 - November 1992 : Greater San Diego Area

The California State Water Resources Control Board, in cooperation with the Office of Emergency Services, compiles lists of all leaks of hazardous substances from underground storage tanks in the State of California pursuant to Section 25295 (b) of the Health and Safety Code. The nine regional boards maintain information on all reported leak cases within their jurisdiction, both for those where the regional board and where other local agencies take the lead in overseeing investigations and remedial actions. Although the data reported here represents sites where at least one leak is known to have occurred, it is not uncommon for more than one tank to have leaked at a given site or cleanup case. The total number of cases reported statewide is over 5,900.

MAP ID NO.	FACILITY	ADDRESS	CITY	ZIP	SUBSTANCE*	GALLONS LOST	CASE TYPE*	STATUS*	REMEDIAL ACTION CODE*
1	CHEVRON	210 GRAND AVE	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
3	BILL COX CADILLAC	30 BAY PLACE	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
5	PERFORMANCE ASSOCIATES	255 27TH ST	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
6	MASRI PROPERTY	290 27TH ST	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
8	LAKE MERRITT TOWERS II	2100 HARRISON ST	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
9	EUROPEAN MOTORS	2915 BROADWAY	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
11	BROADWAY MEDICAL PLAZA	3300 WEBSTER ST	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
11	MERRITT HOSPITAL CARD PULM BDG	365 HAWTHORNE ST	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
12	BROADWAY VOLKSWAGON	2740 BROADWAY	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
12	TRACY BUICK	2735 BROADWAY	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
13	THE TRIBUNE	2302 VALDEZ ST	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
14	POWLEN PROPERTY	2939 SUMMIT ST	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A

* See "Key to Terms" on last page of report for definition

LUST continued...

MAP ID NO.	FACILITY	ADDRESS	CITY	ZIP	SUBSTANCE	GALLONS LOST	CASE TYPE*	STATUS*	REMEDIAL ACTION CODE*
18	NEGHERBON LINCOLN MERCURY	2345 BROADWAY	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
21	CALIFORNIA HIGHWAY PATROL OAKL	3601 TELEGRAPH AVE	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
23	CHEVRON	1633 HARRISON ST	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
25	UNITED GLASS	477 25TH ST	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
26	KAISER REGIONAL PARKING	1901 FRANKLIN ST	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
26	PG&E	1919 WEBSTER ST	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
27	LAURENCE ORTHOPEDIC PROPERTY	3045 TELEGRAPH AVE	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
28	HARRISON STREET GARAGE	1432 HARRISON ST	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
29	SHELL	2800 TELEGRAPH AVE	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
32	CHEVRON	301 14TH ST	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
34	DAVE'S COMPLETE AUTO SERVICE	2250 TELEGRAPH AVE	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
34	TEXACO/EXXON	2225 TELEGRAPH AVE	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
35	CHEVRON	1911 TELEGRAPH AVE	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
38	ARCO	731 MACARTHUR BLVD W	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
39	R.D. MINER CO.	750 37TH ST	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
40	CHINATOWN REDEVELOPMENT PROJ.	11TH & WEBSTER	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
41	MOSTLY MUSTANGS	2576 MARTIN LUTHER KING	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
44	OAKLAND CITY HALL	1 CITY HALL PLAZA	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
45	BRAMALEA PACIFIC	1111 BROADWAY	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
47	FIVE CITY CENTER	1300 CLAY ST	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
47	OAKLAND FEDERAL BUILDING	1305 CLAY ST	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A

* See "Key to Terms" on last page of report for definition

MAP ID NO.	FACILITY	ADDRESS	CITY	ZIP	SUBSTANCE	GALLONS LOST	CASE TYPE*	STATUS*	REMEDIAL ACTION CODE*
48	CITY OF OAKLAND	1417 CLAY ST	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
49	GREYHOUND BUS LINES TERMINAL	2103 SAN PABLO AVE	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
50	SHELL	461 8TH ST	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
52	BLUE PRINT SERVICE COMPANY	1700 JEFFERSON ST	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
52	OAKLAND COMMUNITY DEVELOPMENT	690 15TH ST	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
53	BRAMALEA PACIFIC	12TH & CLAY	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
56	BRAMALEA PACIFIC	13TH & JEFFERSON ST	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
59	CHEVRON	850 GRAND AVE W	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
59	FYNE PROPERTY	774 GRAND AVE W	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
59	MEADERS DRY CLEANING	800 GRAND AVE W	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
60	OAKLAND REDEVELOPMENT AGENCY	1330 MARTIN LUTHER KING	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
61	LOOMIS ARMORED INC	936 BROCKHURST ST	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
62	BRAMALEA USA INC	901-999 JEFFERSON ST	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
64	PARKING STRUCTURE	7TH & JEFFERSON ST	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
65	SHELL	3420 SAN PABLO AVE	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
66	ARATEX SERVICES	958 28TH ST	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
67	THRIFTY OIL	3400 SAN PABLO AVE	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
68	ARCO	889 GRAND AVE W	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
69	CALIFORNIA HOTEL	3501 SAN PABLO AVE	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
72	OAKLAND POWER PLANT	50 MARTIN LUTHER KING	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
72	PG&E POWER PLANT	510 MARTIN LUTHER KING W	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A

* See "Key to Terms" on last page of report for definition

LUST continued...

MAP ID NO.	FACILITY	ADDRESS	CITY	ZIP	SUBSTANCE	GALLONS LOST	CASE TYPE *	STATUS *	REMEDIAL ACTION CODE *
72	TEXACO	424 MARTIN LUTHER KING	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
73	CITY OF PARIS CLEANERS	3516 ADELINE ST	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
74	CAL-WEST PERIODICALS	2400 FILBERT ST	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
78	J & R USED AUTO PARTS	823 12TH ST E	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
79	GREYHOUND	7TH & BUSH	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
81	GUARANTEE FORKLIFT	699 4TH ST	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
83	BELOUS PROPERTY	3423 HARLAN	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
89	DRAYAGE PROPERTY	1350 34TH ST	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
91	MARINE TERMINALS CORP	333 MARKET ST	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
93	COLLINS PROPERTY	2452 MAGNOLIA ST	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
95	ALBERT JOHN PLUTE CO	1229 28TH ST	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
97	GUITON CHARTER BUSES	3421 HOLLIS ST	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
99	JOSEPHIAN ESTATE	2311 MAGNOLIA ST	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
99	NED CLYDE CONSTRUCTION	2311 ADELINE ST	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
102	EBMUD	2127 ADELINE ST	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
104	EAST BAY FORD TRUCK	333 FILBERT ST	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
106	CUSTOM ALLOY SCRAP SALES INC	2730 PERALTA ST	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
107	J.H. FITZMAURICE	2857 HANNAH ST	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
108	GARDINER PROPERTY	1920 UNION ST	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
109	CLARKE & CRAMER INC	2500 KIRKHAM ST	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
110	C.E. TOLAND & SON	2635 PERALTA ST	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
110	OAKLAND SCAVENGER	2601 PERALTA ST	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A

* See "Key to Terms" on last page of report for definition

LUST continued...

MAP ID NO.	FACILITY	ADDRESS	CITY	ZIP	SUBSTANCE	GALLONS LOST	CASE TYPE*	STATUS*	REMEDIAL ACTION CODE*
112	SHIREK ESTATE	3425 ETTIE ST	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
112	TULLOCH CONSTRUCTION	3428 ETTIE ST	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
113	KALMAR AC	2792 CYPRESS ST	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
115	CARNATION DAIRY FACILITY	1310 14TH ST	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
115	NABISCO BRANDS INC	1267 14TH ST	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
116	WAREHAM PROPERTY	2855 CYPRESS ST	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
117	KANTOR'S FURNITURE	2525 CYPRESS ST	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
118	CITY OF OAKLAND HOUSING AUTH	935 UNION ST	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
120	PG&E	2121 PERALTA ST	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
123	PACIFIC SUPPLY	1735 24TH ST	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
124	COCA-COLA ENTERPRISES WEST	1340 CYPRESS ST	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
124	DALVIN PAINT	1401 14TH ST	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
125	CADEMARTORI TRUCKING	1833 PERALTA ST	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
126	ROBIDEAUX PROPERTY	1700 GRAND AVE W	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
126	ZELLERBACH OAKLAND FACILITY	2230 WILLOW ST	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
133	DOYLE PROPERTY	1518 12TH ST	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A
134	BASF CORPORATION	1545 WILLOW ST	OAKLAND	N/A	N/A	N/A	N/A	N/A	N/A

* See "Key to Terms" on last page of report for definition

KEY TO TERMS/ABBREVIATIONS USED IN THIS REPORT:

N/A: An entry having "N/A" in a field indicates no information is available at this time.

CERCLIS:

* *EVENT TYPE* - Evaluation and disposition information:

AR = Administrative Record
AS = Aerial Survey
CO = Combined RI/SI
CR = Remedial Community Relations
CT = Community Relations Technical Assistance
DA = Design Assistance
DS = Discovery
ED = Endangerment Assessment
EO = EDD
ER = Expedited Response Action
ES = Expanded Site Inspection
EV = Evacuation State/Local
FM = Forward Planning/Management Assistance
FP = Forward Planning Activity
(for Historical Purposes only)
FS = Feasibility Study
(Primarily for Historical Purposes)
GS = Geophysical Support/Mapping
HA = Health Assessment
HR = Final Hazard Ranking Determined
IM = Initial Remedial Measure
IR = Immediate Removal
LA = Long-Term Response
LR = Long-Term Response
MA = Management Assistance
NA = NAA
ND = NPL Deletion Process
NF = Final Listing on NPL
NP = Proposal to NPL
NR = Removed from Proposed NPL
OH = Other Event
OM = Operations and Maintenance
OS = Oversight of State by Fund
PA = Preliminary Assessment
PD = Public Comments on Deletion Package
PR = Planned Removal
RA = Remedial Action
RC = Removal Community Relations
RD = Remedial Design
RI = Remedial Investigation
(Primarily for Historical Purposes)
RM = RAMP -- Remedial Action Master Plan
(for Historical Purposes only)
RO = ROD
RS = Removal Investigation
RV = Removal Action
SE = Site Access
SI = Site Inspection
TA = Technical Assistance
TG = Community Relations Technical Assistance
TO = Topographical Mapping
TR = Temporary Relocation
UR = Underground Storage Tank Removal
WP = RI/FS Workplan Approved by HQ
Z_ = (For Internal Office Use only)

* *EVENT QUALIFIER* - Actual or anticipated actions and priorities:

C = Clean up.
D = Deferred.
E = Administrative record compilation / remedial event.
G = Recommended for HRS scoring.
H = Higher priority.
L = Lower priority.
M = Medium priority.
N = No further remedial action planned.
S = Stabilization.
U = Unknown.
V = Administrative record compilation / removal event.

* *REGIONAL UTILITY DESCRIPTION* - Provides information developed by U.S. EPA's regional office about the nature of contamination at a specific site.

NPL:

* *SITE DESCRIPTION* - Provides a brief explanation of the contaminants and circumstances of a particular site.

AWP (FORMERLY BEP):

* *SITE INFORMATION* - Provides a brief description of the hazardous wastes on the site, the potential threat to public health and the status of the site.

CAL-SITES (FORMERLY ASPIS):

* *STATUS CODE* - Indicates the current status of a site and whether it is scheduled for further investigation by DHS Toxic Substances Control Division.

"AWP"	"Annual Workplan" - in remediation.
"BKLG"	"Backlog" - potential AWP site which has been hazard ranked but which is not on the annual workplan.
"CERT"	"Certified" - has been remediated.
"CNTY"	"County lead site" - not a candidate for the annual workplan and the local county has the lead.
"COM"	"Certified Operation and Maintenance" - has been certified but is still in operation and maintenance.
"DLIST"	"Delisted" - taken off the AWP usually for administrative reasons, for example: if several sites are consolidated, the old sites could be given this status.
"EPA"	"EPA lead" - not on the NPL, yet EPA has assumed the lead.
"HRR"	"Hazard Ranking Required" - has had a Preliminary Endangerment Assessment or equivalent evaluation and needs to be hazard ranked.
"NFA"	"No Further Action" - based on the information available on the site's potential to threaten public health and/or the environment, DTSC staff have judged this site to require no further departmental action.
"OAL"	"Other Agency Lead" - not on the AWP and has a lead agency other than the county, the RWQCB, EPA, or RCRA.
"PEARH"	"Preliminary Endangerment Assessment Required, High priority" - judged by DTSC staff to have a high probability of posing a public health or environmental threat.
"PEARL"	"Preliminary Endangerment Assessment Required, Low priority".
"PEARM"	"Preliminary Endangerment Assessment Required, Medium priority".
"PRP"	"Potential Responsible Party search required" - not on the AWP but needs a PRP search, after which would normally receive a ranking of AWP or BKLG.
"RCRA"	"Resource Conservation and Recovery Act" lead - is being mitigated under the Permitting Program and has never been on the AWP or BEP.
"REFRC"	"Referred to RCRA" - has been on the AWP or BEP in the past and is being mitigated under the lead of the permitting program.
"REFRW"	"Referred to RWRQCB" - formerly on the AWP or BEP and is now being mitigated under the lead of the Regional Water Quality Control Board.
"RWQCB"	"Referred to RWQCB" - has never been on the AWP or BEP; is being mitigated under the lead of the RWQCB.
"SSR"	Site Screen Required. The site requires initial screening.

HWIS:

* GEN/TSD - Indicates whether the listed facility is a generator of hazardous waste or is a treatment, storage or disposal facility.

LUST:

* SUBSTANCE CODES

MOTOR OIL = 08
BOILER FUEL = 09
#6 FUEL OIL = 10
HEATER FUEL = 12
SOLVENTS = 13
HYDRAULIC OIL = 14
WASTE WATER = 32
MINERAL SPIRITS = 41
PAINT THINNER = 49
OIL\GREASE WASTE = 51
DRY CLEANING SOLVENT = 52
WATER\WASTE OIL MIX = 61
LUBRICATING OIL = 71
HYDROCARBONS = 76
COOLANT = 77
ALIPHATIC HYDROCARBONS = 78
TRANSMISSION FLUID = 80
LACQUER THINNER = 84
NAPTHA DISTILLATE = 101
V,M&P NAPTHA = 116
CUTTING OIL = 122
#5 FUEL OIL = 127
CHLORINATED HYDROCARBONS = 142
FREON = 171
ALCOHOL = 172
UNLEADED GASOLINE = 12031
REGULAR GASOLINE = 12032
PREMIUM GASOLINE = 12033
DIESEL = 12034
WASTE OIL = 12035
MISC. VEHICLE FUEL = 12036
CYANIDES, SALTS = 57125
ETHYL ALCOLHOL = 64175
ACETIC ACID = 64197
METHYL ALCOLHOL = 67561
ISOPROPYL ALCOHOL = 67630
ACETONE = 67641
BENZENE = 71432
METHYLENE CHLORIDE = 75092
METHYL ETHYL KETONES = 78933
TCE = 79016
PSEUDODOCUMENE = 95636
XYLENE = 106423
ETHYLENE DICHLORIDE = 107062
TOLUENE = 108883
TETRAHYDROFURAN = 109999
PERCHLORETHYLENE = 127184
DINITROTOLUENES = 610399
NICKEL OXIDE = 1313991
PCB = 1336363
LEAD = 7439921
NICKEL = 7440020
COPPER = 7440508
CRUDE OIL (HAZ.) = 8002059
GASOLINE = 8006619
COAL TAR = 8007452
KEROSENE = 8008206
STODDARD SOLVENTS = 8052413
ASPHALT = 8052424
POLYESTER RESIN = 25037665

* CASE TYPE CODES

D - One or more domestic or municipal supply wells have been contaminated.
G - Ground water has been affected.
S - Only soil has been affected.
U - The type of resources affected or extent of the resources affected are not known.

* STATUS CODES

C Remedial action (cleanup) in progress.

O No Action
No action has been taken by the responsible party after the initial report of the leak.

1 Leak Being Confirmed
A leak is suspected at a site, includes inspection of the excavation, and tank and appurtenant plumbing to determine existence of leak.

3A Preliminary Site Assessment Workplan Submitted
A workplan\proposal has been requested of, or submitted by, the responsible party in order to determine whether groundwater has been, or will be, impacted as a result of a release from any underground tanks or associated piping.

3B Preliminary Site Assessment Underway
Implementation of a workplan addressing the above described tasks.

5C Pollution Characterization
Responsible party is in the process of installing additional monitoring wells and\or borings in order to fully define the lateral and vertical extent of contamination in soil and ground water and assess the Hydrogeology of the area. This phase of work may also include performing aquifer tests, soil gas surveys, continued ground water gradient determinations and monitoring, assessing impacts of surface and\or ground water.

5R Remediation plan
A remediation plan has been submitted evaluating long term remediation options. A proposal and implementation schedule for an appropriate remediation option has also beeen submitted. This phase of work may also include preparing and submitting the necessary information for any permits needed prior to implementation of the plan (NPDES or WDR).

7 Remedial Action
Implementation of corrective action plan.

8 Post Remedial Action Monitoring
Periodic ground water or other monitoring at the site, as necessary, in order to verify and/or evalutate the effectiveness of remedial activities.

9 Case Closed
The Regional Board and the Local Agency are in concurrence that no further work is necessary at the site. (9L: Closed by county. 9R: Closed by RWQCB.)

10 Cease and Abate Order

* REMEDIAL ACTION CODES

CB Containment Barrier -- install vertical dike to block horizontal movement of contaminant.
CD Cap Site -- install horizontal impermeable layer to reduce rainfall infiltration.
ED Excavate and Dispose -- remove contaminated soil and dispose in approved site.
ET Excavate and Treat -- remove contaminated soil and treat (includes spreading or land farming).
FP Remove Free Product -- remove floating product from water table.
GT Pump and Treat Ground Water -- generally employed to remove dissolved contaminants.
HU Treatment at Hookup -- install water treatment devices at each dwelling or other place of use.
IT Enhanced Biodegradation -- use of any available technology to promote bacterial decomposition of contaminants.
NA No Action Required -- incident is minor, requiring no remedial action.
NT No Action Taken -- no indication that action was taken.
RS Replace Supply -- provide alternative water supply to affected parties.
UK Unknown -- action not known, or unknown if action taken.
VE Vapor Extraction
VS,VT Vent Soil -- bore holes in soil to allow volatilization of contaminants.

COUNTY:

Class I	Hazardous Materials Accepted (No Radioactivity)	
Class II	Mixed Municipal rubbish	
Class III	Solid waste (concrete)	Type DB Debris Basin
Class LV	Large Volume transfer station	Type LF Landfill
Class SV	Small Volume transfer station	Type TS Transfer Station

NOTE: ALL DESIGNATIONS ARE SUBJECT TO CHANGE.

Index to Map Id Numbers

Map Id Nmbr	Agency Name	Site Name	Street Address	City	ZIP
1	CORTESE	CHEVRON STATION #90019	210 GRAND AVE	OAKLAND	00000
1	CORTESE	CHEVRON STATION #90019	210 GRAND AVE	OAKLAND	00000
1	CORTESE	CHEVRON	210 GRAND AVE	OAKLAND	00000
1	HWIS	CHEVRON STATION #90019	210 GRAND AVENUE	OAKLAND	N/A
1	LUST	CHEVRON	210 GRAND AVE	OAKLAND	N/A
2	HWIS	DOWNTOWN AUTO BODY & FRAME	260 30TH ST	OAKLAND	N/A
3	CORTESE	BILL COX CADILLAC	30 BAY PL	OAKLAND	94604
3	LUST	BILL COX CADILLAC	30 BAY PLACE	OAKLAND	N/A
3	HWIS	PAT PATERSON CADILLAC	230 BAY PLACE	OAKLAND	N/A
3	HWIS	PAT PATERSON CADILLAC	230 BAY PLACE	OAKLAND	N/A
4	HWIS	ROGERS AUTOWORKS	3022 BROADWAY	OAKLAND	N/A
5	CORTESE	OAKLAND ACURA	255 27TH ST	OAKLAND	94528
5	CORTESE	PERFORMANCE ASSOCIATES	255 27TH ST	OAKLAND	94528
5	LUST	PERFORMANCE ASSOCIATES	255 27TH ST	OAKLAND	N/A
6	CORTESE	MARTIN JOHNSON PORCHE	290 27TH ST	OAKLAND	94612
6	CORTESE	MARTIN JOHNSON AUDI PORSCHE	290 27TH ST	OAKLAND	94612
6	CORTESE	MASRI PROPERTY	290 27TH ST	OAKLAND	94612
6	LUST	MASRI PROPERTY	290 27TH ST	OAKLAND	N/A
6	HWIS	CENTRAL RADIATOR SERVICE	297 27TH STREET	OAKLAND	N/A
7	HWIS	COOPERS AUTO BODY & FRAME	295 29TH ST	OAKLAND	N/A
8	CORTESE	LAKE MERRITT TOWERS II	2100 HARRISON ST	OAKLAND	94612
8	LUST	LAKE MERRITT TOWERS II	2100 HARRISON ST	OAKLAND	N/A
9	CORTESE	EUROPEAN MOTORS	2915 BROADWAY	OAKLAND	94611
9	CORTESE	EUROPEAN MOTORS	2915 BROADWAY	OAKLAND	94611
9	CORTESE	EUROPEAN MOTORS LTD	2915 BROADWAY	OAKLAND	94611
9	LUST	EUROPEAN MOTORS	2915 BROADWAY	OAKLAND	N/A
10	HWIS	AUTOMOTIVE EXCHANGE SERVICE INC	288 28TH ST	OAKLAND	N/A
11	CASITES	SAMUEL MERRIT HOSPITAL (ALPINE LABS)	3300 WEBSTER STREET	OAKLAND	94609
11	CORTESE	SAMUEL MERRIT HOSPITAL (ALPINE	3300 WEBSTER ST	OAKLAND	94609
11	CORTESE	BROADWAY MEDICAL PLAZA	3300 WEBSTER ST	OAKLAND	94609
11	HWIS	SAMUEL MERRITT HOSPITAL	HAWTHORNE & WEBSTER	OAKLAND	N/A
11	LUST	BROADWAY MEDICAL PLAZA	3300 WEBSTER ST	OAKLAND	N/A
11	CORTESE	MERRITT HOSPITAL CARD PULM BDG	365 HAWTHORNE ST	OAKLAND	94609
11	LUST	MERRITT HOSPITAL CARD PULM BDG	365 HAWTHORNE ST	OAKLAND	N/A
12	CORTESE	BROADWAY VW	2740 BROADWAY	OAKLAND	94612
12	CORTESE	JOHNSTON PACIFIC CO. INC.	2740 BROADWAY	OAKLAND	94612
12	CORTESE	BROADWAY VOLKSWAGON	2740 BROADWAY	OAKLAND	94612

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Map Id Nmbr	Agency Name	Site Name	Street Address	City	ZIP
12	HWIS	BROADWAY VW	2740 BROADWAY	OAKLAND	N/A
12	LUST	BROADWAY VOLKSWAGON	2740 BROADWAY	OAKLAND	N/A
12	CORTESE	JACK TRACY BUICK	2735 BROADWAY	OAKLAND	00000
12	CORTESE	OAKLAND DODGE INC	2735 BROADWAY	OAKLAND	00000
12	CORTESE	TRACY BUICK	2735 BROADWAY	OAKLAND	00000
12	CORTESE	TRACY BUICK INC.	2735 BROADWAY	OAKLAND	00000
12	LUST	TRACY BUICK	2735 BROADWAY	OAKLAND	N/A
13	CORTESE	THE TRIBUNE	2302 VALDEZ ST	OAKLAND	94612
13	LUST	THE TRIBUNE	2302 VALDEZ ST	OAKLAND	N/A
14	CASITES	INSTITUTE OF FORENSIC SCIENCE CRIM L	2945 WEBSTER STREET	OAKLAND	94609
14	CASITES	HISTONEK LABORATORY	2940 SUMMIT STREET	OAKLAND	94609
14	HWIS	HISTOPATHOLOGY REFERENCE LAB	2940 SUMMIT ST 2ND FLOOR	OAKLAND	N/A
14	LUST	POWLEN PROPERTY	2939 SUMMIT ST	OAKLAND	N/A
15	CASITES	ENDOCRINE METABOLIC CENTER	3100 SUMMIT STREET	OAKLAND	94610
15	HWIS	PROVIDENCE HOSPITAL	3100 SUMMIT ST	OAKLAND	N/A
16	HWIS	ATLANTIC GARAGE	2500 WEBSTER ST	OAKLAND	N/A
17	HWIS	WORLD SAVINGS & LOAN	1901 HARRISON ST	OAKLAND	N/A
18	HWIS	FOREIGN BODY SHOP	2350 WEBSTER ST	OAKLAND	N/A
18	CORTESE	NEGERBON AUTO CENTER	2345 BROADWAY	OAKLAND	00000
18	CORTESE	NEGHERBON LINCON MERCURY	2345 BROADWAY	OAKLAND	00000
18	LUST	NEGHERBON LINCOLN MERCURY	2345 BROADWAY	OAKLAND	N/A
19	HWIS	ICF KAISER ENGINEERS INC	1800 HARRISON STREET	OAKLAND	N/A
20	HWIS	PERALTA HOSPITAL	450 30TH ST	OAKLAND	N/A
21	CORTESE	OAKLAND CHP	3601 TELEGRAPH AVE	OAKLAND	94609
21	CORTESE	CALIFORNIA HIGHWAY PATROL	3601 TELEGRAPH AVE	OAKLAND	94609
21	CORTESE	CALIFORNIA HIGHWAY PATROL OAKL	3601 TELEGRAPH AVE	OAKLAND	94609
21	CORTESE	CALIFORNIA HIGHWAY PATROL	3601 TELEGRAPH AVE	OAKLAND	94609
21	LUST	CALIFORNIA HIGHWAY PATROL OAKL	3601 TELEGRAPH AVE	OAKLAND	N/A
22	HWIS	CHEVRON STATION #90020	17TH & HARRISON	OAKLAND	N/A
23	CORTESE	CHEVRON	1633 HARRISON ST	OAKLAND	00000
23	LUST	CHEVRON	1633 HARRISON ST	OAKLAND	N/A
24	CASITES	MODEL UPHOLSTERING SHOP	3315 TELEGRAPH	OAKLAND	94612
25	HWIS	BROADWAY MOTORS	437 25TH ST	OAKLAND	N/A
25	LUST	UNITED GLASS	477 25TH ST	OAKLAND	N/A

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Map Id Nmbr	Agency Name	Site Name	Street Address	City	ZIP
26	CORTESE	PG & E EAST BAY REGION	1919 WEBSTER ST	OAKLAND	94612
26	CORTESE	PG&E	1919 WEBSTER ST	OAKLAND	94612
26	LUST	PG&E	1919 WEBSTER ST	OAKLAND	N/A
26	HWIS	KAISER FNDN HLTH PLAN OFC BLDG	1950 FRANKLIN ST	OAKLAND	N/A
26	CASITES	C & G DENTAL X-RAY	1904 FRANKLIN STREET, #802	OAKLAND	94612
26	CORTESE	KAISER REGIONAL PARKING	1901 FRANKLIN ST	OAKLAND	94612
26	LUST	KAISER REGIONAL PARKING	1901 FRANKLIN ST	OAKLAND	N/A
27	CORTESE	LAURENCE ORTHOPEDIC PROPERTY	3045 TELEGRAPH AVE	OAKLAND	94609
27	LUST	LAURENCE ORTHOPEDIC PROPERTY	3045 TELEGRAPH AVE	OAKLAND	N/A
28	CORTESE	ROYS AUTO BODY	1432 HARRISON ST	OAKLAND	94612
28	CORTESE	HARRISON STREET GARAGE	1432 HARRISON ST	OAKLAND	94612
28	HWIS	ROYS AUTO BODY	1432 HARRISON ST	OAKLAND	N/A
28	LUST	HARRISON STREET GARAGE	1432 HARRISON ST	OAKLAND	N/A
29	CORTESE	SHELL	2800 TELEGRAPH AVE	OAKLAND	00000
29	CORTESE	PILL HILL SHELL	2800 TELEGRAPH AVE	OAKLAND	00000
29	LUST	SHELL	2800 TELEGRAPH AVE	OAKLAND	N/A
29	HWIS	SHELL STATION #204-5508-2303	2800 TELEGRAPH/28TH	OAKLAND	N/A
30	HWIS	HANZEL AUTO BODY WORKS	456 23RD ST	OAKLAND	N/A
31	CASITES	EAST BAY BLUEPRINT SUPPLY COMPANY	1742 FRANKLIN	OAKLAND	94612
32	CORTESE	CHEVRON STATION #94816	301 14TH ST	OAKLAND	94612
32	CORTESE	CHEVRON	301 14TH ST	OAKLAND	94612
32	HWIS	CHEVRON STATION #94816	301 14TH STREET	OAKLAND	N/A
32	LUST	CHEVRON	301 14TH ST	OAKLAND	N/A
32	CASITES	BARNDOLLAR LETTER SERVICE	325 13TH STREET	OAKLAND	94601
32	CASITES	LAXAS SEWING COMPANY	337 13TH STREET	OAKLAND	94612
33	HWIS	PACIFIC TELEPHONE AND TELEGRAPH CO	1587 FRANKLIN STREET	OAKLAND	N/A
34	CORTESE	DAVES COMPLETE AUTO SERVICE	2250 TELEGRAPH AVE	OAKLAND	94602
34	CORTESE	DAVES COMPLETE AUTO	2250 TELEGRAPH AVE	OAKLAND	94602
34	CORTESE	UNOCAL SVC STA #1110	2250 TELEGRAPH AVE	OAKLAND	94602
34	CORTESE	DAVE'S COMPLETE AUTO SVC	2250 TELEGRAPH AVE	OAKLAND	94602
34	CORTESE	DAVE'S COMPLETE AUTO SERVICE	2250 TELEGRAPH AVE	OAKLAND	94602
34	CORTESE	TONY'S BEACON STATION	2250 TELEGRAPH AVE	OAKLAND	94602
34	LUST	DAVE'S COMPLETE AUTO SERVICE	2250 TELEGRAPH AVE	OAKLAND	N/A
34	CORTESE	TEXACO/EXXON	2225 TELEGRAPH	OAKLAND	91802
34	CORTESE	TEXACO	2225 TELEGRAPH	OAKLAND	91802
34	CORTESE	TELEGRAPH AUTO REPAIR	2225 TELEGRAPH	OAKLAND	91802
34	CORTESE	EXXON COMPANY USA #70235	2225 TELEGRAPH	OAKLAND	91802
34	HWIS	EXXON COMPANY USA #70235	2225 TELEGRAPH	OAKLAND	N/A
34	LUST	TEXACO/EXXON	2225 TELEGRAPH AVE	OAKLAND	N/A
35	CORTESE	CHEVRON	1911 TELEGRAPH AVE	OAKLAND	95050

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35	LUST	CHEVRON	1911 TELEGRAPH AVE	OAKLAND	N/A
35	HWIS	EMPO CAP GOODYEAR AUTO SERVICE	1901 TELEGRAPH AVENUE	OAKLAND	N/A
36	HWIS	MIRACLE AUTO PAINTING	575 W GRAND AVE	OAKLAND	N/A
37	CASITES	ART WEEKS INC	1305 FRANKLIN STREET	OAKLAND	94612
38	HWIS	ARCO PRODUCTS CO FAC 4931	731 W MACARTHUR BLVD	OAKLAND	N/A
38	CORTESE	ARCO PRODUCTS CO FAC 4931	731 MACARTHUR ST W.	OAKLAND	94610
38	CORTESE	ARCO	731 MACARTHUR ST W.	OAKLAND	94610
38	LUST	ARCO	731 MACARTHUR BLVD W	OAKLAND	N/A
39	CASITES	R J S ENTERPRISES	675 37TH STREET	OAKLAND	94609
39	CORTESE	R.D. MINER CO.	750 37TH ST	OAKLAND	00000
39	LUST	R.D. MINER CO.	750 37TH ST	OAKLAND	N/A
40	CORTESE	CHINATOWN REDEVELOPMENT PROJ.	11 WEBSTER	OAKLAND	00000
40	LUST	CHINATOWN REDEVELOPMENT PROJ.	11TH & WEBSTER	OAKLAND	N/A
40	CASITES	CHINATOWN REDEVELOPMENT - OAKLAND	BOUNDED BY 11TH, 10TH,WEBSTER & FRAN	OAKLAND	94601
41	CORTESE	MOSTLY MUSTANGS	2576 MARTIN LUTHER KING	OAKLAND	94612
41	CORTESE	MOSTLY MUSTANGS	2576 MARTIN LUTHER KING	OAKLAND	94612
41	LUST	MOSTLY MUSTANGS	2576 MARTIN LUTHER KING	OAKLAND	N/A
42	CASITES	BATTE RESOURCES INTERNATIONAL	1221 BROADWAY	OAKLAND	94612
42	BZP	CLOROX COMPANY	1221 BROADWAY	OAKLAND	94612
43	HWIS	QUALITY BODY & FENDER	2510 MARTIN LUTHER KINGS WAY	OAKLAND	N/A
44	CORTESE	OAKLAND CITY HALL	1 CITY HALL PLAZA	OAKLAND	94612
44	LUST	OAKLAND CITY HALL	1 CITY HALL PLAZA	OAKLAND	N/A
45	CORTESE	BRAMALEA PACIFIC	1111 BROADWAY	OAKLAND	94607
45	LUST	BRAMALEA PACIFIC	1111 BROADWAY	OAKLAND	N/A
46	CASITES	OAKLAND LAUNDRY COMPANY	730 29TH STREET	OAKLAND	94609
47	HWIS	OAKLAND TRIBUNE INC	409 13TH ST	OAKLAND	N/A
47	CORTESE	FIVE CITY CENTER	1300 CLAY ST	OAKLAND	00000
47	LUST	FIVE CITY CENTER	1300 CLAY ST	OAKLAND	N/A
47	CORTESE	OAKLAND FEDERAL BUILDING	1305 CLAY ST	OAKLAND	94612
47	LUST	OAKLAND FEDERAL BUILDING	1305 CLAY ST	OAKLAND	N/A
48	CORTESE	CITY OF OAKLAND	1417 CLAY ST	OAKLAND	00000
48	LUST	CITY OF OAKLAND	1417 CLAY ST	OAKLAND	N/A
49	CORTESE	GREYHOUND BUS LINES TERMINAL	2103 SAN PABLO	OAKLAND	00000
49	LUST	GREYHOUND BUS LINES TERMINAL	2103 SAN PABLO AVE	OAKLAND	N/A

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Map Id Nmbr	Agency Name	Site Name	Street Address	City	ZIP
50	CORTESE	SHELL	461 8TH ST	OAKLAND	00000
50	LUST	SHELL	461 8TH ST	OAKLAND	N/A
51	CORTESE	BUDS BODY SHOP	1900 MARTIN LUTHER KING WAY	BERKELEY	00009
51	HWIS	BUDS BODY SHOP	1900 MARTIN LUTHER KING JR WAY	OAKLAND	N/A
52	CORTESE	BLUE PRINT SERVICE COMPANY	1700 JEFFERSON ST	OAKLAND	00000
52	CORTESE	BLUE PRINT SERVICE CO.	1700 JEFFERSON ST	OAKLAND	00000
52	LUST	BLUE PRINT SERVICE COMPANY	1700 JEFFERSON ST	OAKLAND	N/A
52	CASITES	CHAMPION COMPANY, THE	610 16TH STREET	OAKLAND	94612
52	CORTESE	OAKLAND COMMUNITY DEVELOPMENT	690 15TH ST	OAKLAND	94612
52	LUST	OAKLAND COMMUNITY DEVELOPMENT	690 15TH ST	OAKLAND	N/A
53	LUST	BRAMALEA PACIFIC	12TH & CLAY	OAKLAND	N/A
54	CASITES	MILLER PHOTO SCREEN SERVICE	2578 WEST STREET	OAKLAND	94612
55	CASITES	REPORTER PUBLISHING COMPANY	814 27TH STREET	OAKLAND	94607
56	LUST	BRAMALEA PACIFIC	13TH & JEFFERSON ST	OAKLAND	N/A
57	HWIS	CHEVRON STATION #94800	1700 CASTRO STREET	OAKLAND	N/A
58	CASITES	PACIFIC MARINE ELECTRONICS	3040 MARKET STREET	OAKLAND	94607
59	CORTESE	FYNE PROPERTY	774 GRAND AVE W	OAKLAND	94612
59	LUST	FYNE PROPERTY	774 GRAND AVE W	OAKLAND	N/A
59	LUST	MEADERS DRY CLEANING	800 GRAND AVE W	OAKLAND	N/A
59	CASITES	JOHN FREITAS UPHOLSTERING	807 WEST GRAND AVENUE	OAKLAND	94607
59	CASITES	WHITEY'S WELDING & STEEL FABRICATION	830 22ND STREET	OAKLAND	94607
59	CORTESE	CHEVRON	850 GRAND AVE W	OAKLAND	00000
59	CORTESE	91853	850 GRAND AVE W	OAKLAND	00000
59	HWIS	CHEVRON STATION #91853	850 W GRAND AVE	OAKLAND	N/A
59	LUST	CHEVRON	850 GRAND AVE W	OAKLAND	N/A
60	CORTESE	OAKLAND REDEVELOPMENT AGENCY	1330 MARTIN LUTHER KING JR WAY WAY	OAKLAND	94612
60	LUST	OAKLAND REDEVELOPMENT AGENCY	1330 MARTIN LUTHER KING	OAKLAND	N/A
61	CORTESE	LOOMIS ARMORED INC	936 BROCKHURST ST	OAKLAND	00000
61	CORTESE	LOOMIS ARMORED CAR SERVICES IN	936 BROCKHURST ST	OAKLAND	00000
61	LUST	LOOMIS ARMORED INC	936 BROCKHURST ST	OAKLAND	N/A
62	CORTESE	BRAMALEA USA INC	901-999 JEFFERSON ST	OAKLAND	94607
62	LUST	BRAMALEA USA INC	901-999 JEFFERSON ST	OAKLAND	N/A
63	CASITES	MOLDED FABRIC PRODUCTS	2605 MARKET STREET	OAKLAND	94607
64	LUST	PARKING STRUCTURE	7TH & JEFFERSON ST	OAKLAND	N/A

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65	CORTESE	SHELL	3420 SAN PABLO AVE	OAKLAND	00000
65	CORTESE	SAN PABLO AVE. SHELL	3420 SAN PABLO AVE	OAKLAND	00000
65	LUST	SHELL	3420 SAN PABLO AVE	OAKLAND	N/A
65	HWIS	SHELL STATION #204-5508-5306	3420 SAN PABLO AVE/35TH	OAKLAND	N/A
66	CORTESE	ARATEX SERVICES	958 28TH ST	OAKLAND	00000
66	LUST	ARATEX SERVICES	958 28TH ST	OAKLAND	N/A
67	CORTESE	THRIFTY OIL	3400 SAN PABLO AVE	OAKLAND	94608
67	CORTESE	THRIFTY OIL STN.#049	3400 SAN PABLO AVE	OAKLAND	94608
67	LUST	THRIFTY OIL	3400 SAN PABLO AVE	OAKLAND	N/A
67	HWIS	FRYER INDUSTRIES, INC.	1073 34TH STREET	OAKLAND	N/A
68	CORTESE	ARCO	889 GRAND AVE W	OAKLAND	94607
68	CORTESE	FALCON ENTERPRISES INC	889 GRAND AVE W	OAKLAND	94607
68	HWIS	ARCO PRODUCTS FACILITY 2169	889 W GRAND AVENUE	OAKLAND	N/A
68	LUST	ARCO	889 GRAND AVE W	OAKLAND	N/A
69	CORTESE	CALIFORNIA HOTEL	3501 SAN PABLO AVE	OAKLAND	94612
69	LUST	CALIFORNIA HOTEL	3501 SAN PABLO AVE	OAKLAND	N/A
70	CASITES	LINDEN LAUNDRY	3217 LINDEN STREET	OAKLAND	94607
71	HWIS	GMC TRUCK & COACH DIVISION	3800 SAN PABLO AVE	OAKLAND	N/A
72	LUST	TEXACO	424 MARTIN LUTHER KING	OAKLAND	N/A
72	CORTESE	PG&E POWER PLANT	510 MARTIN LUTHER KING	OAKLAND	00000
72	LUST	PG&E POWER PLANT	510 MARTIN LUTHER KING W	OAKLAND	N/A
72	CORTESE	TEXACO SERVICE STATION	424 MARTIN LUTHER BLVD	OAKLAND	94520
72	CORTESE	GROVES AUTO RPR	424 MARTIN LUTHER BLVD	OAKLAND	94520
72	LUST	OAKLAND POWER PLANT	50 MARTIN LUTHER KING	OAKLAND	N/A
73	CORTESE	CITY OF PARIS CLEANERS	3516 ADELINE ST	OAKLAND	94608
73	LUST	CITY OF PARIS CLEANERS	3516 ADELINE ST	OAKLAND	N/A
74	CORTESE	CAL WEST PERIODICALS	2400 FILBERT	OAKLAND	00000
74	CORTESE	CAL-WEST PERIODICALS	2400 FILBERT	OAKLAND	00000
74	LUST	CAL-WEST PERIODICALS	2400 FILBERT ST	OAKLAND	N/A
75	HWIS	A&H TRUCK REPAIR	1825 MARKET ST	OAKLAND	N/A
76	CASITES	CLASSIC ILLUMINATION, THE	431 GROVE STREET	OAKLAND	94609
77	CASITES	OAKLAND GRAPHICS	864 14TH STREET	OAKLAND	94612
78	CORTESE	J & R USED AUTO PARTS	823 12TH ST E	OAKLAND	94606
78	LUST	J & R USED AUTO PARTS	823 12TH ST E	OAKLAND	N/A
79	CERCLIS	FRANCIS PLATING OF OAKLAND INC	785 7TH ST	OAKLAND	94607

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Map Id Nmbr	Agency Name	Site Name	Street Address	City	ZIP
79	CORTESE	GREYHOUND	7 BUSH	OAKLAND	00000
79	LUST	GREYHOUND	7TH & BUSH	OAKLAND	N/A
80	HWIS	LENNYS AUTO BODY & PAINTING	3116 ADELINE	OAKLAND	N/A
81	CORTESE	GUARANTEE FORKLIFT INCORPORATE	699 4TH ST	OAKLAND	94807
81	CORTESE	GUARANTEE FORKLIFT INC	699 4TH ST	OAKLAND	94807
81	CORTESE	GUARANTEE FORKLIFT INC	699 4TH ST	OAKLAND	94807
81	CORTESE	GUARANTEE FORKLIFT	699 4TH ST	OAKLAND	94807
81	HWIS	GUARANTEE FORKLIFT INC	699 4TH ST	OAKLAND	N/A
81	LUST	GUARANTEE FORKLIFT	699 4TH ST	OAKLAND	N/A
81	HWIS	E-D COAT INC	715-21 FOURTH ST	OAKLAND	N/A
82	HWIS	SUPERIOR PRESS INC.	3031 ADELINE ST.	OAKLAND	N/A
83	CORTESE	BELOUS PROPERTY	3423 HARLAN	OAKLAND	00000
83	LUST	BELOUS PROPERTY	3423 HARLAN	OAKLAND	N/A
84	HWIS	MOALS BODY SHOP INC	937 E 12TH STREET	OAKLAND	N/A
85	HWIS	TESTING ENGINEERS, INC	2811 ADELINE ST	OAKLAND	N/A
86	CASITES	OAKLAND SHORT RUN TOOL & DIE	1201 32ND STREET	OAKLAND	94609
87	CASITES	POLYMERIC TECHNOLOGY	2329 CHESTNUT STREET	OAKLAND	94607
88	CASITES	CHAMBLAIN ENTERPRISES	1168 26TH STREET	OAKLAND	94607
89	CORTESE	DRAYAGE PROPERTY	1350 34TH ST	OAKLAND	94608
89	LUST	DRAYAGE PROPERTY	1350 34TH ST	OAKLAND	N/A
90	HWIS	ROMAK IRON WORKS	3250 HOLLIS STREET	OAKLAND	N/A
91	CERCLIS	SAFETY- KLEEN CORP 7-178-01	404 MARKET ST	OAKLAND	94607
91	CORTESE	SAFETY-KLEEN ROHNERT PARK	404 MARKET ST	OAKLAND	94607
91	CORTESE	SAFETY KLEEN CORP 7 178 01	404 MARKET ST	OAKLAND	94607
91	CORTESE	SAFETY-KLEEN CORP (7-178-01)	404 MARKET ST	OAKLAND	94607
91	CORTESE	SAFETY-KLEEN CORP.	404 MARKET ST	OAKLAND	94607
91	HWIS	SAFETY-KLEEN CORP (7-178-01)	404 MARKET ST	OAKLAND	N/A
91	HWIS	SAFETY-KLEEN CORP (7-178-01)	404 MARKET ST	OAKLAND	N/A
91	CORTESE	MARINE TERMINALS CORP	333 MARKET ST	OAKLAND	94607
91	LUST	MARINE TERMINALS CORP	333 MARKET ST	OAKLAND	N/A
92	CASITES	ENERGY GUARD SPA	2725 MAGNOLIA STREET	OAKLAND	94612
93	CORTESE	E-Z-EST PRODUCTS COMPANY	2528 ADELINE ST	OAKLAND	94578
93	CORTESE	E Z REST PRODUCTS	2528 ADELINE ST	OAKLAND	94578
93	CASITES	E-Z-EST PRODUCTS COMPANY	2528 ADELINE	OAKLAND	94607
93	CORTESE	COLLINS PROPERTY	2452 MAGNOLIA ST	OAKLAND	94607

Index to Map Id Numbers

Map Id Nmbr	Agency Name	Site Name	Street Address	City	ZIP
93	LUST	COLLINS PROPERTY	2452 MAGNOLIA ST	OAKLAND	N/A
94	HWIS	OAKLAND METAL PAINTING	2645 MAGNOLIA STREET	OAKLAND	N/A
95	CORTESE	ESQUIRE CLEANERS INC	1229 28TH ST	OAKLAND	00000
95	CORTESE	ALBERT JOHN PLUTE CO	1229 28TH ST	OAKLAND	00000
95	LUST	ALBERT JOHN PLUTE CO	1229 28TH ST	OAKLAND	N/A
96	CASITES	GELTZ MACHINERY COMPANY	2015 CHESTNUT STREET	OAKLAND	94607
96	HWIS	MELROSE NAME PLATE CO NO II#	1946 ADELINE ST	OAKLAND	N/A
97	CORTESE	GUITON INC	3421 HOLLIS ST	OAKLAND	94608
97	CORTESE	GUITON INC	3421 HOLLIS ST	OAKLAND	94608
97	CORTESE	GUITON CHARTER BUSES	3421 HOLLIS ST	OAKLAND	94608
97	LUST	GUITON CHARTER BUSES	3421 HOLLIS ST	OAKLAND	N/A
98	HWIS	MODERN MAIL SERVICES	2836 UNION ST	OAKLAND	N/A
99	CASITES	CUTOFF COMPANY	2324 ADELINE	OAKLAND	94607
99	CORTESE	CUSTOM WOOD FINISHING	2311 ADELINE ST	OAKLAND	00000
99	CORTESE	NED CLYDE CONSTRUCTION	2311 ADELINE ST	OAKLAND	00000
99	HWIS	CUSTOM WOOD FINISHING	2311 ADELINE STREET	OAKLAND	N/A
99	LUST	NED CLYDE CONSTRUCTION	2311 ADELINE ST	OAKLAND	N/A
99	HWIS	ARTESIAN WASTE OIL RECOVERY	2306 MAGNOLIA ST	OAKLAND	N/A
99	CORTESE	PACIFIC CRYOGENICS COMPANY	2311 MAGNOLIA ST	OAKLAND	94607
99	CORTESE	PACIFIC OXYGEN SALES COMPANY	2311 MAGNOLIA ST	OAKLAND	94607
99	CORTESE	JOSEPIAN ESTATE	2311 MAGNOLIA ST	OAKLAND	94607
99	LUST	JOSEPHIAN ESTATE	2311 MAGNOLIA ST	OAKLAND	N/A
100	CASITES	ZERO WASTE SYSTEMS INC	1450 32ND STREET	OAKLAND	94609
100	CERCLIS	ZERO WASTE SYSTS INC	1450 32ND ST	OAKLAND	94608
100	CORTESE	ZERO WASTE SYSTEMS INC	1450 32ND ST	OAKLAND	94609
100	CORTESE	ZERO WASTE SYSTEMS INC.	1450 32ND ST	OAKLAND	94609
100	CORTESE	ZERO WASTE SYSTEMS INC.	1450 32ND ST	OAKLAND	94609
101	HWIS	ZERO WASTE SYSTEMS INC	2928 POPLAR ST	OAKLAND	N/A
101	HWIS	CHEMICALS FOR RESEARCH & IND	2928 POPLAR ST	OAKLAND	N/A
102	CORTESE	EAST BAY MUNICIPAL UTILITY DIS	2127 ADELINE ST	OAKLAND	94623
102	CORTESE	EDMUD	2127 ADELINE ST	OAKLAND	94623
102	LUST	EBMUD	2127 ADELINE ST	OAKLAND	N/A
102	HWIS	EAST BAY MUNICIPAL UTIL DIST	1200 21ST ST	OAKLAND	N/A
102	CASITES	CLEO'S PRINTING	1241 21ST	OAKLAND	94607
102	HWIS	DHARMA ENTRPRISES	1241 21ST STREET	OAKLAND	N/A
103	CASITES	MASTER TRANSPORTATION	1451 34TH STREET	OAKLAND	94607
104	CORTESE	EAST BAY FORD TRUCK	333 FILBERT	OAKLAND	00000
104	HWIS	EAST BAY FORD TRUCK	333 FIBERT ST	OAKLAND	N/A

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Map Id Nmbr	Agency Name	Site Name	Street Address	City	ZIP
104	LUST	EAST BAY FORD TRUCK	333 FILBERT ST	OAKLAND	N/A
105	CERCLIS	DONCO INDUSTRIES	2401 UNION ST.	OAKLAND	94607
105	CASITES	INDUSTRIAL & FOUNDRY SUPPLY COMPANY	2401 POPLAR STREET	OAKLAND	94607
106	CASITES	INDUSTRIAL TURNING PROCESSES	2730 PERALTA STREET	OAKLAND	94607
106	CORTESE	INDUSTRIAL TURNING PROCESSES	2730 PERALTA ST	OAKLAND	94607
106	CORTESE	CUSTOM ALLOY SCRAP AND SALES I	2730 PERALTA ST	OAKLAND	94607
106	CORTESE	CUSTOM ALLOYS SCRAP SALES	2730 PERALTA ST	OAKLAND	94607
106	CORTESE	CUSTOM ALLOY SCRAP SALES INC	2730 PERALTA ST	OAKLAND	94607
106	LUST	CUSTOM ALLOY SCRAP SALES INC	2730 PERALTA ST	OAKLAND	N/A
107	CORTESE	J.H. FITZMAURICE	2857 HANNAH ST	OAKLAND	94608
107	LUST	J.H. FITZMAURICE	2857 HANNAH ST	OAKLAND	N/A
108	CASITES	ARCHITECTURAL CERAMICS	1940 UNION STREET	OAKLAND	94607
108	LUST	GARDINER PROPERTY	1920 UNION ST	OAKLAND	N/A
109	CORTESE	CLARKE & CRAMER INC	2500 KIRKHAM ST	OAKLAND	00000
109	LUST	CLARKE & CRAMER INC	2500 KIRKHAM ST	OAKLAND	N/A
110	CORTESE	C.E. TOLAND & SON	2635 PERALTA ST	OAKLAND	94623
110	CORTESE	OLD NEWARK PLANT	2635 PERALTA ST	OAKLAND	94623
110	LUST	C.E. TOLAND & SON	2635 PERALTA ST	OAKLAND	N/A
110	CASITES	BAY CITY DISPOSAL	2601 PERALTA BOULEVARD	OAKLAND	94607
110	HWIS	OAKLAND SCAVENGER CO	2601 PERALTA ST	OAKLAND	N/A
110	HWIS	OAKLAND SCAVENGER CO	2601 PERALTA ST	OAKLAND\	N/A
110	LUST	OAKLAND SCAVENGER	2601 PERALTA ST	OAKLAND	N/A
111	CASITES	MCDERMOTTLSEALY	1577 32ND STREET	OAKLAND	94609
112	CORTESE	TULLOCH CONSTRUCTION	3428 ETTIE ST	OAKLAND	00000
112	CORTESE	TULLUCH CONSTRUCTION	3428 ETTIE ST	OAKLAND	00000
112	LUST	TULLOCH CONSTRUCTION	3428 ETTIE ST	OAKLAND	N/A
112	LUST	SHIREK ESTATE	3425 ETTIE ST	OAKLAND	N/A
112	HWIS	CALTRANS DISTRICT 4	3465 ETTIE ST	OAKLAND	N/A
113	CORTESE	KALMAR AC OF OAKLAND INC	2792 CYPRESS ST	OAKLAND	94607
113	CORTESE	KALMARAC OF OAKLAND INC	2792 CYPRESS ST	OAKLAND	94607
113	CORTESE	KALMAR AC	2792 CYPRESS ST	OAKLAND	94607
113	HWIS	KALMARAC OF OAKLAND INC	2792 CYPRESS STREET	OAKLAND	N/A
113	LUST	KALMAR AC	2792 CYPRESS ST	OAKLAND	N/A
114	CASITES	TIPPER BLONCO COMPANY	2450 CYPRESS STREET	OAKLAND	94626
115	HWIS	COMMAIR MECHANICAL SERVICES CO	1266-14TH STREET	OAKLAND	N/A
115	CORTESE	NABISCO SHREDDED WHEAT BAKERY	1267 14TH ST	OAKLAND	00000
115	CORTESE	NABISCO FOODS	1267 14TH ST	OAKLAND	00000

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Map Id Nmbr	Agency Name	Site Name	Street Address	City	ZIP
115	CORTESE	NABISCO BRANDS INC	1267 14TH ST	OAKLAND	00000
115	HWIS	NABISCO FOODS	1267 14TH STREET	OAKLAND	N/A
115	LUST	NABISCO BRANDS INC	1267 14TH ST	OAKLAND	N/A
115	CORTESE	CARNATION DAIRIES DISTRIB	1310 14TH ST	OAKLAND	94607
115	CORTESE	CARNATION DAIRIES	1310 14TH ST	OAKLAND	94607
115	CORTESE	CARNATION DAIRIES CO	1310 14TH ST	OAKLAND	94607
115	CORTESE	CARNATION DAIRY FACILITY	1310 14TH ST	OAKLAND	94607
115	LUST	CARNATION DAIRY FACILITY	1310 14TH ST	OAKLAND	N/A
116	CORTESE	CUSTOM WOODWORKING SHOP	2855 CYPRESS ST	OAKLAND	94608
116	CORTESE	WAREHAM PROPERTY	2855 CYPRESS ST	OAKLAND	94608
116	LUST	WAREHAM PROPERTY	2855 CYPRESS ST	OAKLAND	N/A
117	CORTESE	KANTOR'S FURNITURE	2525 CYPRESS AVE	OAKLAND	00000
117	LUST	KANTOR'S FURNITURE	2525 CYPRESS ST	OAKLAND	N/A
118	CORTESE	CITY OF OAKLAND HOUSING AUTH	935 UNION ST	OAKLAND	94612
118	LUST	CITY OF OAKLAND HOUSING AUTH	935 UNION ST	OAKLAND	N/A
119	CASITES	BAY GRAPHICS	1337 17TH STREET	OAKLAND	94607
120	CORTESE	PG & E GEN CONSTRUCTION OAKLAN	2121 PERALTA ST	OAKLAND	94607
120	CORTESE	PACIFIC GAS & ELECTRIC OAKLAND	2121 PERALTA ST	OAKLAND	94607
120	CORTESE	PG&E OAKLAND SERVICE CENTER	2121 PERALTA ST	OAKLAND	94607
120	CORTESE	PG&E	2121 PERALTA ST	OAKLAND	94607
120	LUST	PG&E	2121 PERALTA ST	OAKLAND	N/A
121	CASITES	LANGE TRUCKING INC	2226 CAMPBELL STREET	OAKLAND	94607
122	CASITES	RYDER CHEMICAL COMPANY	2601 WOOD STREET	OAKLAND	94607
123	CORTESE	PACIFIC SUPPLY	1735 24TH ST	OAKLAND	94807
123	LUST	PACIFIC SUPPLY	1735 24TH ST	OAKLAND	N/A
124	CORTESE	COCA COLA BOTTLING COMPANY CA	1340 CYPRESS ST	OAKLAND	94607
124	CORTESE	COCA COLA BOTTLING OAKLAND	1340 CYPRESS ST	OAKLAND	94607
124	CORTESE	COCA-COLA BOTTLING CO OF CALIF	1340 CYPRESS ST	OAKLAND	94607
124	CORTESE	COCA-COLA ENTERPRISES WEST	1340 CYPRESS ST	OAKLAND	94607
124	HWIS	COCA COLA BOTTLING OAKLAND	1340 CYPRESS STREET	OAKLAND	N/A
124	LUST	COCA-COLA ENTERPRISES WEST	1340 CYPRESS ST	OAKLAND	N/A
124	CORTESE	DAVLIN PAINT CO	1401 14TH ST E.	OAKLAND	94606
124	CORTESE	DALVIN PAINT	1401 14TH ST E.	OAKLAND	94606
124	LUST	DALVIN PAINT	1401 14TH ST	OAKLAND	N/A
125	CORTESE	CADEMARTORI TRUCKING	1833 PERALTA ST	OAKLAND	94607
125	LUST	CADEMARTORI TRUCKING	1833 PERALTA ST	OAKLAND	N/A
126	CORTESE	ZELLERBACH OAKLAND FACILITY	2230 WILLOW ST	OAKLAND	00000
126	LUST	ZELLERBACH OAKLAND FACILITY	2230 WILLOW ST	OAKLAND	N/A

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Map Id Nmbr	Agency Name	Site Name	Street Address	City	ZIP
126	CASITES	JORGENSEN, EARLE M COMPANY	1699 WEST GRAND AVENUE	OAKLAND	94623
126	LUST	ROBIDEAUX PROPERTY	1700 GRAND AVE W	OAKLAND	N/A
127	CASITES	ALTA PLATING AND CHEMICAL CORPORATIO	1732 PERALTA STREET	OAKLAND	94607
128	HWIS	ARMORED TRANSPORT	1333 8TH ST	OAKLAND	N/A
129	CASITES	PERSONEL MONTHLY STORAGE	1468 14TH STREET	OAKLAND	94607
130	CASITES	CENTER CLEANERS	1224 CENTER STREET	OAKLAND	94610
131	HWIS	K S CUSTOM WOODS	2200 WOOD ST	OAKLAND	N/A
132	HWIS	ACME GALVANIZING CO#	1655 17TH ST	OAKLAND	N/A
133	CORTESE	DOYLE PROPERTY	1518 12TH ST E.	OAKLAND	94606
133	LUST	DOYLE PROPERTY	1518 12TH ST	OAKLAND	N/A
134	CORTESE	INMONT CORP	1545 WILLOW ST	OAKLAND	94607
134	CORTESE	BASF CORPORATION INMONT DIVI	1545 WILLOW ST	OAKLAND	94607
134	CORTESE	BASF CORPORATION	1545 WILLOW ST	OAKLAND	94607
134	HWIS	BASF CORPORATION , INMONT DIVISION	1545 WILLOW ST	OAKLAND	N/A
134	LUST	BASF CORPORATION	1545 WILLOW ST	OAKLAND	N/A
135	CASITES	SOUTHERN PACIFIC OAKLAND	1707 WOOD STREET	OAKLAND	94607
136	CASITES	DUFFY'S TRUCKING	1791 16TH STREET	OAKLAND	94606

Dear Vista Customer:

The report you have just received may show several sites in the mentions section. Mentions are environmental risk sites that have not been or can not be plotted on a map. This is due to one of two circumstances related to how we locate street addresses on our maps. Plotting consists of translating a street address into a latitude and longitude coordinate, or an actual point on a map.

1) A site cannot be plotted because of inaccurate or missing locational information in the record provided by the reporting agency. For many of these records, Vista has corrected or added locational information from private industry address files. However,many site addresses cannot be corrected using these techniques and those sites cannot be mapped.

2) Also, we are continually updating our database. We receive information from the various agencies and go through the mapping process as quickly as possible; however, there are sites that cannot be processed immediately. In order to best serve our customers, we include those sites that we have not been able to rule out, or map. Mappable sites may fall within your radius, or they may have been included because of a similar zip code or area name.

In order to provide you with the most current and comprehensive data it is necessary to include these "unmappables" in your report. As the data matures we will be able to plot more of the sites and look forward to providing you with reports with fewer mentions in the future.

VISTA ENVIRONMENTAL INFORMATION, INC.

5060 SHOREHAM PLACE, SUITE 300 • SAN DIEGO, CALIFORNIA 92122 • (619) 450-6100 • FAX (619) 450-6195
415 EAGLEVIEW BOULEVARD, SUITE 112 · EXTON, PA 19341 · (215) 458-1122 · FAX (215) 458-1134

Mentions for report 1/019352-001

Agency	City	Zip	St #	Street Name	Site Name	NFA?
CERCLIS	OAKLAND	94607		1ST BET JEFFERSON & MARKET	PG&E GAS PLANT OAKLAND 601 2	Y
CERCLIS	OAKLAND	94606		EMBARCADERO CV MARINA SITE	PORT OF OAKLAND	Y
CERCLIS	OAKLAND	94623		NAVAL SUPPLY CENTER OAKLAND	NAVY PUBLIC WORKS CENTER SAN FRANCIS	Y
CERCLIS	OAKLAND	94621		OAKLAND ARPT	PACIFIC AIRMOTIVE	Y
CERCLIS	OAKLAND	94621		OAKLAND ARPT	GOLDEN GATE AVIATION	Y
CERCLIS	OAKLAND	94621		OAKLAND ARPT	BUSINESS AIRCRAFT DISTR	Y
CORTESE	EMERYVILLE	00000	4030	HOLLIS ST	RANSOME COMPANY	-
CORTESE	EMERYVILLE	94608	4050	HORTON ST	WEYERHAEUSER CO	-
CORTESE	EMERYVILLE	94608	1400	PARK AVE	CHROMEX	-
CORTESE	EMERYVILLE	94608	1461	PARK AVE	STUART WESTERN INC	-
CORTESE	EMERYVILLE	94608		SHELLMOUND ST. SOUTH TERMINUS	JUDSON STEEL	-
CORTESE	EMERYVILLE	94608		TRANSO/LACOSTE SITE	EMERYVILLE REDEVELOPMENT AGCY	-
CORTESE	OAKLAND	94612	1236	1238 41ST	MOTOR PARTNERS 1	-
CORTESE	OAKLAND	94607	125	12TH ST	PACIFIC BELL	-
CORTESE	OAKLAND	94612	165	13TH ST	ALAMEDA COUNTY GARAGE	-
CORTESE	OAKLAND	94662	1007	41ST ST	DUNNE FRANK W COMPANY #	-
CORTESE	OAKLAND	94662	1007	41ST ST	FRANK W DUNNE CO	-
CORTESE	OAKLAND	94662	1007	41ST ST	FRANK W. DUNNE CO.	-
CORTESE	OAKLAND	00000		41ST/42ND ST	GROW GP/OAKLAND NATL ENGRAVING	-
CORTESE	OAKLAND	94608	1249	67TH ST	FABCO DIV	-
CORTESE	OAKLAND	00000	921	98TH AVE	NABISCO BRANDS INC.	-
CORTESE	OAKLAND	94621		ASR #9 FACILITY	FAA AIRWAY FACILITY	-
CORTESE	OAKLAND	94606	5	AVE KIRKHAM	SOUTHERN PACIFIC TRANS CO	-
CORTESE	OAKLAND	94605	73	BANCROFT	EASTMONT AUTO SERVICE	-
CORTESE	OAKLAND	94605	73	BANCROFT	BP	-
CORTESE	OAKLAND	94605	73	BANCROFT	FIRESTONE #3659	-
CORTESE	OAKLAND	94611	4100	BROADWAY	7-ELEVEN STORE 2212-18608/CO	-
CORTESE	OAKLAND	94618	5755	BROADWAY	SHELL OIL #204-5510-0402	-
CORTESE	OAKLAND	00000	2345	BROADWAY	NEGHERBON LINCOLN MERCURY	-
CORTESE	OAKLAND	94607	330	CHESTNUT	WORK WEAR CORPORATION	-
CORTESE	OAKLAND	94625		CODE 6 BUILDING 322	OAKLAND NAVAL SUPPLY CENTER	-
CORTESE	OAKLAND	94606		DENNISON AND EMBARCADERO STREE	PORT OF OAKLAND - EMBARCADERO	-
CORTESE	OAKLAND	94606		DENNISON AND EMBARCADERO STREE	PORT OF OAKLAND	-
CORTESE	OAKLAND	94601	315	DERBY AVE	SHELL OIL CO BULK	-
CORTESE	OAKLAND	00000		DOOLITTLE DR	OAKLAND INTERNATIONAL AIRPORT	-
CORTESE	OAKLAND	00000		DOOLITTLE DR	POLVOROSA BUSINESS PARK	-
CORTESE	OAKLAND	00000		DOOLITTLE DR	WDR-ALAMEDA CITY LANDFILL	-
CORTESE	OAKLAND	00000		DOOLITTLE DR	NPD MAJ-DBDA JOINT OUTFALL	-
CORTESE	OAKLAND	00000		DOOLITTLE DR	NPD MAJ-DBDA JOINT OUTFALL	-
CORTESE	OAKLAND	00000	54	EMBARCADERO ST	BEDFORD PROPERTY SITE	-
CORTESE	OAKLAND	00000	54	EMBARCADERO ST		-
CORTESE	OAKLAND	91505	5425	GROVE ST	BP OIL COMPANY	-
CORTESE	OAKLAND	91505	5425	GROVE ST	MOBIL	-
CORTESE	OAKLAND	94612	708	HARRISON ST	OAKLAND AUTO PARTS & TIRES	-
CORTESE	OAKLAND	94005		JACK LONDON MARINA	PORT OF OAKLAND	-
CORTESE	OAKLAND	00000	13	JEFFERSON ST	BRAMALEA PACIFIC	-
CORTESE	OAKLAND	00000	1583	JULIE ANN WAY	YANDELL TRUCKING	-
CORTESE	OAKLAND	94621		L-827 TRACON	FAA AIRWAY FACILITIES	-
CORTESE	OAKLAND	94643	300	LAKESIDE DR	KAISER ALUMINUM EUROPE INC	-
CORTESE	OAKLAND	94643	300	LAKESIDE DR	KAISER CEMENT AND GYPSUM	-

Mentions for report 1/019352-001

Agency	City	Zip	St #	Street Name	Site Name	NFA?
CORTESE	OAKLAND	94520	424	MARTIN LUTHER BLVD	TEXACO	-
CORTESE	OAKLAND	94607	1401	MIDDLE HARBOR RD	SHEREX CHEMICAL COMPANY (MIDDL	-
CORTESE	OAKLAND	94607	1395	MIDDLE HARBOR RD	AMERICAN PRESIDENT LINES	-
CORTESE	OAKLAND	94607	1395	MIDDLE HARBOR RD	AMERICAN PRESIDENT LINES	-
CORTESE	OAKLAND	94607	1395	MIDDLE HARBOR RD	AMERICAN PRESIDENT LINES	-
CORTESE	OAKLAND	94611	6550	MORAGA AVE	CHEVRON USA INC SERVICE STATIO	-
CORTESE	OAKLAND	00000	2844	MOUNTAIN BLVD	PHILS AUTOMOTIVE	-
CORTESE	OAKLAND	00000	2110	MOUNTAIN MERCED	ARCO	-
CORTESE	OAKLAND	94261		OAKLAND AIRPORT--AIRPORT DRIVE	AMERICAN AIRLINES	-
CORTESE	OAKLAND	94261		OAKLAND AIRPORT--AIRPORT DRIVE	PORT OF OAKLAND	-
CORTESE	OAKLAND	94261		OAKLAND AIRPORT--AIRPORT DRIVE	GOLDEN GATE AVIATION	-
CORTESE	OAKLAND	94261		OAKLAND AIRPORT--AIRPORT DRIVE	BUSINESS AIRCRAFT DISTR.	-
CORTESE	OAKLAND	94261		OAKLAND AIRPORT--AIRPORT DRIVE	PACIFIC AIRMOTIVE	-
CORTESE	OAKLAND	94261		OAKLAND AIRPORT--AIRPORT DRIVE	AVIS RENT A CAR	-
CORTESE	OAKLAND	94261		OAKLAND AIRPORT--AIRPORT DRIVE	OAKLAND GS 29	-
CORTESE	OAKLAND	94261		OAKLAND AIRPORT--AIRPORT DRIVE	OAKLAND RTR2	-
CORTESE	OAKLAND	94261		OAKLAND AIRPORT--AIRPORT DRIVE	OAKLAND ASR	-
CORTESE	OAKLAND	94261		OAKLAND AIRPORT--AIRPORT DRIVE	OAKLAND ATCT	-
CORTESE	OAKLAND	94261		OAKLAND AIRPORT--AIRPORT DRIVE	OAKLAND ALS	-
CORTESE	OAKLAND	94261		OAKLAND AIRPORT--AIRPORT DRIVE	OAKLAND ATCT NORTH	-
CORTESE	OAKLAND	94261		OAKLAND AIRPORT--AIRPORT DRIVE	OAKLAND VORTAC	-
CORTESE	OAKLAND	94261		OAKLAND AIRPORT--AIRPORT DRIVE	OAKLAND GS 27	-
CORTESE	OAKLAND	94102		OAKLAND INTL AIRPORT	BUSINESS AIRCRAFT DISTRIBUTORS	-
CORTESE	OAKLAND	94102		OAKLAND INTL AIRPORT	GOLDEN GATE AVIATION	-
CORTESE	OAKLAND	94102		OAKLAND INTL AIRPORT	PACIFIC AIRMOTIVE	-
CORTESE	OAKLAND	94102		OAKLAND INTL AIRPORT	PSA STORAGE TANKS: NUMBERS 20A	-
CORTESE	OAKLAND	94102		OAKLAND INTL AIRPORT	TRANS AMERICAN AIRLINES	-
CORTESE	OAKLAND	94102		OAKLAND INTL AIRPORT	PACIFIC GAS AND ELECTRIC COMPA	-
CORTESE	OAKLAND	94102		OAKLAND INTL AIRPORT	CHEVRON	-
CORTESE	OAKLAND	94102		OAKLAND INTL AIRPORT	HERTZ SERVICE CENTER	-
CORTESE	OAKLAND	00000		OAKPORT ST	EBMUD	-
CORTESE	OAKLAND	94607		PORT OF OAKLAND BIRTH 35	OAKLAND ARMY BASE	-
CORTESE	OAKLAND	94607		PORT OF OAKLAND BIRTH 35	MOBIL BULK PLANT	-
CORTESE	OAKLAND	00000		PRIVATE RD	SOUTHERN PACIFIC	-
CORTESE	OAKLAND	00000	7	ST. 29TH AVE	EBMUD	-
CORTESE	OAKLAND	00000	5	ST. 8TH AVE	BART MAINT. FACILITY	-
CORTESE	OAKLAND	00000	8	ST. E 8TH AVE AVE	SOUTHERN PACIFIC	-
CORTESE	OAKLAND	00000	98	ST. EDES AVE	CITY OF OAKLAND	-
CORTESE	OAKLAND	00000	11	ST. ST		-
CORTESE	OAKLAND	00000		TERMINAL FACILITY	SHELL	-
CORTESE	OAKLAND	00000		TIDEWATER AVE	TIDEWATER BUSINESS PARK	-
CORTESE	OAKLAND	00000		VALDEZ & 13TH	OLD OAKLAND TRIBUNE GARAGE	-
CORTESE	PERMANENTE	94612		PERMANENTE PLANT	KAISER CEMENT AND GYPSUM CORP	-
CORTESE	PERMANENTE	94612		PERMANENTE PLANT	KAISER ALUMINUM	-
CORTESE	PERMANENTE	94612		PERMANENTE PLANT	KAISER CEMENT CORP	-
CORTESE	PERMANENTE	94612		PERMANENTE PLANT	KAISER CEMENT	-
CORTESE	PERMANENTE	94612		PERMANENTE PLANT	WDR-STORM WATER RUNOFF	-
CORTESE	PIEDMONT	94610	29	WILDWOOD	SHELL STATION #204-6001-0109	-
AWP	OAKLAND	94625		CODE 6 BUILDING 322	OAKLAND NAVAL SUPPLY CENTER	-

Agency	City	Zip	St #	Street Name	Site Name	NFA?
ASPIS	EMERYVILLE	94608		I 80 FRONTAGE RD. N OF POWELL	ST. ALBANS SENIOR CENTER	NO
ASPIS	OAKLAND	94625		CODE 6 BUILDING 322	OAKLAND NAVAL SUPPLY CENTER	NO
ASPIS	OAKLAND	94606	845	EMBARCADERO	BUILDING H-232, PORT OF OAKLAND	NO
ASPIS	OAKLAND	94607		MARKET BETWEEN 1ST AND GROVE STREET	PG&E - OAKLAND	NO
ASPIS	OAKLAND	94626		PORT OF OAKLAND	OAKLAND ARMY BASE	NO
ASPIS	SAN CALOS	94603		785/789 OLD COUNTY RD.	PACIFIC READY MIX	NO
ASPIS	EMERYVILLE	94608	6901	CHRISTIE, #405	INTERMODAL TRANSPORTATION SERVICE IN	Y
ASPIS	OAKLAND	94623	1819	10TH	IRVING SUBWAY - DIVISION OF HARSCO C	Y
ASPIS	OAKLAND	94609		GROVE AND 51ST STREET	CHILDREN'S HOSPITAL	Y
ASPIS	OAKLAND	94607	2588	GROVE STREET	PETER LEAF CABINET MAKER	Y
ASPIS	OAKLAND	94614		HANGER #5, OAKLAND INTERNATIONAL AIR	POWER PAC ENGINEERING CORPORATION	Y
ASPIS	OAKLAND	94614		HANGER #6, OAKLAND INTERNATIONAL AIR	AIR CALIFORNIA	Y
ASPIS	OAKLAND	94611	4139	JULIO	ALVAREZ & ORTIZ	Y
ASPIS	OAKLAND	94602	314	MAPLE STREET	SHIELD TERMITE	Y
ASPIS	OAKLAND	94607		MARITIME STREET	GLOBAL INTERNATIONAL FORWARDERS	Y
ASPIS	OAKLAND	94621		OAKLAND INTERNATIONAL AIRPORT, BLDG	BUSINESS AIRCRAFT DISTRIBUTORS	Y
ASPIS	OAKLAND	94621		OAKLAND INTERNATIONAL AIRPORT, BLDG	GOLDEN GATE AVIATION	Y
ASPIS	OAKLAND	94621		OAKLAND INTERNATIONAL AIRPORT, BLDG	PACIFIC AIRMOTIVE	Y
ASPIS	OAKLAND	94662		PO BOX 8722	STAND COMPANY INDUSTRIES	Y
HWIS	N/A	N/A		ALAMEDA COUNTY	ALAMEDA COUNTY/EMERG RESPONSE ONLY	-
HWIS	N/A	N/A		COUNTY OF ALAMEDA / EMERGENCY RESPONSE	STATE DEPT OF HEALTH SERVICES	-
HWIS	N/A	N/A		COUNTY OF ALAMEDA / EMERGENCY RESPONSE	STATE DEPT OF HEALTH SERVICES	-
HWIS	N/A	N/A		COUNTY OF ALAMEDA / EMERGENCY RESPONSE	STATE DEPT OF HEALTH SERVICES	-
HWIS	N/A	N/A		COUNTY OF ALAMEDA / EMERGENCY RESPONSE	STATE DEPT OF HEALTH SERVICES	-
HWIS	N/A	N/A		COUNTY OF ALAMEDA / EMERGENCY RESPONSE	STATE DEPT OF HEALTH SERVICES	-
HWIS	N/A	N/A		COUNTY OF ALAMEDA / EMERGENCY RESPONSE	STATE DEPT OF HEALTH SERVICES	-
HWIS	N/A	N/A		COUNTY OF ALAMEDA / EMERGENCY RESPONSE	STATE DEPT OF HEALTH SERVICES	-
HWIS	N/A	N/A		COUNTY OF ALAMEDA / EMERGENCY RESPONSE	STATE DEPT OF HEALTH SERVICES	-
HWIS	OAKLAND	N/A		12TH AND JEFFERSON STREETS	U.S. GENERAL SERVICE ADMIN.	-
HWIS	OAKLAND	N/A		ADMINISTRATION BUILDING	CALTRANS DISTRICT 4	-
HWIS	OAKLAND	N/A		BLD 99 MARATIME	ARMY & AIR FORCE ESCH SVC	-
HWIS	OAKLAND	N/A		BLDG 1086 OARB	USAR CENTER	-
HWIS	OAKLAND	N/A		BLDG 814 OAKLAND ARPT	S & S ACCESSORY OVERHAUL INC	-
HWIS	OAKLAND	N/A		FOOT OF ADELINE ST	SCHINTZER STEEL	-
HWIS	OAKLAND	N/A	5425	GROVE ST	BP OIL COMPANY	-
HWIS	OAKLAND	N/A		HGR 8 OAKLAND AIRPORT	SOUTHERN AIR TRANSPORT	-
HWIS	OAKLAND	N/A		N FIELD TRNG AREA OAK. AIRPORT	PORT OF OAKLAND	-
HWIS	OAKLAND	N/A		OAKLAND AIRPORT BLD L311	PORT OF OAKLAND	-
HWIS	OAKLAND	N/A		ONE KAISER PLAZA	ORDWAY THE	-
HWIS	OAKLAND	N/A	1	QTR. MILE EAST OF MARTIN / ROAD ON WAKE AVE.	EAST BAY MUNICIPAL UTILITY DISTRICT	-
HWIS	OAKLAND AIRPORT	N/A	112	AIR GARGO BLDG OAKLAND	FEDERAL EXPRESS	-
HWIS	OAKLAND APO	N/A	1	NEIL ARMSTRONG WAY	AVIS RENT-A-CAR	-
LUST	OAKLAND	N/A	1236	&123841ST AVE	MOTOR PARTNERS I	NO
LUST	OAKLAND	N/A		11TH ST	N/A	NO
LUST	OAKLAND	N/A	1111	12TH ST E	GLASS ON THE MOVE	NO
LUST	OAKLAND	N/A		14TH ST E/HAVENSCOUR	N/A	NO
LUST	OAKLAND	N/A		1581-89 MACARTHUR BLVD	N/A	NO

Mentions for report 1/019352-001

Agency	City	Zip	St #	Street Name	Site Name	NFA?
LUST	OAKLAND	N/A		20TH & BROADWAY	EMPORUIM CAPWELL	NO
LUST	OAKLAND	N/A		20TH & BROADWAY	EMPORUIM CAPWELL	NO
LUST	OAKLAND	N/A	294	27TH ST	OAKLAND ACURA	NO
LUST	OAKLAND	N/A	294	27TH ST	OAKLAND ACURA	NO
LUST	OAKLAND	N/A	417	29TH ST	GRANT SCHOOL	NO
LUST	OAKLAND	N/A	417	29TH ST	GRANT SCHOOL	NO
LUST	OAKLAND	N/A		3420/3315 PERALTA/MAGNOLIA STS	CLAWSON HIGH SCHOOL	NO
LUST	OAKLAND	N/A	339	3RD ST	P.E. O'HAIR	NO
LUST	OAKLAND	N/A	339	3RD ST	P.E. O'HAIR	NO
LUST	OAKLAND	N/A	490	43RD ST	BLUMERT COMPANY	NO
LUST	OAKLAND	N/A	490	43RD ST	BLUMERT COMPANY	NO
LUST	OAKLAND	N/A	1437	48TH AVE	N/A	NO
LUST	OAKLAND	N/A	1033	4TH AVE	N/A	NO
LUST	OAKLAND	N/A	501	5TH AVE	PERALTA MAINTENANCE YARD	NO
LUST	OAKLAND	N/A	501	5TH AVE	PERALTA MAINTENANCE YARD	NO
LUST	OAKLAND	N/A		5TH AVE & KIRKHAM	SOUTHERN PACIFIC TRANS CO	NO
LUST	OAKLAND	N/A		73RD & BANCROFT	BP	NO
LUST	OAKLAND	N/A	1675	7TH ST	US POST OFFICE	NO
LUST	OAKLAND	N/A	1520	7TH ST	RELIABLE HANDI CAB	NO
LUST	OAKLAND	N/A	1520	7TH ST	RELIABLE HANDI CAB	NO
LUST	OAKLAND	N/A	1675	7TH ST	US POST OFFICE	NO
LUST	OAKLAND	N/A	5829	ADELINE AVE	N/A	NO
LUST	OAKLAND	N/A	114	ADELINE ST	N/A	NO
LUST	OAKLAND	N/A		ASR #9 FACILITY	FAA AIRWAY FACILITY	NO
LUST	OAKLAND	N/A	3785	BROADWAY	FIRESTONE & RUBBER COMPANY	NO
LUST	OAKLAND	N/A	333	BROADWAY	EXPRESS AUTO	NO
LUST	OAKLAND	N/A	4101	BROADWAY ST	FIVE C GROUP	NO
LUST	OAKLAND	N/A		BROADWAY-SAN PABLO	OAKLAND REDEV AGENCY/GALLERIA	NO
LUST	OAKLAND	N/A	150	CHESTNUT ST	LEHAR SALES	NO
LUST	OAKLAND	N/A	333	CLAY ST	ALLIED POULTRY	NO
LUST	OAKLAND	N/A		EARHART RD	NATIONAL AIROMOTIVE	NO
LUST	OAKLAND	N/A	7683	EARHART RD	PORT OF OAKLAND	NO
LUST	OAKLAND	N/A	54	EMBARCADERO ST	N/A	NO
LUST	OAKLAND	N/A		FERRY & PETROLEUM	ASHLAND OIL	NO
LUST	OAKLAND	N/A	1751	GOSS ST	MARVYS GARVEY COMMONS	NO
LUST	OAKLAND	N/A	1751	GOSS ST	MARVYS GARVEY COMMONS	NO
LUST	OAKLAND	N/A	3234	GRAND AVE	N/A	NO
LUST	OAKLAND	N/A	1563	JULIE ANN WY	YANDELL TRUCKING	NO
LUST	OAKLAND	N/A	1	KAISER PLAZA	ORDWAY/BROADWAY BUILDING	NO
LUST	OAKLAND	N/A		L-827 TRACON	FAA AIRWAY FACILITIES	NO
LUST	OAKLAND	N/A	5885	MACARTHUR BLVD	N/A	NO
LUST	OAKLAND	N/A	5885	MACARTHUR BLVD	N/A	NO
LUST	OAKLAND	N/A	1919	MARKET ST	SCOTT COMPANY	NO
LUST	OAKLAND	N/A	1919	MARKET ST	SCOTT COMPANY	NO
LUST	OAKLAND	N/A	5776	MILES AVE	FIRE STATION #19	NO
LUST	OAKLAND	N/A	6550	MORAGA AVE	CHEVRON	NO
LUST	OAKLAND	N/A	2110	MOUNTAIN & MERCED	ARCO	NO
LUST	OAKLAND	N/A	7100	MOUNTAIN BLVD	LEONA QUARRY	NO
LUST	OAKLAND	N/A		N/A	OAKLAND ARMY BASE	NO
LUST	OAKLAND	N/A		OAKLAND AIRPORT	AVIS RENT A CAR	NO
LUST	OAKLAND	N/A		OAKLAND INTN'L AIR	CHEVRON	NO
LUST	OAKLAND	N/A		OAKPORT ST	EBMUD	NO

Mentions for report 1/019352-001

Agency	City	Zip	St #	Street Name	Site Name	NFA?
LUST	OAKLAND	N/A		PETROLEUM ST	MOBIL	NO
LUST	OAKLAND	N/A	2850	POPLAR	LINFORD AIR & REFRIGERATION	NO
LUST	OAKLAND	N/A	2850	POPLAR	LINFORD AIR & REFRIGERATION	NO
LUST	OAKLAND	N/A		PORT OF OAKLAND	MOBIL BULK PLANT	NO
LUST	OAKLAND	N/A		PRIVATE RD	SOUTHERN PACIFIC	NO
LUST	OAKLAND	N/A	5714	SAN PABLO AVE	CHIEF AUTO PARTS	NO
LUST	OAKLAND	N/A		TERMINAL FACILITY	SHELL	NO
LUST	OAKLAND	N/A		TIDEWATER AVE	TIDEWATER BUSINESS PARK	NO
LUST	OAKLAND	N/A		VALDEZ & 13TH	OLD OAKLAND TRIBUNE GARAGE	NO
LUST	OAKLAND	N/A	2020	WAKE AVE	EBMUD-WATER POLLUT CONTRL PLNT	NO
LUST	OAKLAND	N/A	1975	WEBSTER ST	MOBIL	NO
LUST	OAKLAND	N/A	1975	WEBSTER ST	MOBIL	NO
LUST	OAKLAND	N/A	3401	WOOD ST	DOWNES TRUST-PROPERTY 593	NO
LUST	OAKLAND EMERYVILLE	N/A		41ST/42ND ST	GROW GP/OAKLAND NATL ENGRAVING	NO
LUST	UNO		11	UNO		NO

NFA code descriptions: "-" indicates the agency did not supply this information; "Y" indicates there was "No Further Action" planned for the site (ASPIS/CAL-SITES) or "Case Closed" (LUST); "NO" indicates the agency did not mark the site "No Further Action" or "Case Closed", but does supply this information. For the CERCLIS database a "Y" indicates that all CERCLIS events for the site show an actual completion date and the most recent event indicates "no further remedial action planned."

APPENDIX C

WELL CONSTRUCTION PERMITS

ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

5997 PARKSIDE DRIVE ♦ PLEASANTON, CALIFORNIA 94566 ♦ (415) 484-2600

GROUNDWATER PROTECTION ORDINANCE PERMIT APPLICATION

FOR APPLICANT TO COMPLETE

LOCATION OF PROJECT ARCO Station 2169
889 West Grand Avenue
Oakland, California

CLIENT
Name ARCO Products Company
Address P.O. Box 5811 Phone (415) 571-2434
City San Mateo Zip CA 94402

APPLICANT
Name GeoStrategies Inc
Barbara Sieminski
Address 2140 West Winton Ave Phone (510) 352-4800
City Hayward, CA Zip 94545

TYPE OF PROJECT

Well Construction		Geotechnical Investigation	
Cathodic Protection	___	General	___
Water Supply	___	Contamination	___
Monitoring	___	Well Destruction	___

Vapor Extraction (2)
Air Sparging (3)

PROPOSED WATER SUPPLY WELL USE
Domestic ___ Industrial ___ Other ___
Municipal ___ Irrigation ___

DRILLING METHOD:
Mud Rotary ___ Air Rotary ___ Auger Hollow Stem
Cable ___ Other ___

DRILLER'S LICENSE NO. C57482390

WELL PROJECTS
Drill Hole Diameter 10 (8) in. 2 (3) Maximum
Casing Diameter 4 (2) in. 2 (3) Depth 15 (30) ft. 2 (3)
Surface Seal Depth 5 (25) ft 2 (3) Number 5

GEOTECHNICAL PROJECTS
Number of Borings ___ Maximum
Hole Diameter ___ in. Depth ___ ft.

ESTIMATED STARTING DATE 8/30/93
ESTIMATED COMPLETION DATE 8/31/93

I hereby agree to comply with all requirements of this permit and Alameda County Ordinance No. 73-68.

APPLICANT'S SIGNATURE Barbara Sieminski Date 8/20/93

FOR OFFICE USE

PERMIT NUMBER 93471
LOCATION NUMBER ___

PERMIT CONDITIONS

Circled Permit Requirements Apply

(A.) GENERAL
1. A permit application should be submitted so as t arrive at the Zone 7 office five days prior t proposed starting date.
2. Submit to Zone 7 within 60 days after completio of permitted work the original Department o Water Resources Water Well Drillers Report or equivalent for well projects, or drilling logs and location sketch for geotechnical projects.
3. Permit is void if project not begun within 9(days of approval date.

(B.) WATER WELLS, INCLUDING PIEZOMETERS
1. Minimum surface seal thickness is two inches o cement grout placed by tremie.
2. Minimum seal depth is 50 feet for municipal and industrial wells or 20 feet for domestic and irrigation wells unless a lesser depth is specially approved. Minimum seal depth for monitoring wells is the maximum depth practicable or 20 feet.

C. GEOTECHNICAL. Backfill bore hole with compacted cuttings or heavy bentonite and upper two feet with compacted material. In areas of known or suspected contamination, tremied cement grout shall be used in place of compacted cuttings.

D. CATHODIC. Fill hole above anode zone with concrete placed by tremie.

E. WELL DESTRUCTION. See attached.

Approved Wyman Hong Date 23 Aug 93
Wyman Hong

121989

ZONE 7 WATER AGENCY

5997 PARKSIDE DRIVE PLEASANTON, CALIFORNIA 94588 VOICE (510) 484-2600
FAX (510) 462-3914

DRILLING PERMIT APPLICATION

FOR APPLICANT TO COMPLETE

LOCATION OF PROJECT 889 West Grand Avenue, Oakland, California
ARCO Station 2169

CLIENT
Name ARCO Products Co
Address P.O. Box 5811 Voice (415) 571-2434
City San Mateo, CA Zip 94402

APPLICANT
Name GeoStrategies Inc.
B. Sieminski Fax
Address 6747 Sierra Court, Suite G Voice (510) 551-7444 (ext 288)
City Dublin, CA Zip 94568

TYPE OF PROJECT

Well Construction		Geotechnical Investigation	
Cathodic Protection	___	General	___
Water Supply	___	Contamination	___
Monitoring	V	Well Destruction	___

PROPOSED WATER SUPPLY WELL USE
Domestic ___ Industrial ___ Other ___
Municipal ___ Irrigation ___

DRILLING METHOD:
Mud Rotary ___ Air Rotary ___ Auger Hollow Stem
Cable ___ Other ___

DRILLER'S LICENSE NO. C-57 484288

WELL PROJECTS

Drill Hole Diameter	10	in. (4) 8" (2)	Maximum		
Casing Diameter	4	in. (4) 2" (2)	Depth	35	ft. (4) 15' (2)
Surface Seal Depth	4	ft. (4) 25' (2)	Number	6	

GEOTECHNICAL PROJECTS
Number of Borings ___ Maximum
Hole Diameter ___ in. Depth ___ ft.

ESTIMATED STARTING DATE ___
ESTIMATED COMPLETION DATE ___

I hereby agree to comply with all requirements of this permit and Alameda County Ordinance No. 73-68.

APPLICANT'S SIGNATURE B. Sieminski Date 11/08/93

FOR OFFICE USE

PERMIT NUMBER 93655
LOCATION NUMBER ___

PERMIT CONDITIONS

Circled Permit Requirements Apply

(A.) GENERAL
1. A permit application should be submitted so as to arrive at the Zone 7 office five days prior to proposed starting date.
2. Submit to Zone 7 within 60 days after completion of permitted work the original Department of Water Resources Water Well Drillers Report or equivalent for well Projects, or drilling logs and location sketch for geotechnical projects.
3. Permit is void if project not begun within 90 days of approval date.

(B.) WATER WELLS, INCLUDING PIEZOMETERS
1. Minimum surface seal thickness is two inches of cement grout placed by tremie.
2. Minimum seal depth is 50 feet for municipal and industrial wells or 20 feet for domestic and irrigation wells unless a lesser depth is specially approved. Minimum seal depth for monitoring wells is the maximum depth practicable or 20 feet.

C. GEOTECHNICAL. Backfill bore hole with compacted cuttings or heavy bentonite and upper two feet with compacted material. In areas of known or suspected contamination, tremied cement grout shall be used in place of compacted cuttings.

D. CATHODIC. Fill hole above anode zone with concrete placed by tremie.

E. WELL DESTRUCTION. See attached.

Approved Wyman Hong Date 19 Nov 93
Wyman Hong

91992

APPENDIX D

EXPLORATORY BORING LOGS AND WELL CONSTRUCTION DETAILS

MAJOR DIVISIONS					TYPICAL NAMES
COARSE-GRAINED SOILS MORE THAN HALF IS COARSER THAN NO. 200 SIEVE	GRAVELS MORE THAN HALF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE SIZE	CLEAN GRAVELS WITH LITTLE OR NO FINES	GW		WELL GRADED GRAVELS WITH OR WITHOUT SAND, LITTLE OR NO FINES
			GP		POORLY GRADED GRAVELS WITH OR WITHOUT SAND, LITTLE OR NO FINES
		GRAVELS WITH OVER 15% FINES	GM		SILTY GRAVELS, SILTY GRAVELS WITH SAND
			GC		CLAYEY GRAVELS, CLAYEY GRAVELS WITH SAND
	SANDS MORE THAN HALF COARSE FRACTION IS SMALLER THAN NO. 4 SIEVE SIZE	CLEAN SANDS WITH LITTLE OR NO FINES	SW		WELL GRADED SANDS WITH OR WITHOUT GRAVEL, LITTLE OR NO FINES
			SP		POORLY GRADED SANDS WITH OR WITHOUT GRAVEL, LITTLE OR NO FINES
		SANDS WITH OVER 15% FINES	SM		SILTY SANDS WITH OR WITHOUT GRAVEL
			SC		CLAYEY SANDS WITH OR WITHOUT GRAVEL
FINE-GRAINED SOILS MORE THAN HALF IS FINER THAN NO. 200 SIEVE	SILTS AND CLAYS LIQUID LIMIT 50% OR LESS		ML		INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTS WITH SANDS AND GRAVELS
			CL		INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY CLAYS WITH SANDS AND GRAVELS, LEAN CLAYS
			OL		ORGANIC SILTS OR CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50%		MH		INORGANIC SILTS, MICACEOUS OR DIATOMACIOUS, FINE SANDY OR SILTY SOILS, ELASTIC SILTS
			CH		INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH		ORGANIC SILTS OR CLAYS OF MEDIUM TO HIGH PLASTICITY
HIGHLY ORGANIC SOILS			PT		PEAT AND OTHER HIGHLY ORGANIC SOILS

LL - Liquid Limit (%)

PI - Plastic Index (%)

PID - Volatile Vapors in ppm

MA - Particle Size Analysis

2.5 YR 6/2 - Soil Color according to Munsell Soil Color Charts (1975 Edition)

5 GY 5/2 - GSA Rock Color Chart

- No Soil Sample Recovered
- "Undisturbed" Sample
- Bulk or Classification Sample
- First Encountered Ground Water Level
- Piezometric Ground Water Level

Penetration - Sample drive hammer weight - 140 pounds falling 30 inches. Blows required to drive sampler 1 foot are indicated on the logs

GeoStrategies Inc.

Unified Soil Classification - ASTM D 2488-85 and Key to Test Data

GeoStrategies, Inc.
6747 Sierra Court - Suite G Dublin, Ca. 95468

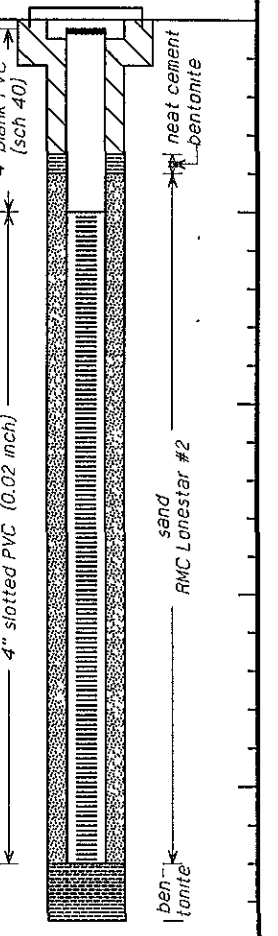
Log of Boring ADR-1

PROJECT: *ARCO Station 2169*	LOCATION: *889 West Grand Avenue, Oakland, CA.*
GSI PROJECT NO.: *7927.17*	SURFACE ELEVATION: *ft. MSL*
DATE STARTED: *12/06/93*	WL (ft. bgs): *12.5* DATE: *12/06/93* TIME: *2:00pm*
DATE FINISHED: *12/06/93*	WL (ft. bgs): *12.5* DATE: *12/06/93* TIME: *2:30pm*
DRILLING METHOD: *10 in. Hollow Stem Auger*	TOTAL DEPTH: *23.5 Feet*
DRILLING COMPANY: *Exploration Geoservices*	GEOLOGIST: *BS*

DEPTH feet	PID (ppm)	BLOWS/FT.*	SAMPLE NUMBER	SAMPLE INT.	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION
							DRILLING THROUGH AN EXISTING WELL BOX.
							Bottom of a well box at 2.5 feet.
						CL	SILTY CLAY (CL) - olive, hard, damp, 90% fines, 10% fine grained sand, medium plasticity.
5	9	29	ADR-1-5.5				
10	10	36	ADR-1-10.5				Increasing sand.
	51	32	ADR-1-12			SC	CLAYEY SAND (SC) - light olive brown, dense, moist, 70% fine grained sand, 30% fines. Becoming saturated at 12.5 feet.
15	3	24	ADR-1-15.5				With fine gravel.
						SW	SAND WITH GRAVEL (SW) - gray, dense, saturated, 85% fine to coarse grained sand, 15% fine gravel.
20	0	34	ADR-1-20.5			SP	SAND (SP) - gray, dense, saturated, 100% fine grained sand.
	0	29	ADR-1-23			CL	CLAY (CL) - bluish gray, hard, moist, 90% fines, 10% fine sand, medium plasticity.
							Becoming damp at 2 feet.
25							Bottom of boring at 23.5 feet. 12/06/93
30							
35							

(* = converted to equivalent standard penetration blows/ft.)

WELL DIAGRAM



JOB NUMBER: *7927.17*

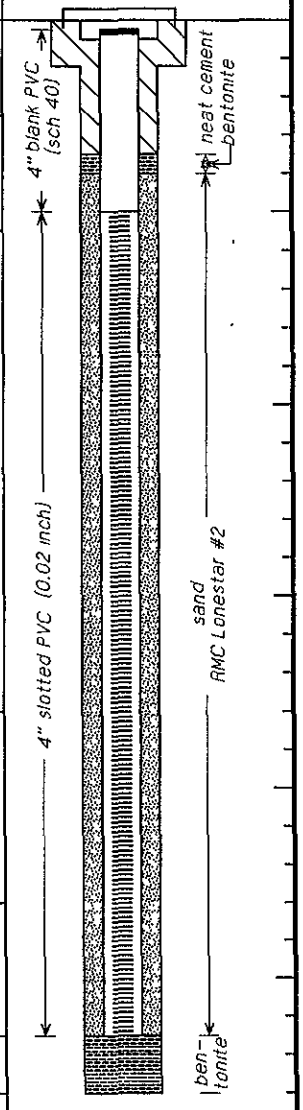
GeoStrategies, Inc.
6747 Sierra Court - Suite G Dublin, Ca. 95468

Log of Boring ADR-2

PROJECT: *ARCO Station 2169*	LOCATION: *889 West Grand Avenue, Oakland, CA.*
GSI PROJECT NO. : *7927.17*	SURFACE ELEVATION: *ft. MSL*
DATE STARTED: *12/06/93*	WL (ft. bgs): *18* DATE: *12/06/93* TIME: *3:00pm*
DATE FINISHED: *12/06/93*	WL (ft. bgs): *12.7* DATE: *12/07/93* TIME: *5:00pm*
DRILLING METHOD: *10 in. Hollow Stem Auger*	TOTAL DEPTH: *28 Feet*
DRILLING COMPANY: *Exploration Geoservices*	GEOLOGIST: *BS*

DEPTH feet	PID (ppm)	BLOWS/FT. *	SAMPLE NUMBER	SOIL CLASS	GEOLOGIC DESCRIPTION
					DRILLING THROUGH AN EXISTING WELL BOX.
					Bottom of a well box at 2.5 feet.
				CL	SANDY CLAY (CL) - gray, very stiff, damp, 70% fines, 30% fine grained sand, low plasticity.
5	47	38	ADR-2-5.5	CL	SILTY CLAY WITH SAND (CL) - brown mottled gray, hard, damp, 85% fines, 15% fine grained sand, medium plasticity.
10	25	21	ADR-2-10.5		Color change to olive brown, increasing sand, becoming moist, very stiff.
	51	21	ADR-2-12		
15	9	23	ADR-2-15.5		Becoming very moist. No water in hole after waiting 10 minutes.
				SW	GRAVELLY SAND WITH CLAY (SW) - olive brown, very dense, saturated, 60% fine to coarse grained sand, 30% fine gravel, 10% fines.
20	0	50 /5"	ADR-2-20.5		
				SP	SAND (SP) - brownish gray, dense, saturated, 100% fine grained sand.
25	0	34	ADR-2-25		
	0	61	ADR-2-27.5	CL	SILTY CLAY (CL) - bluish gray, hard, damp to moist, 90% fines, 10% fine grained sand, medium plasticity.
30					Bottom of boring at 28 feet. 12/06/93
35					(* = converted to equivalent standard penetration blows/ft.)

WELL DIAGRAM



JOB NUMBER: *7927.17*

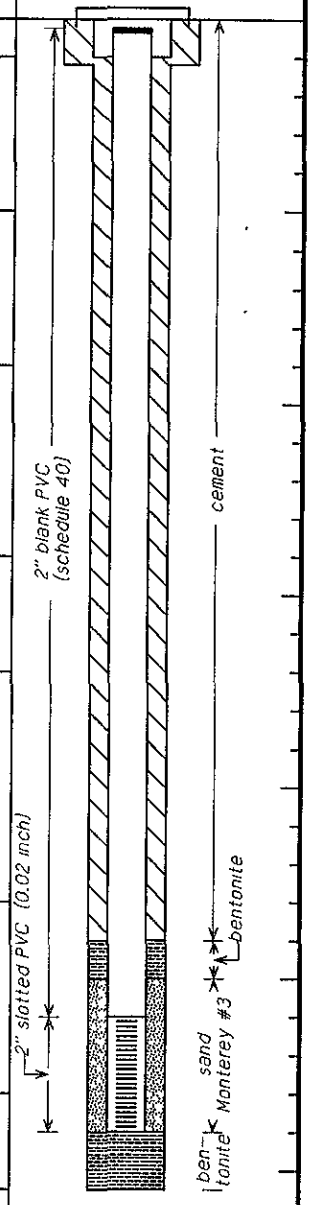
GeoStrategies, Inc.
6747 Sierra Court - Suite G Dublin, Ca. 95468

Log of Boring AS-3

PROJECT: *ARCO Station 2169*	LOCATION: *889 West Grand Avenue Oakland, CA.*
GSI PROJECT NO. : *7927.11*	SURFACE ELEVATION: *ft. MSL*
DATE STARTED: *9/8/93*	WL (ft. bgs): *12.5* DATE: *9/8/93* TIME: *10:30*
DATE FINISHED: *9/8/93*	WL (ft. bgs): *12.0* DATE: *9/8/93* TIME: *12:00*
DRILLING METHOD: *8 in. Hollow Stem Auger*	TOTAL DEPTH: *30.5 Feet*
DRILLING COMPANY: *Exploration Geoservices*	GEOLOGIST: *BS*

DEPTH feet	PID (ppm)	BLOWS/FT. *	SAMPLE NUMBER	SOIL CLASS	GEOLOGIC DESCRIPTION
				PV	PAVEMENT SECTION - 7" baserock, 5" asphalt.
				CL	SILTY CLAY WITH SAND (CL) - brownish black (5YR 2/1), stiff, damp, medium plasticity, 80% fines, 20% fine grained sand.
5	151	29	AS-3-5.5	SC	CLAYEY SAND (SC) - dark greenish gray (5GY 4/1), dense, damp, 60% fine grained sand, 40% fines. Color change to moderate yellowish brown (10YR 5/4) at 6 feet.
10	902	28	AS-3-10.5	ML	CLAYEY SILT WITH SAND (ML) - light olive brwon (5Y 5/6), very stiff, damp, 70% fines, 30% fine grained sand, low to medium plasticity.
	886	31	AS-3-12.5		Increasing sand, saturated at 12.5 feet.
15	4	11		SC	CLAYEY SAND (SC) - light brown (5YR 5/6) with grayish green (10GY 5/2) mottling, medium dense, saturated, 70% fine grained sand, 30% fines.
				SW	GRAVELLY SAND (SW) - dark yellowish brown (10YR 4/2), very dense, saturated, 60% fine to coarse grained sand, 35% gravel, 5% fines.
20	0	57	AS-3-20.5		
				SP	SAND (SP) - grayish olive (10Y 4/2), very dense, saturated, 100% fine to medium grained sand.
25	0		AS-3-26.0		
				CL	CLAY (CL) - medium bluish gray (5G 5/1), hard, damp, 90% fines, 10% fine grained sand, medium to high plasticity.
30	0	30	AS-3-30		
					Bottom of boring at 30.5 feet 9/8/93
35					(* = converted to equivalent standard penetrations blows/ft.)

WELL DIAGRAM



JOB NUMBER: *7927.11*

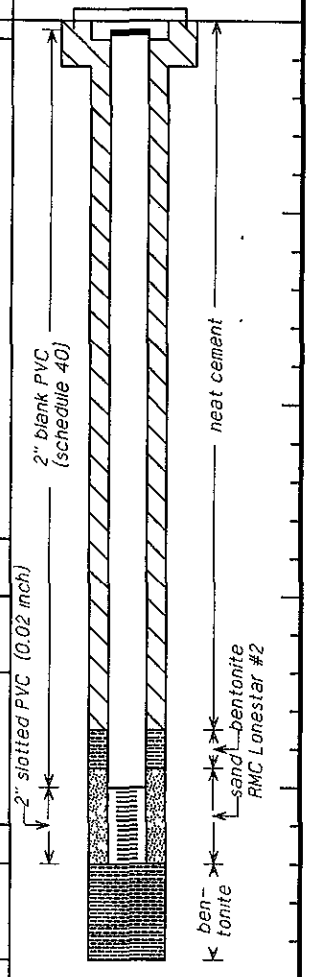
GeoStrategies, Inc.
6747 Sierra Court - Suite G Dublin, Ca. 95468

Log of Boring AS-4

PROJECT: *ARCO Station 2169*	LOCATION: *889 West Grand Avenue, Oakland, CA.*
GSI PROJECT NO.: *7927.17*	SURFACE ELEVATION: *ft. MSL*
DATE STARTED: *12/07/93*	WL (ft. bgs): *12.8* DATE: *12/07/93* TIME: *3:00pm*
DATE FINISHED: *12/07/93*	WL (ft. bgs): *13* DATE: *12/07/93* TIME: *7:05pm*
DRILLING METHOD: *8 in. Hollow Stem Auger*	TOTAL DEPTH: *24.5 Feet*
DRILLING COMPANY: *Exploration Geoservices*	GEOLOGIST: *BS*

DEPTH feet	PID (ppm)	BLOWS/FT. *	SAMPLE NUMBER	SOIL CLASS	GEOLOGIC DESCRIPTION
				PV	PAVEMENT SECTION - 3" asphalt over baserock.
				GP	GRAVEL (GP) - gray, very dense, damp, 100% gravel (BACKFILL).
5					
10					
	30	14	AS-4-13.5	SC	CLAYEY SAND (SC) - gray, medium dense, wet, 85% fine grained sand, 15% fines.
15	28	38	AS-4-15.5	CL	GRAVELLY CLAY WITH SAND (CL) - brown mottled gray, hard, moist, 50% clay, 30% gravel, 20% fine to coarse grained sand, low plasticity.
				SW	GRAVELLY SAND (SW) - dark olive gray, very dense, saturated, 60% fine to coarse grained sand, 30% gravel, 10% fines.
20	0	62	AS-4-20.5	SP	SAND (SP) - gray, very dense, saturated, 95% fine grained sand, 5% fines.
				CL	SILTY CLAY (CL) - dark bluish gray, hard, damp, 90% fines, 10% fine grained sand, medium plasticity.
	7	50	AS-4-24		Increasing sand.
25					Bottom of boring at 24.5 feet. 12/07/93
30					
35					

WELL DIAGRAM



(* = converted to equivalent standard penetration blows/ft.)

JOB NUMBER: *7927.17*

GeoStrategies, Inc.
6747 Sierra Court - Suite G Dublin, Ca. 95468

Log of Boring AS-5

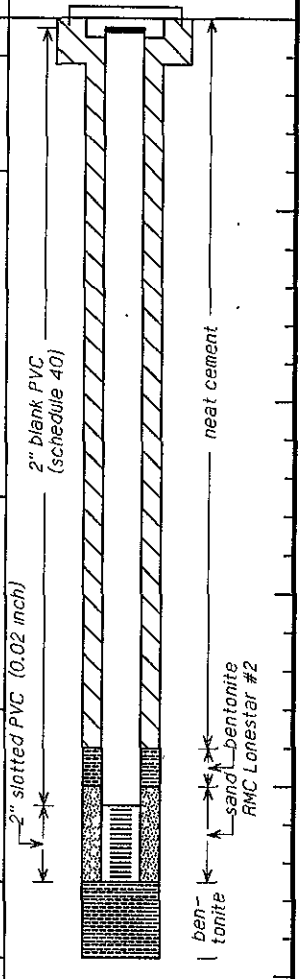
PROJECT: *ARCO Station 2169*	LOCATION: *889 West Grand Avenue, Oakland, CA.*
GSI PROJECT NO.: *7927.17*	SURFACE ELEVATION: *ft. MSL*
DATE STARTED: *12/07/93*	WL (ft. bgs): *13* DATE: *12/07/93* TIME: *11:00am*
DATE FINISHED: *12/07/93*	WL (ft. bgs): *12.8* DATE: *12/07/93* TIME: *7:10pm*
DRILLING METHOD: *8 in. Hollow Stem Auger*	TOTAL DEPTH: *24.5 Feet*
DRILLING COMPANY: *Exploration Geoservices*	GEOLOGIST: *BS*

DEPTH feet	PID (ppm)	BLOWS/FT. *	SAMPLE NUMBER	SAMPLE INT.	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION
						PV	PAVEMENT SECTION - 4" asphalt over baserock.
						CL	SILTY CLAY (CL) - dark brown, damp, 80% fines, 15% fine grained sand, 5% gravel, medium plasticity.
5	29	NM	AS-5-5.5			CL	SANDY CLAY (CL) - gray, damp, 70% fines, 30% fine grained sand, low plasticity.
10	128	NM	AS-5-10.5				Color change to olive brown, some fine gravel, some organic matter, with root holes.
	152	NM	AS-5-12				Increasing sand, becoming moist.
						SC	CLAYEY SAND (SC) - olive brown, saturated, 60% fines, 40% fine grained sand.
15	16	NM	AS-5-15.5				
						SW	GRAVELLY SAND WITH CLAY (SW) - gray, saturated, 60% fine to coarse grained sand, 30% gravel, 10% fines.
20	NM	NM					
						CL	CLAY WITH SAND (CL) - bluish gray, moist, 80% fines, 20% fine grained sand, medium plasticity.
	0	NM	AS-5-24				
25							Bottom of boring at 24.5 feet. 12/07/93
30							
35							

(* = converted to equivalent standard penetration blows/ft.)

NM = not measured

WELL DIAGRAM



JOB NUMBER: *7927.17*

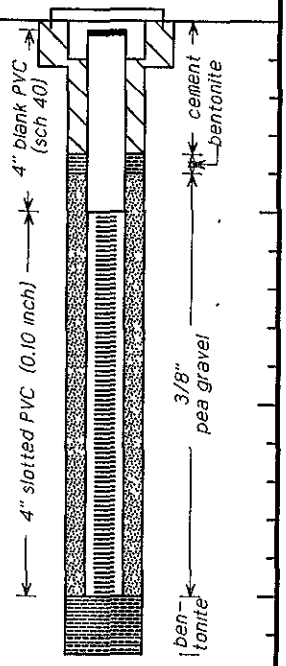
GeoStrategies, Inc.
6747 Sierra Court – Suite G Dublin, Ca. 95468

Log of Boring AV-4

PROJECT: *ARCO Station 2169*	LOCATION: *889 West Grand Avenue, Oakland, CA.*
GSI PROJECT NO. : *7927.11*	SURFACE ELEVATION: *ft. MSL*
DATE STARTED: *9/7/93*	WL (ft. bgs): DATE: TIME:
DATE FINISHED: *9/7/93*	WL (ft. bgs): *13.5* DATE: *9/7/93* TIME:
DRILLING METHOD: *10 in. Hollow Stem Auger*	TOTAL DEPTH: *16.5 Feet*
DRILLING COMPANY: *Exploration Geoservices*	GEOLOGIST: *BS*

DEPTH feet	PID (ppm)	BLOWS/FT. *	SAMPLE NUMBER	SOIL CLASS	GEOLOGIC DESCRIPTION
				PV	PAVEMENT SECTION – 7" concrete, 5" sand.
				CL	SILTY CLAY (CL) – brownish black (5YR 2/1), very stiff, damp, 95% fines, 5% fine grained sand, medium plasticity; fragments of brick and concrete observed (FILL).
5	64	28	AV-4-5	CL	SILTY CLAY (CL) – yellowish brown (10YR 5/4), very stiff, damp, 60% fines, 40% fine grained sand, low plasticity, with organic matter.
10	97	16	AV-4-10.5	SC	CLAYEY SAND (SC) – yellowish brown (10YR 5/4), medium dense, damp, 60% fine grained sand, 40% fines.
	147	25	AV-4-12.5	ML	CLAYEY SILT WITH SAND (ML) – light olive brown (5Y 5/6), very stiff, damp, 70% fines, 30% fine grained sand, low plasticity.
				SC	
15	70	22	AV-4-16	CL	CLAYEY SAND (SC) – brown (10YR 5/3), medium dense, very moist, 60% fine grained sand, 40% fines.
					SANDY CLAY (CL) – light brown (5YR 5/6), very stiff, moist, 70% fines, 30% fine grained sand, plasticity.
					Bottom of boring at 16.5 feet. 9/7/93
20					
25					
30					
35					

WELL DIAGRAM



(* = converted to equivalent standard penetration blows/ft.)

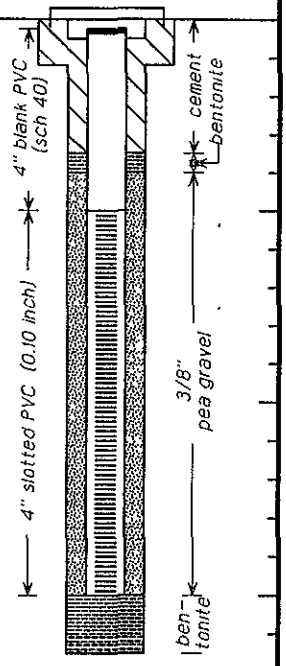
GeoStrategies, Inc.
6747 Sierra Court - Suite G Dublin, Ca. 95468

Log of Boring AV-5

PROJECT: *ARCO Station 2169*	LOCATION: *889 West Grand Avenue, Oakland, CA.*
GSI PROJECT NO.: *7927.11*	SURFACE ELEVATION: *ft. MSL*
DATE STARTED: *9/7/93*	WL (ft. bgs): DATE: TIME:
DATE FINISHED: *9/7/93*	WL (ft. bgs): *13.5* DATE: *9/7/93* TIME: *18:10*
DRILLING METHOD: *10 in. Hollow Stem Auger*	TOTAL DEPTH: *16.5 Feet*
DRILLING COMPANY: *Exploration Geoservices*	GEOLOGIST: *BS*

DEPTH feet	PID (ppm)	BLOWS/FT. *	SAMPLE NUMBER	SOIL CLASS	GEOLOGIC DESCRIPTION
				PV	PAVEMENT SECTION - 7" concrete, 5" sand.
				SP	SAND (SP) - brownish black (5YR 2/1), medium dense, damp, brick and concrete fragments observed (FILL).
				CL	
5	10	28	AV-5-5	CL	SILTY CLAY (CL)- brownish black (5YR 2/1), very stiff, damp, 95% fines, 5% fine grained sand, medium plasticity, fragments of brick and concrete observed (FILL).
				ML	SANDY CLAY (CL) - grayish olive (10Y 4/2), very stiff, damp, 85% fines, 15% fine grained sand, low to medium plasticity.
10	55	15	AV-5-10.5		CLAYEY SILT WITH SAND (ML) - light olive brown (5Y 5/6) with greenish gray (5G 6/1) mottling, very stiff, damp, 50% silt, 35% clay, 15% fine grained sand.
	88	18	AV-5-12.5		Increasing sand, becoming moist at 12.5 feet.
				SC	CLAYEY SAND (SC) - light olive brown (5Y 5/6), dense, very moist, 60% fine grained sand, 40% fines.
15	19	22	AV-5-15.5	CL	SANDY CLAY (CL) - light brown (5YR 5/6) with grayish green (10GY 5/2) mottling, very stiff, moist, 70% fines, 30% fine grained sand, low plasticity.
				SW	GRAVELLY SAND WITH CLAY (SW) - light olive brown (5YR 5/6) mottled brown (5YR 5/6), medium dense, saturated, 75% fine to medium grained sand, 15% fine gravel, 10% fines.
20					Bottom of boring at 16.5 feet. 9/7/93
25					
30					
35					

WELL DIAGRAM



(* = converted to equivalent standard penetration blows/ft.)

GeoStrategies, Inc.
6747 Sierra Court – Suite G Dublin, Ca. 95468

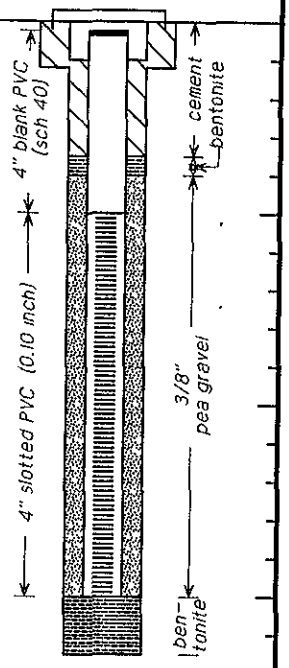
Log of Boring AV-6

PROJECT: *ARCO Station 2169*	LOCATION: *889 West Grand Avenue, Oakland, CA.*
GSI PROJECT NO.: *7927.17*	SURFACE ELEVATION: *ft. MSL*
DATE STARTED: *12/06/93*	WL (ft. bgs): *14.0* DATE: *12/06/93* TIME: *10:30am*
DATE FINISHED: *12/06/93*	WL (ft. bgs): *14.2* DATE: *12/07/93* TIME: *7:00pm*
DRILLING METHOD: *10 in. Hollow Stem Auger*	TOTAL DEPTH: *16.5 Feet*
DRILLING COMPANY: *Exploration Geoservices*	GEOLOGIST: *BS*

DEPTH feet	PID (ppm)	BLOWS/FT.*	SAMPLE NUMBER	SOIL CLASS	GEOLOGIC DESCRIPTION
				PV	PAVEMENT SECTION – 3" asphalt over baserock.
				CL	SILTY CLAY WITH SAND (CL) – dark brown, hard, damp, 80% fines, 20% fine grained sand, medium plasticity.
5	0	42	AV-6-5.5	CL	SANDY CLAY (CL) – olive brown, hard, damp, 60% fines, 40% fine to coarse grained sand, low plasticity.
10	17	49	AV-6-10.5		Color change to olive brown mottled gray, increasing sand, becoming moist.
	117	38	AV-6-12.5		
15	17	34	AV-6-16	SP	SILTY SAND (SM) – olive gray, dense, saturated, 85% fine to medium grained sand, 15% fines.
				CL	SANDY CLAY (CL) – light brown mottled olive, hard, moist, 70% fines, 30% fine grained sand, medium plasticity.
20					Bottom of boring at 16.5 feet. 12/06/93
25					
30					
35					

(* = converted to equivalent standard penetration blows/ft.)

WELL DIAGRAM



JOB NUMBER: *7927.17*

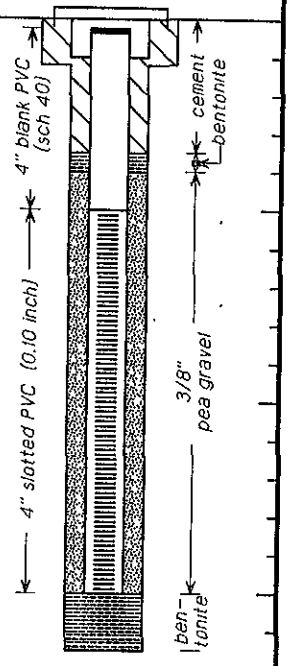
GeoStrategies, Inc.
6747 Sierra Court - Suite G Dublin, Ca. 95468

Log of Boring AV-7

PROJECT: *ARCO Station 2169*	LOCATION: *889 West Grand Avenue, Oakland, CA.*
GSI PROJECT NO. : *7927.17*	SURFACE ELEVATION: *ft. MSL*
DATE STARTED: *12/06/93*	WL (ft. bgs): *12.8* DATE: *12/06/93* TIME: *11:30am*
DATE FINISHED: *12/06/93*	WL (ft. bgs): *12.0* DATE: *12/07/93* TIME: *7:00pm*
DRILLING METHOD: *10 in. Hollow Stem Auger*	TOTAL DEPTH: *16.5 Feet*
DRILLING COMPANY: *Exploration Geoservices*	GEOLOGIST: *BS*

DEPTH feet	PID (ppm)	BLOWS/FT.*	SAMPLE NUMBER	SOIL CLASS	GEOLOGIC DESCRIPTION
				PV	PAVEMENT SECTION - 4" asphalt over baserock
				CL	SILTY CLAY WITH SAND (CL) - dark brown, damp, very stiff, 80% fines, 20% fine grained sand, medium plasticity, pieces of brick observed (FILL).
5	35	34	AV-7-5.5	CL	SILTY CLAY (CL) - greenish gray, hard, damp, 90% fines, 10% fine grained sand, medium plasticity.
				ML	SANDY SILT WITH CLAY (ML) - olive gray, hard, damp, 60% fines, 40% fine to medium grained sand, low plasticity.
				CL	GRAVELLY CLAY WITH SAND (CL) - brown mottled gray, hard, damp, 60% fines, 30% fine gravel, 10% fine sand, low plasticity.
10	157	39	AV-7-10.5	SC	CLAYEY SAND (SC) - gray mottled brown, dense, moist, 70% fine sand, 30% fines.
	129	31	AV-7-12		Becoming saturated at 12.8 feet.
15	61	34	AV-7-15.5	GC	CLAYEY GRAVEL WITH SAND (GC) - brown mottled gray, dense, moist, 50% gravel, 30% fines, 20% sand.
					Bottom of boring at 16.5 feet. 12/06/93
20					
25					
30					
35					

WELL DIAGRAM



(* = converted to equivalent standard penetration blows/ft.)

JOB NUMBER: *7927.17*

APPENDIX E

WELLHEAD SURVEY REPORTS

ALHAMBRA LAND SURVEYORS

ENGINEERING SURVEYING

649 MAIN STREET, SUITE 103
MARTINEZ, CA 94553
(510) 370-9700

TRANSMITTAL LETTER

TO: Barbara Sieminski

FROM: John Koch

Job No.: 93072

COMPANY: GeoStrategies Inc.

Re: GSI Job #792711-13

FAX NO: (510) 783-1089

SUBJECT: Arco Station 2169
889 West Grand Avenue
@ Market Street
Oakland, CA

PER: _x_ Your request.

___ Our telephone conversation of: _____

___ Other: _____

FIND ENCLOSED:

1. Tabulation of specified wells.

2. Plot of specified wells.

NO. OF PAGES (including transmittal): 4

MESSAGE:

THANK YOU

ALHAMBRA LAND SURVEYORS

ENGINEERING SURVEYING

649 MAIN STREET, SUITE 103
MARTINEZ, CA 94553
(510) 370 9700

LICENSED LAND SURVEYOR
JOHN E. KOCH
No. 4811
Exp. 09-30-96
STATE OF CALIFORNIA

GeoStrategies Inc.
2140 West Winton Avenue,
Hayward, CA 94545
(510)352-4800
FAX(510)783-1089

Tabulation of Elevations as of 05:00 p.m. 08/05/93

GSI JOB NUMBER 792711-13
Project Manager:Barbara Sieminski
Site: ARCO Service Station #2169
889 West Grand Avenue
@ Market Street
Oakland, CA

BENCHMARK: City of Oakland BM no. 2589. Cut Square on top of curb at the west return of the southwest corner of West Grand Avenue and Market Street (Elevation = 11.829').

MONITOR WELL DATA TABLE

Well Designation	Elevation	Description
AS-1	12.87	Top of PVC Casing
	13.15	Top of Box
AS-2	13.30	Top of PVC Casing
	13.53	Top of Box
AS-3	12.91	Top of PVC Casing
	13.29	Top of Box
AV-4	13.63	Top of PVC Casing
	13.85	Top of Box
AV-5	12.63	Top of PVC Casing
	13.15	Top of Box

ALHAMBRA LAND SURVEYORS
ENGINEERING SURVEYING
649 MAIN STREET, SUITE 103
MARTINEZ, CA 94553
(510) 370-9700

GSI JOB #792711-13
ARCO 2169

NOTES:

1. Datum is City of Oakland =USC&GS + 3.00'

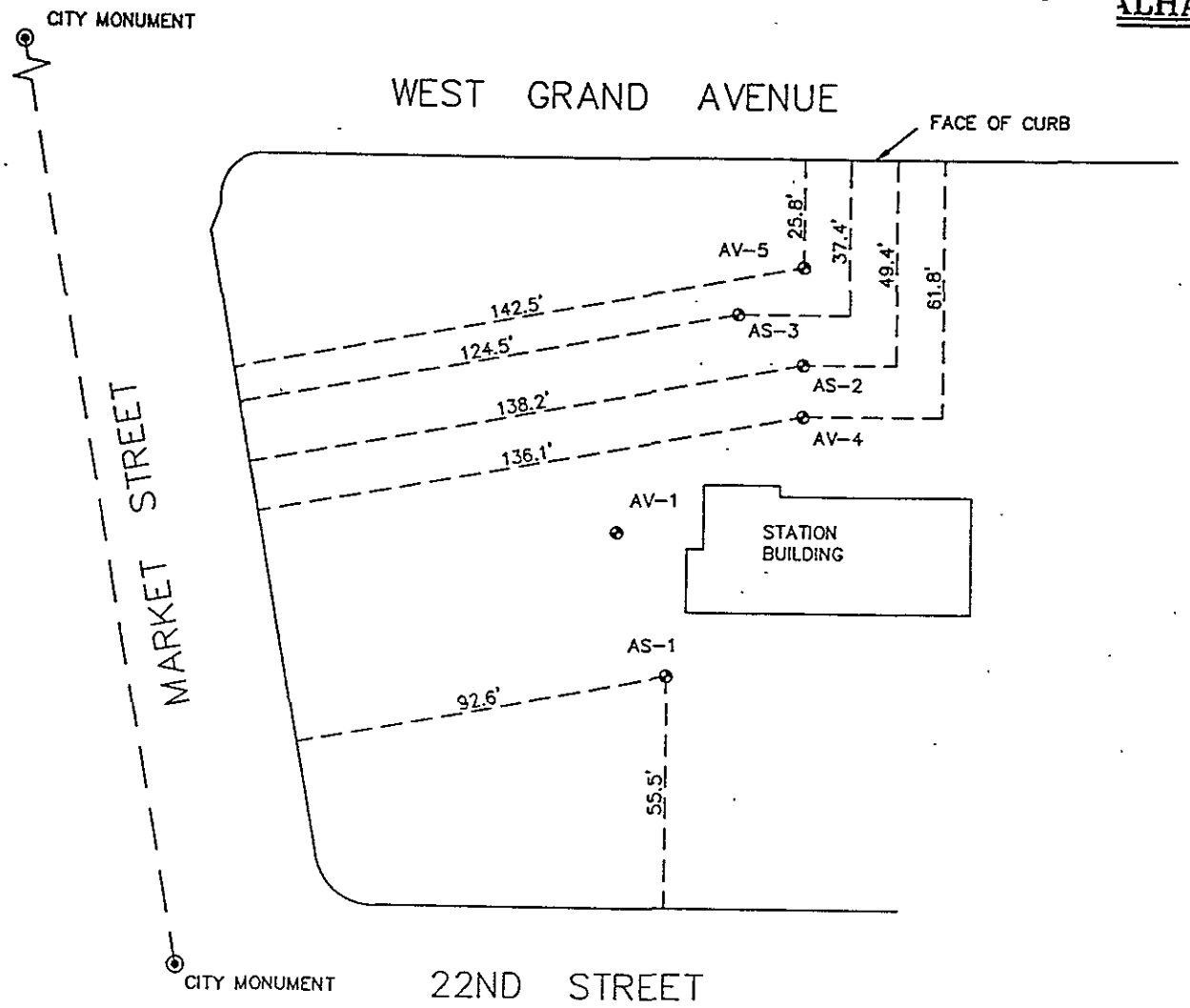
2. Top of PVC Casing Elevation located at a notch set on the top of PVC for all wells.

3. Top of Box elevation located at the rim of "Christie" box for all wells.

4. A-6 was resurveyed and found to be within 0.01' of elevation (translated to City of Oakland Datum) shown on report of 02/25/93 provided by client.

LICENSED LAND SURVEYOR
JOHN E. KOCH
No. 4811
Exp. 09-30-96
STATE OF CALIFORNIA

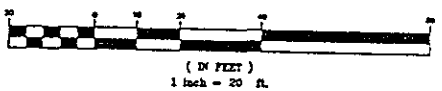
ALHAMBRA LAND SURVEYORS
ENGINEERING SURVEYING
649 MAIN STREET, SUITE 103
MARTINEZ, CA 94553
(510) 370-9700



ELEVATIONS

WELL NUMBER	TOP OF CASING	TOP OF BOX
AS-1	12.87	13.15
AS-2	13.30	13.53
AS-3	12.91	13.29
AV-4	13.63	13.85
AV-5	12.63	13.15

GRAPHIC SCALE



BENCHMARK:
CITY OF OAKLAND BM NO. 2589.
CUT SQUARE ON TOP OF CURB AT THE WEST RETURN OF THE SOUTHWEST CORNER OF WEST GRAND AND MARKET.

ELEVATION = 11.829'
DATUM IS CITY OF OAKLAND = USC&GS - 3.00'

SITE: ARCO SERVICE STATION #2169 889 WEST GRAND AVENUE OAKLAND, CALIFORNIA GIS JOB # 792711-13	CLIENT: GEOSTRATEGIES INC. 2140 WEST WINTON AVENUE HAYWARD, CA 94545	DRAWN BY: T.R.	DATE: 9/22/93
		CHECKED BY: J.E.K.	DRAWING NO.: 93072
		JOB NO.: 93072	SHEET 1 OF 1

Virgil Chavez Land Surveying
1418 Lassen Street
Vallejo, California 94591
707.553.2476

February 11, 1994
Project No. 1104-08

Barbara Sieminski
GeoStrategies, Inc.
6747 Sierra Ct., Suite D
Dublin, Ca. 94568

Subject: Monitoring Well Survey
889 West Grand Ave.
Oakland, Ca.

Dear Barbara:

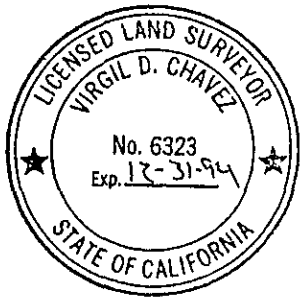
This is to confirm that we have proceeded at your request to survey the ground water monitoring wells located at the above referenced location. The survey was performed on February 4, 1994. My findings are shown in the table on page 2, and are based on U.S.G.S. Datum. The benchmark used for the survey was a cut square in the top of curb at the southwest corner of W. Grand & Market (Elev.=11.829' City datum; add 3.00' to U.S.G.S. datum).

Measurements for top of box were taken at approximate north side of top of box. Measurements for top of casing were marked with hashes using a black marker on the top of casing.

Sincerely yours,

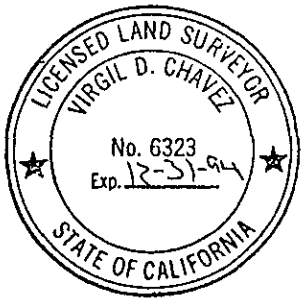
Virgil D. Chavez

Virgil D. Chavez, P.L.S. 6323
Virgil Chavez Land Surveying



Monitoring Well Survey
889 West Grand Ave.
Oakland, Ca.

Monitoring Well No.	Rim Elevation	Top of Casing Elevation
A- 1	14.84'	14.16'
A- 2	15.21'	14.55'
A- 3	16.45'	15.75'
A- 4	16.05'	15.25'
A- 5	14.14'	13.51'
AR-1	15.98'	15.61'
AR-2	15.77'	15.28'
ADR-1	14.76'	13.95'
ADR-2	14.97'	14.64'
AV-1	16.55'	15.61'
AV-2	15.67'	14.78'
AV-3	16.23'	15.37'
AV-4	16.89'	16.24'
AV-5	16.20'	15.57'
AV-6	16.85'	16.14'
AV-7	15.27'	14.47'
AS-1	16.28'	15.39'
AS-2	16.55'	15.65'
AS-3	16.34'	15.44'
AS-4	15.61'	14.72'
AS-5	15.77'	14.88'



Virgil D. Chavez, P.L.S. 6323

APPENDIX F

IWM REPORT
AND CHAIN-OF-CUSTODY FORM
AND ANALYTICAL REPORT FOR GROUNDWATER SAMPLES

I NTEGRATED
W ASTESTREAM
M ANAGEMENT, INC.

March 4, 1994

Ms. Barbara Sieminski
Geostrategies
6747 Sierra Court
Suite G
Dublin, CA. 94568

Dear Ms. Sieminski:

Attached are the field data sheets and analytical results for quarterly ground water sampling at ARCO Facility No. A-2169 in Oakland, California. Integrated Wastestream Management measured the depth to water and collected samples from wells at this site on February 9, 1994.

Sampling was carried out in accordance with the protocols described in the "Request for Bid for Quarterly Sampling at ARCO Facilities in Northern California".

Please call us if you have any questions.

Sincerely,
Integrated Wastestream Management

Tom DeLon
Project Manager

Walter H. Howe
Registered Geologist

950 AMES AVENUE MILPITAS, CA. 95035 (408) 942-8955

A- 7927.01

I NTEGRATED
W ASTESTREAM
M ANAGEMENT

A2169QA4.XLS

Summary of Ground Water Sample Analyses ARCO Facility No. A-2169, Oakland, California

WELL NUMBER	A-1	A-2	A-3	A-4	A-5	A-6	AR-1	AR-2	ADR-1	ADR-2
DATE SAMPLED	2/9/94	2/9/94	2/9/94	2/9/94	2/9/94	2/9/94	2/9/94	2/9/94	2/9/94	2/9/94
DEPTH TO WATER	10.09	10.67	11.32	10.01	9.44	9.48	11.08	11.33	9.90	10.73
SHEEN	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE
PRODUCT THICKNESS	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
TPHg	3,000	260	ND	ND	2,200	640	26,000	82	3,000	83,000
BTEX										
BENZENE	560	<0.6	ND	ND	190	<2.9	2,900	ND	380	6,300
TOLUENE	150	ND	ND	ND	130	<3.7	450	ND	140	6,100
ETHLYBENZENE	66	ND	ND	ND	130	<2.4	920	ND	59	2,000
XYLENES	190	ND	ND	ND	310	<8.2	3,000	ND	240	11,000
EPA 3510										
DIESEL	650	NA	NA	NA	NA	NA	4,200	ND	110	12,000

FOOTNOTES:

Concentrations reported in ug/L (ppb).

TPHg = Total Purgeable Petroleum Hydrocarbons (USEPA Method 8015 Modified)

BTEX Distinction (USEPA Method 8020)

PCE = Tetrachloroethene (USEPA Method 8010)

DCE = cis-1, 2-Dichloroethene (USEPA Method 8010)

TCE = Trichloroethene (USEAP Method 8010)

N.D. = Not Detected.

FIELD REPORT

DEPTH TO WATER / FLOATING PRODUCT SURVEY

SITE ARRIVAL TIME: 1245

SITE DEPARTURE TIME:

WEATHER CONDITIONS: Cloudy/cool

PROJECT NO.: _____ LOCATION: 889 West grandaw. OAK DATE: Feb 9, 1994

CLIENT/STATION #: Arco 2169 FIELD TECHNICIAN: Vince/Francisco DAY OF WEEK: Wednesday

DTW ORDER	WELL ID	SURFACE SEAL	LID SECURE	GASKET	LOCK	EXPANDING CAP	TOTAL DEPTH (Feet)	FIRST DEPTH TO WATER (Feet)	SECOND DEPTH TO WATER (Feet)	DEPTH TO FLOATING PRODUCT (Feet)	FLOATING PRODUCT THICKNESS (Feet)	SHEEN (Y = YES, N = NO)	COMMENTS	MATERIALS
8	A-1	OK	Yes	OK	OK	OK	25.0	10.09	10.09	N/A	N/A	N	3" square grading	
3	A-2	"	"	"	"	"	25.0	10.67	10.67	"	"	"	3" square grading	
1	A-3	"	"	"	"	"	29.5	11.32	11.32	"	"	"	3" square grading	
2	A-4	"	"	"	"	"	28.0	10.01	10.01	"	"	"	3" square grading	
10	A-5	"	"	"	"	"	30.0	9.44	9.44	"	"	"	2" Well box / filled up to ABOVE SURFACE DTW 10.13	Busy Street Work
5	A-6	"	"	"	"	"	28.5	9.48	9.48	"	"	"	2" Street well	
6	ADR-2	"	"	"	"	"	26.5	10.73	10.73	"	"	"	4" square grading	
7	ADR-1	"	"	"	"	"	22.0	9.90	9.90	"	"	"	4" square grading	
9	AR-1	"	"	"	"	"	28.0	11.08	11.08	"	"	"	6" square grading	
4	AR-2	"	"	"	"	"	28.5	11 33	11 33	"	"	"	4" CIRCULAR grading missing bolts	

GROUND WATER SAMPLE FIELD DATA SHEET

PROJECT NO: _____ WELL ID: A-3

CLIENT/STATION #: 7720 2169 ADDRESS: 880 W 3rd St Antioch

CASING DIAMETER (inches): 2 | 3 | 4 | 6 | 8 | 12 | Other _____

GALLON/LINEAR FOOT: 0.17 | 0.38 | 0.66 | 1.5 | 2.6 | 5.8 | Other _____

TD 29.5 - DTW 11.32 x GALLON/LINEAR FT. 0.38 x CASING VOLUME 3 = CALCULATED PURGE 20.72 ACTUAL PURGE 21 G

DATE PURGED: 2-9-94 START (2400 Hr) 1430 END (2400 Hr) 1436

DATE SAMPLED: 2-9-94 START (2400 Hr) 1443 END (2400 Hr) 1443

DTW 11.5

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1431	13	7.62	0.72	65.8	clear	
1433	9	7.74	0.81	65.6	clear	
1435	15	7.70	0.84	65.3	clear	
1436	21	7.69	0.82	64.9	clear	

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): _____

PURGING EQUIPMENT

- ___ 2" Bladder Pump
- ✓ Centrifugal Pump
- ___ Submersible Pump
- ___ Dedicated
- ___ Bailer (Teflon®)
- ___ Bailer (PVC)
- ___ Bailer (Stainless Steel)

Other: _____

SAMPLING EQUIPMENT

- ___ 2" Bladder Pump
- ___ DDL Sampler
- ___ Dipper
- ✓ Bailer Disposable
- ___ Bailer (Teflon®)
- ___ Bailer (Stainless Steel)
- ___ Submersible Pump
- ___ Dedicated

Other: _____

REMARKS: _____

PRINT NAME: Vince Valdes

SIGNATURE: Vince Valdes

GROUND WATER SAMPLE FIELD DATA SHEET

PROJECT NO: _____ WELL ID: A-4

CLIENT/STATION #: ARCO 2169 ADDRESS: 889 WEST GRAND AVE, OAK

CASING DIAMETER (inches):	2	3	4	6	8	12	Other _____
GALLON/LINEAR FOOT:	0.17	0.38	0.66	1.5	2.6	5.8	Other _____

TD 28.0 - DTW 10.01 x GALLON/LINEAR FT. .038 x CASING VOLUME 3 = CALCULATED PURGE 20.50 ACTUAL PURGE 21 G

DATE PURGED: 2-9-94 START (2400 Hr) 1447 END (2400 Hr) 1452

DATE SAMPLED: 2-9-94 START (2400 Hr) 1459 END (2400 Hr) 1459

DTW 10.2

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1448	4	6.76	0.99	65.8	clear	
1449	11	6.89	1.08	66.1	clear	
1451	16	6.93	0.96	65.7	clear	
1452	21	6.96	0.97	65.4	clear	

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): _____

PURGING EQUIPMENT

- ___ 2" Bladder Pump
- ✓ Centrifugal Pump
- ___ Submersible Pump
- ___ Dedicated
- ___ Bailer (Teflon®)
- ___ Bailer (PVC)
- ___ Bailer (Stainless Steel)

Other: _____

SAMPLING EQUIPMENT

- ___ 2" Bladder Pump
- ___ DDL Sampler
- ___ Dipper
- ✓ Bailer Disposable
- ___ Bailer (Teflon®)
- ___ Bailer (Stainless Steel)
- ___ Submersible Pump
- ___ Dedicated

Other: _____

REMARKS: _____

PRINT NAME: Vince Valdez

SIGNATURE: Vince Valdez

GROUND WATER SAMPLE FIELD DATA SHEET

PROJECT NO: _____ WELL ID: A-2

CLIENT/STATION #: ARCO 2169 ADDRESS: 859 WEST GRAND AVE OAK

CASING DIAMETER (inches): 2 | 3 | 4 | 6 | 8 | 12 | Other _____

GALLON/LINEAR FOOT: 0.17 | 0.38 | 0.66 | 1.5 | 2.6 | 5.8 | Other _____

TD 25.0 - DTW 10.67 X GALLON/LINEAR FT. 038 X CASING VOLUME 3 = CALCULATED PURGE 16.33 | ACTUAL PURGE 17.0

DATE PURGED: 2-9-94 START (2400 Hr) 1512 END (2400 Hr) 1518

DATE SAMPLED: 2-9-94 START (2400 Hr) 1525 END (2400 Hr) 1535

DTW 11.0

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1514	4	7.09	1.12	68.5	clear	
1515	9	7.07	0.96	68.8	clear	
1516	14	7.08	0.94	68.4	clear	
1518	17	7.06	0.93	68.0	clear	

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): _____

PURGING EQUIPMENT

- ____ 2" Bladder Pump
- ✓ Centrifugal Pump
- ____ Submersible Pump
- ____ Dedicated
- ____ Bailer (Teflon®)
- ____ Bailer (PVC)
- ____ Bailer (Stainless Steel)

Other: _____

SAMPLING EQUIPMENT

- ____ 2" Bladder Pump
- ____ DDL Sampler
- ____ Dipper
- ✓ Bailer Disposable
- ____ Bailer (Teflon®)
- ____ Bailer (Stainless Steel)
- ____ Submersible Pump
- ____ Dedicated

Other: _____

REMARKS: _____

PRINT NAME: Vince Waites

SIGNATURE: Vince Waites

GROUND WATER SAMPLE FIELD DATA SHEET

PROJECT NO: _____ WELL ID: AR-2

CLIENT/STATION #: ARCO 2169 ADDRESS: 889 WEST GRAND AVE. OAK

CASING DIAMETER (inches): 2 | 3 | 4 | 6 | 8 | 12 | Other _____

GALLON/LINEAR FOOT: 0.17 | 0.38 | 0.66 | 1.5 | 2.6 | 5.8 | Other _____

TD 28.5 - DTW 11.33 X GALLON/LINEAR FT. 0.66 X CASING VOLUME 3 = CALCULATED PURGE 33.99 ACTUAL PURGE 34.0

DATE PURGED: 2-9-94 START (2400 Hr) 1537 END (2400 Hr) 1546

DATE SAMPLED: 2-9-94 START (2400 Hr) 1559 END (2400 Hr) 1559

DTW 11.3

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1539	3	7.19	0.88	67.4	clear	
1543	12	7.26	1.03	68.3	clear	
1547	22	7.17	0.97	68.0	clear	
1551	26	7.08	0.95	67.8	clear	
1556	31	7.08	0.94	67.6	clear	

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): _____

PURGING EQUIPMENT

- ____ 2" Bladder Pump
- ✓ Centrifugal Pump
- ____ Submersible Pump
- ____ Dedicated
- ____ Bailer (Teflon®)
- ____ Bailer (PVC)
- ____ Bailer (Stainless Steel)

Other: _____

SAMPLING EQUIPMENT

- ____ 2" Bladder Pump
- ____ DDL Sampler
- ____ Dipper
- ✓ Bailer Disposable
- ____ Bailer (Teflon®)
- ____ Bailer (Stainless Steel)
- ____ Submersible Pump
- ____ Dedicated

Other: _____

REMARKS: _____

PRINT NAME: _____

SIGNATURE: _____

GROUND WATER SAMPLE FIELD DATA SHEET

PROJECT NO: _____ WELL ID: A-6

CLIENT/STATION #: ARCO 2109 ADDRESS: 889 WEST GRAND AVE. OAK

CASING DIAMETER (inches): 2 | 3 | 4 | 6 | 8 | 12 | Other _____

GALLON/LINEAR FOOT: 0.17 | 0.38 | 0.66 | 1.5 | 2.6 | 5.8 | Other _____

TD 28.5 - DTW 9.48 X GALLON/LINEAR FT. 0.17 X CASING VOLUME 3 = CALCULATED PURGE 9.70 ACTUAL PURGE 8.0

DATE PURGED: 2-9-94 START (2400 Hr) 1609 END (2400 Hr) 1614

DATE SAMPLED: 2-9-94 START (2400 Hr) 1621 END (2400 Hr) 1624

DTW 10.0

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1610	2	7.15	0.84	66.9	clear	
1612	4	7.09	0.89	66.5	clear	
1614	8	7.03	0.94	66.4	clear	

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): _____

PURGING EQUIPMENT

- ___ 2" Bladder Pump
- ✓ Centrifugal Pump
- ___ Submersible Pump
- ___ Dedicated
- ___ Bailer (Teflon®)
- ___ Bailer (PVC)
- ___ Bailer (Stainless Steel)

Other: _____

SAMPLING EQUIPMENT

- ___ 2" Bladder Pump
- ___ DDL Sampler
- ___ Dipper
- ✓ Bailer Disposable
- ___ Bailer (Teflon®)
- ___ Bailer (Stainless Steel)
- ___ Submersible Pump
- ___ Dedicated

Other: _____

REMARKS: Well pumped dry at 8 gallons.

PRINT NAME: Vince Valdes

SIGNATURE: Vince Valdes

GROUND WATER SAMPLE FIELD DATA SHEET

PROJECT NO: _____ WELL ID: ADR - 2

CLIENT/STATION #: ARCO 2169 ADDRESS: 999 WEST GRAND AVE. OAK

CASING DIAMETER (inches): 2 | 3 | 4 | 6 | 8 | 12 | Other _____

GALLON/LINEAR FOOT: 0.17 | 0.38 | 0.66 | 1.5 | 2.6 | 5.8 | Other _____

TD 26.5 - DTW 10.73 X (GALLON / LINEAR FT.) 0.66 X (CASING VOLUME) 3 = (CALCULATED PURGE) 31.22 ACTUAL PURGE ~25 G

DATE PURGED: 2-9-94 START (2400 Hr) 1625 END (2400 Hr) 1647

DATE SAMPLED: 2-9-94 START (2400 Hr) 1652 END (2400 Hr) 1658

DTW 23.0

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1641	4	6.93	123	67.5	cloudy	
1643	12	6.98	135	67.3	cloudy	
1644	15	6.99	1.39	67.0	clear	
1647	25	7.01	141	66.9	clear	

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): _____

PURGING EQUIPMENT

- ___ 2" Bladder Pump
- ✓ Centrifugal Pump
- ___ Submersible Pump
- ___ Dedicated
- ___ Bailer (Teflon®)
- ___ Bailer (PVC)
- ___ Bailer (Stainless Steel)

Other: _____

SAMPLING EQUIPMENT

- ___ 2" Bladder Pump
- ___ DDL Sampler
- ___ Dipper
- ✓ Bailer Disposable
- ___ Bailer (Teflon®)
- ___ Bailer (Stainless Steel)
- ___ Submersible Pump
- ___ Dedicated

Other: _____

REMARKS: Well pumped dry at 25 gallons.

PRINT NAME: Vince Vallejos

SIGNATURE: Vince Vallejos

GROUND WATER SAMPLE FIELD DATA SHEET

PROJECT NO: _____ WELL ID: A-1

CLIENT/STATION #: ARCO 2169 ADDRESS: 889 WEST GRAND AVE OAK

CASING DIAMETER (inches): 2 | 3 | 4 | 6 | 8 | 12 | Other _____

GALLON/LINEAR FOOT: 0.17 | 0.38 | 0.66 | 1.5 | 2.6 | 5.8 | Other _____

TD 25.0 - DTW 10.09 X GALLON/LINEAR FT. .038 X CASING VOLUME 3 = CALCULATED PURGE 10.99 ACTUAL PURGE 17.0

DATE PURGED: 2-9-94 START (2400 Hr) 1736 END (2400 Hr) 1741

DATE SAMPLED: 2-9-94 START (2400 Hr) 1748 END (2400 Hr) 1748

DTW 17.0

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1737	5	6.83	1.01	66.0	clear	
1739	11	6.92	1.15	65.8	clear	
1741	17	7.02	1.20	65.4	clear	

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): _____

PURGING EQUIPMENT

- ___ 2" Bladder Pump
- ✓ Centrifugal Pump
- ___ Submersible Pump
- ___ Dedicated
- ___ Bailer (Teflon®)
- ___ Bailer (PVC)
- ___ Bailer (Stainless Steel)

Other: _____

SAMPLING EQUIPMENT

- ___ 2" Bladder Pump
- ___ DDL Sampler
- ___ Dipper
- ✓ Bailer Disposable
- ___ Bailer (Teflon®)
- ___ Bailer (Stainless Steel)
- ___ Submersible Pump
- ___ Dedicated

Other: _____

REMARKS: _____

PRINT NAME: FRANCISCO ABUNGAN

SIGNATURE: Francisco Abungan

GROUND WATER SAMPLE FIELD DATA SHEET

PROJECT NO: _____ WELL ID: AR-1

CLIENT/STATION #: ARCO 2169 ADDRESS: 389 WEST GRAND AVE. OAK

CASING DIAMETER (inches):	2	3	4	6	8	12	Other
GALLON/LINEAR FOOT:	0.17	0.38	0.66	1.5	2.6	5.8	Other

TD 28.0 - DTW 11.08 X GALLON/LINEAR FT. 1.5 X CASING VOLUME 3 = CALCULATED PURGE 76.14 ACTUAL PURGE 77.0

DATE PURGED: 2-9-94 START (2400 Hr) 1801 END (2400 Hr) 1812

DATE SAMPLED: 2-9-94 START (2400 Hr) 1825 END (2400 Hr) 1925

DTW 11.1

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1802	4	7.35	1.73	66.9	cloudy	
1804	21	7.49	1.86	66.3	clear	
1807	47	7.48	1.66	65.8	clear	
1809	57	7.49	1.58	65.0	clear	
1812	77	7.52	1.54	64.9	clear	

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): _____

PURGING EQUIPMENT

- ____ 2" Bladder Pump
- ✓ Centrifugal Pump
- ____ Submersible Pump
- ____ Dedicated
- ____ Bailer (Teflon®)
- ____ Bailer (PVC)
- ____ Bailer (Stainless Steel)

Other: _____

SAMPLING EQUIPMENT

- ____ 2" Bladder Pump
- ____ DDL Sampler
- ____ Dipper
- ✓ Bailer Disposable
- ____ Bailer (Teflon®)
- ____ Bailer (Stainless Steel)
- ____ Submersible Pump
- ____ Dedicated

Other: _____

REMARKS: _____

PRINT NAME: Vince Vallejos

SIGNATURE: Vince Vallejos

GROUND WATER SAMPLE FIELD DATA SHEET

PROJECT NO: _____ WELL ID: A-5

CLIENT/STATION #: ARCO 2169 ADDRESS: 899 WEST GRAND AVE. ORG.

CASING DIAMETER (inches):	2	3	4	6	8	12	Other _____
GALLON/LINEAR FOOT:	0.17	0.38	0.66	1.5	2.6	5.8	Other _____

TD 30.0 - DTW 9.44 X GALLON/LINEAR FT. 0.17 X CASING VOLUME 3 = CALCULATED PURGE 10.48 ACTUAL PURGE 11.0

DATE PURGED: 2-9-94 START (2400 Hr) 1314 END (2400 Hr) 1317

DATE SAMPLED: 2-9-94 START (2400 Hr) 1240 END (2400 Hr) 1340

PTW 10.0

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1315	3	7.58	0.90	61.0	CLEAR	
1316	7	7.46	0.84	65.4	CLEAR	
1317	11	7.47	0.86	65.4	CLEAR	

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): _____

PURGING EQUIPMENT

- ____ 2" Bladder Pump
- ✓ Centrifugal Pump
- ____ Submersible Pump
- ____ Dedicated
- ____ Bailer (Teflon®)
- ____ Bailer (PVC)
- ____ Bailer (Stainless Steel)

Other: _____

SAMPLING EQUIPMENT

- ____ 2" Bladder Pump
- ____ DDL Sampler
- ____ Dipper
- ✓ Bailer Disposable
- ____ Bailer (Teflon®)
- ____ Bailer (Stainless Steel)
- ____ Submersible Pump
- ____ Dedicated

Other: _____

REMARKS: _____

PRINT NAME: FRANCISCO ABUNIAN

SIGNATURE: Francisco Abunian

GROUND WATER SAMPLE FIELD DATA SHEET

PROJECT NO: _____ WELL ID: ADR-1

CLIENT/STATION #: ARCO 2169 ADDRESS: 889 WEST GRAND AVE. OAK:

CASING DIAMETER (inches): 2 | 3 | 4 | 6 | 8 | 12 | Other _____

GALLON/LINEAR FOOT: 0.17 | 0.38 | 0.66 | 1.5 | 2.6 | 5.8 | Other _____

TD 22.0 - DTW 9.90 X GALLON/LINEAR FT. 0.66 X CASING VOLUME 3 = CALCULATED PURGE 23.95 ACTUAL PURGE 24.0

DATE PURGED: 2-9-94 START (2400 Hr) 1707 END (2400 Hr) 1715

DATE SAMPLED: 2-9-94 START (2400 Hr) 1721 END (2400 Hr) 1721

DTW E.C

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1715	7	6.97	1.12	66.7	cloudy	
1710	12	6.99	1.21	66.2	cloudy	
1712	18	6.95	1.20	66.4	clear	
1715	24	7.25	1.18	66.6	clear	

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): _____

PURGING EQUIPMENT

- ___ 2" Bladder Pump
- ___ Bailer (Teflon®)
- ✓ Centrifugal Pump
- ___ Bailer (PVC)
- ___ Submersible Pump
- ___ Bailer (Stainless Steel)
- ___ Dedicated

Other: _____

SAMPLING EQUIPMENT

- ___ 2" Bladder Pump
- ___ Bailer (Teflon®)
- ___ DDL Sampler
- ___ Bailer (Stainless Steel)
- ___ Dipper
- ___ Submersible Pump
- ✓ Bailer Disposable
- ___ Dedicated

Other: _____

REMARKS: _____

PAGE 11 OF 11

PRINT NAME: Lance Childers

SIGNATURE: Lance Childers

Columbia Analytical Services, Inc.

February 25, 1994

Service Request No. SJ94-0195

Gina Austin
Tom DeLon
IWM
950 Ames Avenue
Milpitas, CA 95035

Re: **ARCO Facility No. A2169**

Dear Ms. Austin/Mr. DeLon:

Attached are the results of the water samples submitted to our lab on February 11, 1994. For your reference, these analyses have been assigned our service request number SJ94-0195.

All analyses were performed consistent with our laboratory's quality assurance program. All results are intended to be considered in their entirety, and CAS is not responsible for use of less than the complete report. Results apply only to the samples analyzed.

Please call if you have any questions.

Respectfully submitted:

COLUMBIA ANALYTICAL SERVICES, INC.

Keoni A. Murphy
Laboratory Manager

Annelise J. Bazar
Regional QA Coordinator

KAM/kmh

1921 Ringwood Avenue • San Jose, California 95131 • Telephone 408/437-2400 • Fax 408/437-9356

Acronyms

ASTM	American Society for Testing and Materials
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LUFT	Leaking Underground Fuel Tank
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MRL	Method Reporting Limit
NA	Not Applicable
NAN	Not Analyzed
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected at or above the MRL
NR	Not Requested
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
VPH	Volatile Petroleum Hydrocarbons

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	IWM		**Dates Collected:**	02/09/94
Project:	ARCO Facility No	A2169	**Date Received:**	02/11/94
Sample Matrix:	Water		**Date Extracted:**	02/15/94
			Date Analyzed:	02/17/94
			Service Request:	SJ94-0195

Total Petroleum Hydrocarbons as Diesel
EPA Method 3510/California DHS LUFT Method
Units: µg/L (ppb)

Sample Name	TPH as Deisel	
A-1 (17.0)	650.	(a)
AR-1 (11.1)	4,200.	(b)
AR-2 (11.3)	ND	
ADR-1 (15.0)	110.	(b)
ADR-2 (23.0)	12,000.	(c)
Method Blank	ND	
MRL	50	

(a) Sample contains lower and higher boiling point hydrocarbon mixtures quantitated as diesel. The chromatogram does not match the typical diesel fingerprint.

(b) The sample contains a lower boiling point hydrocarbon mixture quantitated as diesel. The chromatogram does not match the typical diesel fingerprint.

(c) The sample contains a lower boiling point hydrocarbon and diesel mixture quantitated as diesel. The chromatogram does not match the typical diesel fingerprint.

Approved By: Kevin A Murphy Date: February 11, 1994

1804 Bigelow Avenue • San Jose, California 95126 • Telephone: (408)437-9489 • Fax: (408)437-9354

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	IWM	**Dates Collected:**	02/09/94
Project:	ARCO Facility No A2169	**Date Received:**	02/11/94
Sample Matrix:	Water	**Date Extracted:**	N/A
		Date Analyzed:	02/18, 22/94
		Service Request:	SJ94-0195

BTEX and TPH as Gasoline
EPA Methods 5030/8020/California DHS LUFT Method

Analyte:		**Benzene**	**Toluene**	**Ethyl-benzene**	**Total Xylenes**	**TPH as Gasoline**
Units:		µg/L (ppb)	µg/L (ppb)	µg/L (ppb)	µg/L (ppb)	µg/L (ppb)
Method Reporting Limit:		0.5	0.5	0.5	0.5	50
Sample Name	**Date Analyzed**					
A-1 (17.0)	02/18/94	560.	150.	66.	190.	3,000.
A-2 (11.0)	02/18/94	<0.6 (a)	ND	ND	ND	260. (b)
A-3 (11.5)	02/18/94	ND	ND	ND	ND	ND
A-4 (10.2)	02/18/94	ND	ND	ND	ND	ND
A-5 (10.0)	02/18/94	190.	130.	130.	310.	2,200.
A-6 (10.0)	02/22/94	<2.9 (a)	<3.7 (a)	<2.4 (a)	<8.2 (a)	640.
AR-1 (11.1)	02/18/94	2,900.	450.	920.	3,000.	26,000.
AR-2 (11.3)	02/18/94	ND	ND	ND	ND	82 . (b)
ADR-1 (15.0)	02/18/94	380.	140.	59.	240.	3,000.
ADR-2 (23.0)	02/18/94	6,300.	6,100.	2,000.	11,000.	83,000.
Method Blank	02/18/94	ND	ND	ND	ND	ND
Method Blank	02/22/94	ND	ND	ND	ND	ND

(a) Raised MRL due to matrix interference.
(b) The sample contains a single non-fuel component eluting in the gasoline range, and quantitated as gasoline. The chromatogram does not match the typical gasoline fingerprint.

Approved By: Edward Murphy Date: February 25, 1994

APPENDIX A

LABORATORY QC RESULTS

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	IWM		**Dates Collected:**	02/09/94
Project:	ARCO Facility No.	A2169	**Date Received:**	02/11/94
Sample Matrix:	Water		**Date Extracted:**	N/A
			Date Analyzed:	02/18, 22/94
			Service Request:	SJ94-0195

Surrogate Recovery Summary
BTEX and TPH as Gasoline
EPA Methods 5030/8020/California DHS LUFT Method

Sample Name	Date Analyzed	Percent Recovery a.a.a-Trifluorotoluene
A-1 (17.0)	02/18/94	81.
A-2 (11.0)	02/18/94	84.
A-3 (11.5)	02/18/94	94.
A-4 (10.2)	02/18/94	78.
A-5 (10.0)	02/18/94	82.
A-6 (10.0)	02/22/94	101.
AR-1 (11.1)	02/18/94	78.
AR-2 (11.3)	02/18/94	79.
ADR-1 (15.0)	02/18/94	86.
ADR-2 (23.0)	02/18/94	82.
A-3 (11.5) MS	02/18/94	87.
A-3 (11.5) DMS	02/18/94	96.
Method Blank	02/18/94	87.
Method Blank	02/22/94	89.

CAS Acceptance Limits: 62-112

Approved By: KDunitMurphy

Date: February 25, 1994

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	IWM	**Dates Collected:**	02/09/94
Project:	ARCO Facility No. A2169	**Date Received:**	02/11/94
Sample Matrix:	Water	**Date Extracted:**	N/A
		Date Analyzed:	02/18/94
		Service Request:	SJ94-0195

Initial Calibration Verification
BTEX and TPH as Gasoline
EPA Methods 5030/8020/California DHS LUFT Method
Units: µg/L (ppb)

Analyte	True Value	Result	Percent Recovery	CAS Acceptance Criteria
Benzene	25.	25.5	102.	85-115
Toluene	25.	25.6	102.	85-115
Ethylbenzene	25.	22.5	90.	85-115
Total Xylenes	75.	64.9	86.	85-115
TPH as Gasoline	250.	235.	94.	90-110

Approved By: _____ Date: February 25, 1994

[940195 XLW]8020ccs/2/25/94

1231 Ringwood Avenue • San Jose, California 95131 • Telephone (408)437-0400 • Fax (408)437-0356

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	IWM	**Dates Collected:**	02/09/94
Project:	ARCO Facility No. A2169	**Date Received:**	02/11/94
Sample Matrix:	Water	**Date Extracted:**	N/A
		Date Analyzed:	02/18/94
		Service Request:	SJ94-0195

Matrix Spike/Duplicate Matrix Spike Summary
TPH as Gasoline
EPA Methods 5030/California DHS LUFT Method
Units: µg/L (ppb)

Sample Name: A-3 (11.5)

					Percent Recovery		
		Sample	Spike Result				CAS Acceptance
Analyte	Spike Level	Result	MS	DMS	MS	DMS	Criteria
TPH as Gasoline	250.	ND	282.	289.	113.	116.	67-121

Approved By: Karen A Murphy Date February 25, 1994

[940195.XLW]8020tplms/2/25/94

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: IWM
Project: ARCO Facility No. A2169
Sample Matrix: Water

Dates Collected: 02/09/94
Date Received: 02/11/94
Date Extracted: 02/15/94
Date Analyzed: 02/17/94
Service Request: SJ94-0195

Surrogate Recovery Summary
Total Petroleum Hydrocarbons as Diesel
EPA Method 3510/California DHS LUFT Method

Sample Name	Percent Recovery p-Terphenyl
A-1 (17.0)	95.
AR-1 (11.1)	90.
AR-2 (11.3)	90.
ADR-1 (15.0)	90.
ADR-2 (23.0)	89.
MS	99.
DMS	100.
Method Blank	100.

CAS Acceptance Limits: 66-123

Approved By: Kevin A Murphy Date: February 25, 1994

[940195.XLW]tphdsr3/2/25/94

1921 Ringwood Avenue • San Jose, California 95131 • Telephone 408/437-2400 • Fax 408/437-2954

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: IWM
Project: ARCO Facility No. A2169
Sample Matrix: Water

Dates Collected: 02/09/94
Date Received: 02/11/94
Date Extracted: N/A
Date Analyzed: 02/17/94
Service Request: SJ94-0195

Initial Calibration Verification
Total Petroleum Hydrocarbons as Diesel
EPA Method 3510/California DHS LUFT Method
Units: mg/L (ppm)

Analyte	True Value	Result	Percent Recovery	CAS Acceptance Criteria
TPH as Diesel	500.	509.	102.	90-110

Approved By: Kevin M. Murphy Date: February 25, 1994

[940195 NLW]Tphdecs1/2/25/94

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: IWM
Project: ARCO Facility No. A2169
Sample Matrix: Water

Dates Collected: 02/09/94
Date Received: 02/11/94
Date Extracted: 02/15/94
Date Analyzed: 02/17/94
Service Request: SJ94-0195

Matrix Spike/Duplicate Matrix Spike Summary
Total Petroleum Hydrocarbons as Diesel
EPA Method 3510/California DHS LUFT Method
Units: µg/L (ppb)

					Percent Recovery		
		Sample	Spike Result				CAS Acceptance
Analyte	Spike Level	Result	MS	DMS	MS	DMS	Criteria
Diesel	4.000.	ND	4.360.	4.550.	109.	114.	61-141

Approved By: Keoni A Murphy Date: February 25, 1994

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APPENDIX B

CHAIN OF CUSTODY

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. IWM-94-5CC

Chain of Custody

ARCO Facility no. A 2169	City (Facility) OAKLAND	Project manager (Consultant) TOM DeLaw	Laboratory name Columbia
ARCO engineer Tyler Christie	Telephone no. (ARCO)	Telephone no. (Consultant) 408/942 8955	Fax no. (Consultant) 408/942 1499
Consultant name I.W.M.		Address (Consultant) 950 Ames ave. Milp. Ca 95035	Contract number 07077

Method of shipment: CAS COURIER

Sample I.D.	Lab no.	Container no.	Matrix: Soil	Matrix: Water	Matrix: Other	Preservation: Ice	Preservation: Acid HCl	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH EPA M602/8020/8015	TPH Modified 8015 Gas ☒ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Metals ☐ Semi VOA ☐ VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐	TPH/HOLD SEE BOX
FB	1-2	2		✓		✓	✓	2-9-94	1250		✓	✓									
A-1	3-5	3		✓		✓	✓		1748		✓	✓									✓
A-2	6-7	2		✓		✓	✓		1525		✓	✓									
A-3	8-9	2		✓		✓	✓		1443		✓	✓									
A-4	10-11	2		✓		✓	✓		1459		✓	✓									
A-5	12-13	2		✓		✓	✓		1840		✓	✓									
A-6	14-15	2		✓		✓	✓		1621		✓	✓									
AR-1	16-18	3		✓		✓	✓		1825		✓	✓									✓
AR-2	19-21	3		✓		✓	✓		1559		✓	✓									✓
ADR-1	22-24	3		✓		✓	✓		1721		✓	✓									✓
ADR-2	25-27	3		✓		✓	✓		1658		✓	✓									✓

Special detection Limit/reporting

Special QA/QC

Remarks: ~~Hold~~ on B

Lab number: 5594-0195

Turnaround time
- Priority Rush 1 Business Day ☐
- Rush 2 Business Days ☐
- Expedited 5 Business Days ☐
- Standard 10 Business Days ☒

Condition of sample: Good / cold		Temperature received: cool	
Relinquished by sampler: Vince Salcedo	Date 2-11-94 Time	Received by: CAS/SS	2/11/94
Relinquished by	Date Time	Received by	
Relinquished by	Date Time	Received by laboratory	Date Time

Distribution: White copy — Laboratory; Canary copy — ARCO Environmental Engineering; Pink copy — Consultant
APPC-3292 (2-91)

APPENDIX G

ANALYTICAL REPORT
AND CHAIN-OF-CUSTODY FORM
FOR SOIL SAMPLES

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

Gettler Ryan/Geostrategies
2150 W. Winton Avenue
Hayward, CA 94545
Attention: Matt Donohue

Project: 2169-93-2, Arco 2169-Oakland

Enclosed are the results from 13 soil samples received at Sequoia Analytical on September 9,1993. The requested analyses are listed below:

SAMPLE #	SAMPLE DESCRIPTION	DATE OF COLLECTION	TEST METHOD
3I50101	Soil, AV-4-5	9/7/93	EPA 5030/8015/8020
3I50102	Soil, AV-4-10.5	9/7/93	EPA 5030/8015/8020
3I50103	Soil, AV-4-12.5	9/7/93	EPA 5030/8015/8020
3I50104	Soil, AV-4-16	9/7/93	EPA 5030/8015/8020
3I50105	Soil, AV-5-5.5	9/7/93	EPA 5030/8015/8020
3I50106	Soil, AV-5-10.5	9/7/93	EPA 5030/8015/8020
3I50107	Soil, AV-5-12.5	9/7/93	EPA 5030/8015/8020
3I50108	Soil, AV-5-15.5	9/7/93	EPA 5030/8015/8020
3I50109	Soil, AS-1-6	9/7/93	EPA 3550/8015 EPA 5030/8015/8020
3I50110	Soil, AS-1-11	9/7/93	EPA 3550/8015 EPA 5030/8015/8020
3I50111	Soil, AS-1-12.5	9/7/93	EPA 3550/8015 EPA 5030/8015/8020
3I50112	Soil, AS-1-15.5	9/7/93	EPA 3550/8015 EPA 5030/8015/8020
3I50113	Soil, AS-1-30	9/7/93	EPA 3550/8015 EPA 5030/8015/8020

Please contact me if you have any questions. In the meantime, thank you for the opportunity to work with you on this project.

Very truly yours,

SEQUOIA ANALYTICAL

Nokowhat D. Herrera
Project Manager

927-A

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

Gettler Ryan/Geostrategies	Client Project ID:	2169-93-2, Arco 2169-Oakland	Sampled:	Sep 7, 1993
2150 W. Winton Avenue	Sample Matrix:	Soil	Received:	Sep 9, 1993
Hayward, CA 94545	Analysis Method:	EPA 5030/8015/8020	Reported:	Sep 20, 1993
Attention: Matt Donohue	First Sample #:	3I50101		

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit mg/kg	Sample I.D. 3I50101 AV-4-5	Sample I.D. 3I50102 AV-4-10.5	Sample I.D. 3I50103 AV-4-12.5	Sample I.D. 3I50104 AV-4-16	Sample I.D. 3I50105 AV-5-5.5	Sample I.D. 3I50106 AV-5-10.5
Purgeable Hydrocarbons	1.0	N.D.	270	470	N.D.	N.D.	N.D.
Benzene	0.0050	0.94	2.2	1.9	0.016	N.D.	0.13
Toluene	0.0050	N.D.	7.0	8.7	N.D.	N.D.	N.D.
Ethyl Benzene	0.0050	N.D.	4.5	4.9	N.D.	N.D.	N.D.
Total Xylenes	0.0050	0.25	25	27	0.014	N.D.	0.027
Chromatogram Pattern:		Discrete Peaks	Gas	Gas	Discrete Peaks	--	Discrete Peaks

Quality Control Data

Report Limit Multiplication Factor:	1.0	100	20	1.0	1.0	1.0
Date Analyzed:	9/15/93	9/16/93	9/16/93	9/15/93	9/15/93	9/15/93
Instrument Identification:	GCHP-2	GCHP-2	GCHP-17	GCHP-2	GCHP-2	GCHP-2
Surrogate Recovery, %: (QC Limits = 70-130%)	87	122	116	104	95	92

Purgeable Hydrocarbons are quantitated against a fresh gasoline standard.
Analytes reported as N.D. were not detected above the stated reporting limit.

SEQUOIA ANALYTICAL

Nokowhat D. Herrera
Project Manager

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

Gettler Ryan/Geostrategies	Client Project ID:	2169-93-2, Arco 2169-Oakland	Sampled:	Sep 7, 1993
2150 W. Winton Avenue	Sample Matrix:	Soil	Received:	Sep 9, 1993
Hayward, CA 94545	Analysis Method:	EPA 5030/8015/8020	Reported:	Sep 20, 1993
Attention: Matt Donohue	First Sample #:	3150107		

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit mg/kg	Sample I.D. 3150107 AV-5-12.5	Sample I.D. 3150108 AV-5-15.5	Sample I.D. 3150109 AS-1-6	Sample I.D. 3150110 AS-1-11	Sample I.D. 3150111 AS-1-12.5	Sample I.D. 3150112 AS-1-15.5
Purgeable Hydrocarbons	1.0	30	N.D.	N.D.	41	160	89
Benzene	0.0050	0.24	N.D.	0.031	0.18	1.5	0.77
Toluene	0.0050	0.058	N.D.	N.D.	0.47	4.4	1.5
Ethyl Benzene	0.0050	0.31	N.D.	N.D.	0.35	2.6	0.90
Total Xylenes	0.0050	0.98	N.D.	0.036	1.9	13	4.8
Chromatogram Pattern:		Gas	--	Discrete Peaks	Gas	Gas	Gas

Quality Control Data

Report Limit Multiplication Factor:	1.0	100	1.0	5.0	10	2.0
Date Analyzed:	9/16/93	9/15/93	9/15/93	9/16/93	9/16/93	9/16/93
Instrument Identification:	GCHP-17	GCHP-2	GCHP-2	GCHP-18	GCHP-18	GCHP-17
Surrogate Recovery, %: (QC Limits = 70-130%) * - Coelution Confirmed	110	104	102	155 *	229 *	127

Purgeable Hydrocarbons are quantitated against a fresh gasoline standard.
Analytes reported as N.D. were not detected above the stated reporting limit.

SEQUOIA ANALYTICAL

Nokowhat D. Herrera
Project Manager

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

Gettler Ryan/Geostrategies	Client Project ID:	2169-93-2, Arco 2169-Oakland	Sampled:	Sep 7, 1993
2150 W. Winton Avenue	Sample Matrix:	Soil	Received:	Sep 9, 1993
Hayward, CA 94545	Analysis Method:	EPA 5030/8015/8020	Reported:	Sep 20, 1993
Attention: Matt Donohue	First Sample #:	3I50113		

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit mg/kg	Sample I.D. 3I50113 AS-1-30	Sample I.D.	Sample I.D.	Sample I.D.	Sample I.D.	Sample I.D.
Purgeable Hydrocarbons	1.0	7.5					
Benzene	0.0050	0.24					
Toluene	0.0050	0.78					
Ethyl Benzene	0.0050	0.22					
Total Xylenes	0.0050	1.1					
Chromatogram Pattern:		Gas					

Quality Control Data

Report Limit Multiplication Factor:	1.0
Date Analyzed:	9/15/93
Instrument Identification:	GCHP-2
Surrogate Recovery, %: (QC Limits = 70-130%)	93

* - Coelution Confirmed

Purgeable Hydrocarbons are quantitated against a fresh gasoline standard.
Analytes reported as N.D. were not detected above the stated reporting limit.

SEQUOIA ANALYTICAL

Nokowhat D. Herrera
Project Manager

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

Gettler Ryan/Geostrategies	Client Project ID:	2169-93-2, Arco 2169-Oakland	Sampled:	Sep 7, 1993
2150 W. Winton Avenue	Sample Matrix:	Soil	Received:	Sep 9, 1993
Hayward, CA 94545	Analysis Method:	EPA 3550/8015	Reported:	Sep 20, 1993
Attention: Matt Donohue	First Sample #:	3I50109		

TOTAL EXTRACTABLE PETROLEUM HYDROCARBONS

Analyte	Reporting Limit mg/kg	Sample I.D. 3I50109 AS-1-6	Sample I.D. 3I50110 AS-1-11	Sample I.D. 3I50111 AS-1-12.5	Sample I.D. 3I50112 AS-1-15.5	Sample I.D. 3I50113 AS-1-30	Sample I.D.
Extractable Hydrocarbons	1.0	15	43	14	15	2.8	
Chromatogram Pattern:		Diesel + Non-Diesel Mix > C14	Non-Diesel Mix > C19	Non-Diesel Mix > C14	Non-Diesel Mix > C14	Non-Diesel Mix > C12	

Quality Control Data

Report Limit Multiplication Factor:	1.0	1.0	1.0	1.0	1.0
Date Extracted:	9/15/93	9/15/93	9/15/93	9/15/93	9/15/93
Date Analyzed:	9/16/93	9/16/93	9/16/93	9/16/93	9/16/93
Instrument Identification:	GCHP-5	GCHP-5	GCHP-5	GCHP-5	GCHP-5

Extractable Hydrocarbons are quantitated against a fresh diesel standard.
Analytes reported as N.D. were not detected above the stated reporting limit.

SEQUOIA ANALYTICAL

Nokowhat D. Herrera
Project Manager

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

Gettler Ryan/Geostrategies
2150 W. Winton Avenue
Hayward, CA 94545
Attention: Matt Donohue

Client Project ID: 2169-93-2, Arco 2169-Oakland
Matrix: Soil
QC Sample Group: 3I50101 -13

Reported: Sep 20, 1993

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl-Benzene	Xylenes	Diesel
Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020	EPA 8015
Analyst:	R.Geckler	R.Geckler	R.Geckler	R.Geckler	V.H.
Conc. Spiked:	0.20	0.20	0.20	0.60	15
Units:	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
LCS Batch#:	GBLK091493	GBLK091493	GBLK091493	GBLK091493	DBLK091393
Date Prepared:	9/14/93	9/14/93	9/14/93	9/14/93	9/13/93
Date Analyzed:	9/15/93	9/15/93	9/15/93	9/15/93	9/14/93
Instrument I.D.#:	GCHP-2	GCHP-2	GCHP-2	GCHP-2	GCHP-5
LCS % Recovery:	105	105	105	102	87
Control Limits:	60-140	60-140	60-140	60-140	50-15
MS/MSD Batch #:	3I33201	3I33201	3I33201	3I33201	D3I40801
Date Prepared:	9/14/93	9/14/93	9/14/93	9/14/93	9/13/93
Date Analyzed:	9/15/93	9/15/93	9/15/93	9/15/93	9/14/93
Instrument I.D.#:	GCHP-2	GCHP-2	GCHP-2	GCHP-2	GCHP-5
Matrix Spike % Recovery:	105	115	110	107	80
Matrix Spike Duplicate % Recovery:	105	110	110	107	73
Relative % Difference:	0.0	4.4	0.0	0.0	9.2

Quality Assurance Statement: All standard operating procedures and quality control requirements have been met.

SEQUOIA ANALYTICAL

Nokowhat D. Herrera
Project Manager

Please Note:
The LCS is a control sample of known, interferent free matrix that is analyzed using the same reagents, preparation and analytical methods employed for the samples. The LCS % recovery data is used for validation of sample batch results. Due to matrix effects, the QC limits for MS/MSD's are advisory only and are not used to accept or reject batch results.

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. 2169-93-2

Chain of Custody

ARCO Facility no. 2169	City (Facility) Oakland	Project manager (Consultant) Joel Coffman	Laboratory name Sequoia
ARCO engineer Michael Whelan	Telephone no. (ARCO) (415) 571-2434	Telephone no. (Consultant) (510) 352-4800	Fax no. (Consultant) (510) 783-1089
Consultant name GeoStrategies	Address (Consultant) 2140 West Winton Ave, Hayward, CA 94545		Contract number

Sample I.D.	Lab no.	Container no.	Matrix: Soil	Water	Other	Preservation: Ice	Acid	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH-Gas EPA M602/8020/8015	TPH Modified 8015 Gas ☐ Diesel ☒	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Metals ☐ VOA ☐ Semi VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐		
AV-4-5		1	✓			✓		09/07/93			X										-01	A
AV-4-10.5		1	✓			✓		09/07/93			X										-02	A
AV-4-12.5		1	✓			✓		09/07/93			X										-03	A
AV-4-16		1	✓			✓		09/07/93			X										-04	A
AV-5-5.5		1	✓			✓		09/07/93			X										-05	A
AV-5-10.5		1	✓			✓		09/07/93			X										-06	A
AV-5-12.5		1	✓			✓		09/07/93			X										-07	A
AV-5-15.5		1	✓			✓		09/07/93			X										-08	A
AS-1-6		1	✓			✓		09/07/93			X	X									-09	AB
AS-1-11		1	✓			✓		09/07/93			X	X									-10	AB
AS-1-12.5		1	✓			✓		09/07/93			X	X									-11	AB
AS-1-15.5		1	✓			✓		09/07/93			X	X									-12	AB
AS-1-30		1	✓			✓		09/07/93			X	X									-13	AB

Method of shipment: Sequoia Courier

Special detection Limit/reporting

Special QA/QC

Remarks: 9309501

Lab number

Turnaround time
- Priority Rush 1 Business Day ☐
- Rush 2 Business Days ☐
- Expedited 5 Business Days ☐
- Standard 10 Business Days ☒

Condition of sample:

Temperature received:

Relinquished by sampler: Barbara Sieminski	Date: 09/09/93	Time: 3:24	Received by:
Relinquished by:	Date: 9/9/93	Time: 4:35	Received by:
Relinquished by:	Date:	Time:	Received by laboratory: Date: Time:

White copy — Laboratory; Canary copy — ARCO Environmental Engineering; Pink copy — Consultant

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

Gettler Ryan/Geostrategies
2150 W. Winton Avenue
Hayward, CA 94545
Attention: Matt Donohue

Project: 2169-93-2, Arco 2169-Oakland

Enclosed are the results from 8 soil samples received at Sequoia Analytical on September 9,1993. The requested analyses are listed below:

SAMPLE #	SAMPLE DESCRIPTION	DATE OF COLLECTION	TEST METHOD
3I51801	Soil, AS-2-5.5	9/8/93	EPA 5030/8015/8020
3I51802	Soil, AS-2-10	9/8/93	EPA 5030/8015/8020
3I51803	Soil, AS-2-13	9/8/93	EPA 5030/8015/8020
3I51804	Soil, AS-2-16	9/8/93	EPA 5030/8015/8020
3I51805	Soil, AS-2-24	9/8/93	EPA 5030/8015/8020
3I51806	Soil, AS-3-5.5	9/8/93	EPA 5030/8015/8020
3I51807	Soil, AS-3-10.5	9/8/93	EPA 5030/8015/8020
3I51808	Soil, AS-3-30	9/8/93	EPA 5030/8015/8020

Please contact me if you have any questions. In the meantime, thank you for the opportunity to work with you on this project.

Very truly yours,

SEQUOIA ANALYTICAL

Nokowhat D. Herrera
Project Manager

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

Gettler Ryan/Geostrategies	Client Project ID:	2169-93-2, Arco 2169-Oakland	Sampled:	Sep 8, 1993
2150 W. Winton Avenue	Sample Matrix:	Soil	Received:	Sep 9, 1993
Hayward, CA 94545	Analysis Method:	EPA 5030/8015/8020	Reported:	Sep 20, 1993
Attention: Matt Donohue	First Sample #:	3I51801		

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit mg/kg	Sample I.D. 3I51801 AS-2-5.5	Sample I.D. 3I51802 AS-2-10	Sample I.D. 3I51803 AS-2-13	Sample I.D. 3I51804 AS-2-16	Sample I.D. 3I51805 AS-2-24	Sample I.D. 3I51806 AS-3-5.5
Purgeable Hydrocarbons	1.0	N.D.	N.D.	1,500	N.D.	N.D.	N.D.
Benzene	0.0050	0.016	0.010	5.7	0.018	N.D.	0.016
Toluene	0.0050	0.0060	0.011	31	0.031	N.D.	N.D.
Ethyl Benzene	0.0050	N.D.	N.D.	25	0.0090	N.D.	N.D.
Total Xylenes	0.0050	0.011	0.023	130	0.048	N.D.	N.D.
Chromatogram Pattern:		Gas	Gas	Gas	Gas	--	Gas

Quality Control Data

Report Limit Multiplication Factor:	1.0	1.0	100	1.0	1.0	1.0
Date Analyzed:	9/16/93	9/16/93	9/16/93	9/16/93	9/16/93	9/16/93
Instrument Identification:	GCHP-18	GCHP-18	GCHP-18	GCHP-18	GCHP-18	GCHP-18
Surrogate Recovery, %: (QC Limits = 70-130%) * - Coelution Confirmed	91	91	162 *	93	92	98

Purgeable Hydrocarbons are quantitated against a fresh gasoline standard.
Analytes reported as N.D. were not detected above the stated reporting limit.

SEQUOIA ANALYTICAL

Nokowhat D. Herrera
Project Manager

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

Gettler Ryan/Geostrategies	Client Project ID:	2169-93-2, Arco 2169-Oakland	Sampled:	Sep 8, 1993
2150 W. Winton Avenue	Sample Matrix:	Soil	Received:	Sep 9, 1993
Hayward, CA 94545	Analysis Method:	EPA 5030/8015/8020	Reported:	Sep 20, 1993
Attention: Matt Donohue	First Sample #:	3I51807		

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit mg/kg	Sample I.D. 3I51807 AS-3-10.5	Sample I.D. 3I51808 AS-3-30	Sample I.D.	Sample I.D.	Sample I.D.	Sample I.D.
Purgeable Hydrocarbons	1.0	23	N.D.				
Benzene	0.0050	0.45	0.0060				
Toluene	0.0050	0.73	0.013				
Ethyl Benzene	0.0050	0.36	N.D.				
Total Xylenes	0.0050	2.0	0.013				
Chromatogram Pattern:		Gas	Gas				

Quality Control Data

Report Limit Multiplication Factor:	5.0	1.0
Date Analyzed:	9/16/93	9/16/93
Instrument Identification:	GCHP-18	GCHP-18
Surrogate Recovery, %: (QC Limits = 70-130%)	122	96

* - Coelution Confirmed

Purgeable Hydrocarbons are quantitated against a fresh gasoline standard.
Analytes reported as N.D. were not detected above the stated reporting limit.

SEQUOIA ANALYTICAL

Nokowhat D. Herrera
Project Manager

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

Gettler Ryan/Geostrategies
2150 W. Winton Avenue
Hayward, CA 94545
Attention: Matt Donohue

Client Project ID: 2169-93-2, Arco 2169-Oakland
Matrix: Soil
QC Sample Group: 3I51801 - 08

Reported: Sep 20, 1993

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl-Benzene	Xylenes
Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Analyst:	R.Geckler	R.Geckler	R.Geckler	R.Geckler
Conc. Spiked:	0.20	0.20	0.20	0.60
Units:	mg/kg	mg/kg	mg/kg	mg/kg
LCS Batch#:	GBLK091493	GBLK091493	GBLK091493	GBLK091493
Date Prepared:	9/14/93	9/14/93	9/14/93	9/14/93
Date Analyzed:	9/15/93	9/15/93	9/15/93	9/15/93
Instrument I.D.#:	GCHP-2	GCHP-2	GCHP-2	GCHP-2
LCS % Recovery:	105	105	105	102
Control Limits:	60-140	60-140	60-140	60-140
MS/MSD Batch #:	3I33201	3I33201	3I33201	3I33201
Date Prepared:	9/14/93	9/14/93	9/14/93	9/14/93
Date Analyzed:	9/15/93	9/15/93	9/15/93	9/15/93
Instrument I.D.#:	GCHP-2	GCHP-2	GCHP-2	GCHP-2
Matrix Spike % Recovery:	105	115	110	107
Matrix Spike Duplicate % Recovery:	105	115	110	107
Relative % Difference:	0.0	4.4	0.0	0.0

Quality Assurance Statement: All standard operating procedures and quality control requirements have been met.

SEQUOIA ANALYTICAL

Nokowhat D. Herrera
Project Manager

Please Note:
The LCS is a control sample of known, interferent free matrix that is analyzed using the same reagents, preparation and analytical methods employed for the samples. The LCS % recovery data is used for validation of sample batch results. Due to matrix effects, the QC limits for MS/MSD's are advisory only and are not used to accept or reject batch results.

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. 2169-93-2

Chain of Custody

ARCO Facility no. 2169	City (Facility) Oakland	Project manager (Consultant) Joel Coffman	Laboratory name Sequoia
ARCO engineer Michael Whelan	Telephone no. (ARCO) (415) 571-2434	Telephone no. (Consultant) (510) 352-4800	Fax no. (Consultant) (510) 783-1089
Consultant name GeoStrategies	Address (Consultant) 2140 West Winton Ave, Hayward, CA 94545		Contract number

Sample I.D.	Lab no.	Container no.	Matrix: Soil	Matrix: Water	Matrix: Other	Preservation: Ice	Preservation: Acid	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH — Gas EPA M602/8020/8015	TPH Modified 8015 Gas ☐ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Metals ☐ Semi VOA ☐ VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐	
AS-2-5.5		1	✓			✓		09/08/93			X										-01
AS-2-10		1	✓			✓		09/08/93			X										-02
AS-2-13		1	✓			✓		09/08/93			X										-03
AS-2-16		1	✓			✓		09/08/93			X										-04
AS-2-24		1	✓			✓		09/08/93			X										-05
AS-3-5.5		1	✓			✓		09/08/93			X										-06
AS-3-10.5		1	✓			✓		09/08/93			X										-07
AS-3-30		1	✓			✓		09/08/93			X										-08

Condition of sample:

Temperature received:

Relinquished by sampler: Barbara Sieminski	Date: 09/09/93	Time: 3:24	Received by:
Relinquished by:	Date: 9/9/93	Time: 4:35	Received by:
Relinquished by:	Date:	Time:	Received by laboratory: Date: Time:

Special detection Limit/reporting

Special QA/QC

Remarks: 9309518

Lab number

Turnaround time

- Priority Rush 1 Business Day ☐
- Rush 2 Business Days ☐
- Expedited 5 Business Days ☐
- Standard 10 Business Days ☑

Method of shipment: Sequoia Courier

White copy — Laboratory; Canary copy — ARCO Environmental Engineering; Pink copy — Consultant

792 (2-91)

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

Gettler Ryan/Geostrategies
2150 W. Winton Avenue
Hayward, CA 94545
Attention: Matt Donohue

Project: 2169-93-2, Arco 2169-Oakland

Enclosed are the results from 1 soil sample received at Sequoia Analytical on September 9,1993. The requested analyses are listed below:

SAMPLE #	SAMPLE DESCRIPTION	DATE OF COLLECTION	TEST METHOD
3I31901	Soil Composite, SP(A-D)	9/8/93	Corrosivity Ignitability Reactivity EPA 5030/8015/8020 EPA 5030/8020 TCLP STLC, Lead

Please contact me if you have any questions. In the meantime, thank you for the opportunity to work with you on this project.

Very truly yours,

SEQUOIA ANALYTICAL

Nokowhat D. Herrera
Project Manager

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

Gettler Ryan/Geostrategies	Client Project ID:	2169-93-2, Arco 2169-Oakland	Sampled:	Sep 8, 1993
2150 W. Winton Avenue	Sample Matrix:	TCLP Extract of Soil Composite	Received:	Sep 9, 1993
Hayward, CA 94545	Analysis Method:	EPA 5030/8020	Reported:	Sep 14, 1993
Attention: Matt Donohue	First Sample #:	3I31901		

BTEX DISTINCTION

Analyte	Reporting Limit µg/L	Sample I.D. 3I31901 SP(A-D)	Sample I.D.	Sample I.D.	Sample I.D.	Sample I.D.	Sample I.D.
Benzene	0.50	N.D.					
Toluene	0.50	11					
Ethyl Benzene	0.50	N.D.					
Total Xylenes	0.50	51					

Quality Control Data

Report Limit Multiplication Factor:	20
Date Analyzed:	9/13/93
Instrument Identification:	GCHP-2
Surrogate Recovery, %: (QC Limits = 70-130%)	103

Analytes reported as N.D. were not detected above the stated reporting limit.

SEQUOIA ANALYTICAL

Nokowhat D. Herrera
Project Manager

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

Gettler Ryan/Geostrategies	Client Project ID:	2169-93-2, Arco 2169-Oakland	Sampled:	Sep 8, 1993
2150 W. Winton Avenue	Sample Matrix:	Soil Composite	Received:	Sep 9, 1993
Hayward, CA 94545	Analysis Method:	EPA 5030/8015/8020	Reported:	Sep 14, 1993
Attention: Matt Donohue	First Sample #:	3I31901		

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit mg/kg	Sample I.D. 3I31901 SP(A-D)	Sample I.D.	Sample I.D.	Sample I.D.	Sample I.D.	Sample I.D.
Purgeable Hydrocarbons	1.0	26					
Benzene	0.0050	0.10					
Toluene	0.0050	0.26					
Ethyl Benzene	0.0050	0.21					
Total Xylenes	0.0050	1.2					
Chromatogram Pattern:		Gas					

Quality Control Data

Report Limit Multiplication Factor:	5.0
Date Analyzed:	9/10/93
Instrument Identification:	GCHP-18
Surrogate Recovery, %: (QC Limits = 70-130%)	130

Purgeable Hydrocarbons are quantitated against a fresh gasoline standard.
Analytes reported as N.D. were not detected above the stated reporting limit.

SEQUOIA ANALYTICAL

Nokowhat D. Herrera
Project Manager

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

Gettler Ryan/Geostrategies	Client Project ID:	2169-93-2, Arco 2169-Oakland	Sampled:	Sep 8, 1993
2150 W. Winton Avenue	Sample Descript:	Soil Composite, SP(A-D)	Received:	Sep 9, 1993
Hayward, CA 94545				
Attention: Matt Donohue	Lab Number:	3I31901	Reported:	Sep 14, 1993

CORROSIVITY, IGNITABILITY, AND REACTIVITY

Analyte	Detection Limit	Sample Results
Corrosivity:		
pH	N.A.	8.0
Ignitability:		
Flashpoint (Pensky-Martens), °C	N.A.	> 100 °C
Reactivity:		
Sulfide, mg/kg	13	N.D.
Cyanide, mg/kg	0.50	N.D.
Reaction with water	N.A.	Negative

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL

Nokowhat D. Herrera
Project Manager

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

Gettler Ryan/Geostrategies	Client Project ID:	2169-93-2, Arco 2169-Oakland	Sampled:	Sep 8, 1993
2150 W. Winton Avenue	Sample Descript:	Soil Composite, SP(A-D)	Received:	Sep 9, 1993
Hayward, CA 94545			Analyzed:	see below
Attention: Matt Donohue	Lab Number:	3I31901	Reported:	Sep 14, 1993

LABORATORY ANALYSIS

Analyte	Date Analyzed	Detection Limit	Sample Result
Lead, STLC, mg/L	9/14/93	0.50	2.4

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL

Nokowhat D. Herrera
Project Manager

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

Gettler Ryan/Geostrategies
2150 W. Winton Avenue
Hayward, CA 94545
Attention: Matt Donohue

Client Project ID: 2169-93-2, Arco 2169-Oakland
Matrix: Soil
QC Sample Group: 3I31901

Reported: Sep 14, 1993

QUALITY CONTROL DATA REPORT

ANALYTE	TCLP Benzene	TCLP Toluene	TCLP Ethyl-Benzene	TCLP Xylenes	STLC Lead
Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020	EPA 239.2
Analyst:	M.Nipp	M.Nipp	M.Nipp	M.Nipp	J.Martinez
Conc. Spiked:	10	10	10	30	0.050
Units:	µg/L	µg/L	µg/L	µg/L	mg/L
LCS Batch#:	GBLK091393	GBLK091393	GBLK091393	GBLK091393	BLK091393
Date Prepared:	9/13/93	9/13/93	9/13/93	9/13/93	9/13/93
Date Analyzed:	9/13/93	9/13/93	9/13/93	9/13/93	9/13/93
Instrument I.D.#:	GCHP-2	GCHP-2	GCHP-2	GCHP-2	MV-1
LCS % Recovery:	110	100	100	100	105
Control Limits:	80-120	80-120	80-120	80-120	75-125
MS/MSD Batch #:	G3H17002	G3H17002	G3H17002	G3H17002	3I21502
Date Prepared:	9/13/93	9/13/93	9/13/93	9/13/93	9/13/93
Date Analyzed:	9/13/93	9/13/93	9/13/93	9/13/93	9/13/93
Instrument I.D.#:	GCHP-2	GCHP-2	GCHP-2	GCHP-2	MV-1
Matrix Spike % Recovery:	100	97	95	93	103
Matrix Spike Duplicate % Recovery:	95	90	88	90	105
Relative % Difference:	5.1	7.5	7.7	3.3	1.9

Quality Assurance Statement: All standard operating procedures and quality control requirements have been met.

SEQUOIA ANALYTICAL

Nokowhat D. Herrera
Project Manager

Please Note:
The LCS is a control sample of known, interferent free matrix that is analyzed using the same reagents, preparation and analytical methods employed for the samples. The LCS % recovery data is used for validation of sample batch results. Due to matrix effects, the QC limits for MS/MSD's are advisory only and are not used to accept or reject batch results.

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

Gettler Ryan/Geostrategies	Client Project ID:	2169-93-2, Arco 2169-Oakland
2150 W. Winton Avenue	Matrix:	Soil
Hayward, CA 94545		
Attention: Matt Donohue	QC Sample Group: 3I31901	Reported: Sep 14, 1993

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl-Benzene	Xylenes
Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Analyst:	R.Geckler	R.Geckler	R.Geckler	R.Geckler
Conc. Spiked:	0.20	0.20	0.20	0.60
Units:	mg/kg	mg/kg	mg/kg	mg/kg
LCS Batch#:	GBLK091093	GBLK091093	GBLK091093	GBLK091093
Date Prepared:	9/10/93	9/10/93	9/10/93	9/10/93
Date Analyzed:	9/10/93	9/10/93	9/10/93	9/10/93
Instrument I.D.#:	GCHP-18	GCHP-18	GCHP-18	GCHP-18
LCS % Recovery:	90	90	90	92
Control Limits:	60-140	60-140	60-140	60-140
MS/MSD Batch #:	G3I24037	G3I24037	G3I24037	G3I24037
Date Prepared:	9/10/93	9/10/93	9/10/93	9/10/93
Date Analyzed:	9/10/93	9/10/93	9/10/93	9/10/93
Instrument I.D.#:	GCHP-18	GCHP-18	GCHP-18	GCHP-18
Matrix Spike % Recovery:	95	100	95	95
Matrix Spike Duplicate % Recovery:	95	95	95	95
Relative % Difference:	0.0	5.1	0.0	0.0

Quality Assurance Statement: All standard operating procedures and quality control requirements have been met.

SEQUOIA ANALYTICAL

Nokowhat D. Herrera
Project Manager

Please Note:
The LCS is a control sample of known, interferent free matrix that is analyzed using the same reagents, preparation and analytical methods employed for the samples. The LCS % recovery data is used for validation of sample batch results. Due to matrix effects, the QC limits for MS/MSD's are advisory only and are not used to accept or reject batch results.

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

Gettler Ryan/Geostrategies	Client Project ID:	2169-93-2, Arco 2169-Oakland
2150 W. Winton Avenue	Matrix:	Soil
Hayward, CA 94545		
Attention: Matt Donohue	QC Sample Group: 3I31901	Reported: Sep 14, 1993

QUALITY CONTROL DATA REPORT

ANALYTE	pH	Flashpoint	Reactive Sulfide	Cyanide
Method:	EPA 9045	EPA 1010	SW-846	SW-846
Analyst:	Y.Arteaga	K. Newberrry	K. Newberrry	M.Nguyen
Units:	N.A.	°C	mg/L	mg/L
Date:	9/9/93	9/10/93	9/7/93	9/7/93
Sample #:	3I28006	3I31901	3I09801	3I09801
Sample Concentration:	9.5	> 100	N.D.	N.D.
Sample Duplicate Concentration:	9.5	> 100	N.D.	N.D.
% RPD:	0.0	0.0	0.0	0.0
Control Limits:	0-30	± 5.0	± 20	± 20

SEQUOIA ANALYTICAL

Nokowhat D. Herrera
Project Manager

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. 2169-93-2

Chain of Custody

ARCO Facility no. 2169	City (Facility) Oakland	Project manager (Consultant) Joel Coffman	Laboratory name Sequoia
ARCO engineer Michael Whelan	Telephone no. (ARCO) (415) 571-2434	Telephone no. (Consultant) (510) 352-4800	Fax no. (Consultant) (510) 783-1089
Consultant name	Address (Consultant) 2140 West Winton Ave,		Contract number 07-073

Method of shipment: Sequoia Courier

Sample I.D.	Lab no.	Container no.	Matrix: Soil	Matrix: Water	Matrix: Other	Preservation: Ice	Preservation: Acid	Sampling date	Sampling time	BTEX TCLP 602/EPA 8020	BTEX/TPH – GRS EPA M602/8020/8015	TPH Modified 8015 Gas ☐ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Metals ☐ Semi VOA ☐ VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐	STLC Lead	PCI
SP-A		1	V			V		09/08/93		X	X										X	X
SP-B		1	V			V		09/08/93		X	X										X	X
SP-C		1	V			V		09/08/93		X	X										X	X
SP-D		1	V			V		09/08/93		X	X										X	X

Special detection Limit/reporting

Special QA/QC

Remarks: Composite Sample 48 hr turnaround time

Lab number: 9309319

Turnaround time

- Priority Rush 1 Business Day ☐
- Rush 2 Business Days ☑
- Expedited 5 Business Days ☐
- Standard 10 Business Days ☐

Condition of sample:		Temperature received:	
Relinquished by sampler: Barbara Sieminski	Date: 09/09/93 Time: 3:20	Received by:	
Relinquished by:	Date: 9/9/93 Time: 7:35	Received by:	
Relinquished by:	Date: Time:	Received by laboratory:	Date: 9/9/93 Time: 16:35

Distribution: White copy — Laboratory; Canary copy — ARCO Environmental Engineering; Pink copy — Consultant

SEQUOIA ANALYTICAL
680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

Gettler Ryan/Geostrategies
6747 Sierra Court, Ste J
Dublin, CA 94568
Attention: Matt Donohue

Project: 2169-93-4D/Arco 2169-Oakland

Enclosed are the results from 13 soil samples received at Sequoia Analytical on December 9,1993. The requested analyses are listed below:

SAMPLE #	SAMPLE DESCRIPTION	DATE OF COLLECTION	TEST METHOD
3L63001	Soil, ADR-1-5.5	12/6/93	EPA 3550/8015 Mod. EPA 5030/8015 Mod. /8020
3L63002	Soil, ADR-1-12	12/6/93	EPA 3550/8015 Mod. EPA 5030/8015 Mod. /8020
3L63003	Soil, ADR-1-23	12/6/93	EPA 3550/8015 Mod. EPA 5030/8015 Mod. /8020
3L63004	Soil, ADR-2-5.5	12/6/93	EPA 3550/8015 Mod. EPA 5030/8015 Mod. /8020
3L63005	Soil, ADR-2-12	12/6/93	EPA 3550/8015 Mod. EPA 5030/8015 Mod. /8020
3L63006	Soil, ADR-2-15.5	12/6/93	EPA 3550/8015 Mod. EPA 5030/8015 Mod. /8020
3L63007	Soil, ADR-2-27.5	12/6/93	EPA 3550/8015 Mod. EPA 5030/8015 Mod. /8020
3L63008	Soil, AV-6-5.5	12/6/93	EPA 5030/8015 Mod. /8020
3L63009	Soil, AV-6-12.5	12/6/93	EPA 5030/8015 Mod. /8020
3L63010	Soil, AV-6-16	12/6/93	EPA 5030/8015 Mod. /8020
3L63011	Soil, AV-7-5.5	12/6/93	EPA 3550/8015 Mod. EPA 5030/8015 Mod. /8020
3L63012	Soil, AV-7-10.5	12/6/93	EPA 3550/8015 Mod. EPA 5030/8015 Mod. /8020
3L63013	Soil, AV-7-15.5	12/6/93	EPA 3550/8015 Mod. EPA 5030/8015 Mod. /8020

SEQUOIA ANALYTICAL
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Please contact me if you have any questions. In the meantime, thank you for the opportunity to work with you on this project.

Very truly yours,

SEQUOIA ANALYTICAL

Nokowhat D. Herrera
Project Manager

SEQUOIA ANALYTICAL

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(415) 364-9600 • FAX (415) 364-9233

Gettler Ryan/Geostrategies	Client Project ID:	2169-93-4D/Arco 2169-Oakland	Sampled:	Dec 6, 1993
6747 Sierra Court, Ste J	Sample Matrix:	Soil	Received:	Dec 9, 1993
Dublin, CA 94568	Analysis Method:	EPA 5030/8015 Mod. /8020	Reported:	Dec 22, 1993
Attention: Matt Donohue	First Sample #:	3L63001		

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit mg/kg	Sample I.D. 3L63001 ADR-1-5.5	Sample I.D. 3L63002 ADR-1-12	Sample I.D. 3L63003 ADR-1-23	Sample I.D. 3L63004 ADR-2-5.5	Sample I.D. 3L63005 ADR-2-12	Sample I.D. 3L63006 ADR-2-15.5
Purgeable Hydrocarbons	1.0	N.D.	500	N.D.	N.D.	2,200	4.4
Benzene	0.0050	0.16	2.4	N.D.	0.018	11	0.81
Toluene	0.0050	0.0090	14	N.D.	N.D.	64	0.055
Ethyl Benzene	0.0050	0.026	8.0	N.D.	N.D.	34	0.11
Total Xylenes	0.0050	0.027	45	N.D.	N.D.	180	0.20
Chromatogram Pattern:		Low Gas	Gas	--	Low Gas	Gas	Gas

Quality Control Data

Report Limit Multiplication Factor:	1.0	50	1.0	1.0	100	1.0
Date Analyzed:	12/15/93	12/17/93	12/15/93	12/15/93	12/17/93	12/16/93
Instrument Identification:	GCHP-7	GCHP-18	GCHP-7	GCHP-7	GCHP-18	GCHP-3
Surrogate Recovery, %: (QC Limits = 70-130%)	88	136*	93	96	171*	88

*Coelution confirmed

Purgeable Hydrocarbons are quantitated against a fresh gasoline standard.
Analytes reported as N.D. were not detected above the stated reporting limit.

SEQUOIA ANALYTICAL

Nokowhat D. Herrera
Project Manager

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Gettler Ryan/Geostrategies	Client Project ID:	2169-93-4D/Arco 2169-Oakland	Sampled:	Dec 6, 1993
6747 Sierra Court, Ste J	Sample Matrix:	Soil	Received:	Dec 9, 1993
Dublin, CA 94568	Analysis Method:	EPA 5030/8015 Mod. /8020	Reported:	Dec 22, 1993
Attention: Matt Donohue	First Sample #:	3L63007		

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit mg/kg	Sample I.D. 3L63007 ADR-2-27.5	Sample I.D. 3L63008 AV-6-5.5	Sample I.D. 3L63009 AV-6-12.5	Sample I.D. 3L63010 AV-6-16	Sample I.D. 3L63011 AV-7-5.5	Sample I.D. 3L63012 AV-7-10.5
Purgeable Hydrocarbons	1.0	N.D.	N.D.	330	22	N.D.	190
Benzene	0.0050	N.D.	N.D.	1.1	0.13	0.0094	1.8
Toluene	0.0050	N.D.	N.D.	4.4	0.38	N.D.	4.8
Ethyl Benzene	0.0050	N.D.	N.D.	5.8	0.30	N.D.	7.5
Total Xylenes	0.0050	N.D.	N.D.	29	1.6	N.D.	17
Chromatogram Pattern:		--	--	Gas	Gas	Discrete Peak	Gas

Quality Control Data

Report Limit Multiplication Factor:	1.0	1.0	50	1.0	1.0	20
Date Analyzed:	12/16/93	12/16/93	12/17/93	12/16/93	12/16/93	12/17/93
Instrument Identification:	GCHP-3	GCHP-3	GCHP-18	GCHP-3	GCHP-3	GCHP-18
Surrogate Recovery, %: (QC Limits = 70-130%)	86	87	117	82	88	120

*Coelution confirmed

Purgeable Hydrocarbons are quantitated against a fresh gasoline standard.
Analytes reported as N.D. were not detected above the stated reporting limit.

SEQUOIA ANALYTICAL

Nokowhat D. Herrera
Project Manager

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Gettler Ryan/Geostrategies	Client Project ID:	2169-93-4D/Arco 2169-Oakland	Sampled:	Dec 6, 1993
6747 Sierra Court, Ste J	Sample Matrix:	Soil	Received:	Dec 9, 1993
Dublin, CA 94568	Analysis Method:	EPA 5030/8015 Mod. /8020	Reported:	Dec 22, 1993
Attention: Matt Donohue	First Sample #:	3L63013		

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit mg/kg	Sample I.D. 3L63013 AV-7-15.5
Purgeable Hydrocarbons	1.0	1.9
Benzene	0.0050	0.099
Toluene	0.0050	0.019
Ethyl Benzene	0.0050	0.026
Total Xylenes	0.0050	0.039
Chromatogram Pattern:		Low Gas

Quality Control Data

Report Limit Multiplication Factor:	1.0
Date Analyzed:	12/16/93
Instrument Identification:	GCHP-3
Surrogate Recovery, %: (QC Limits = 70-130%)	84
*Coelution confirmed	

Purgeable Hydrocarbons are quantitated against a fresh gasoline standard.
Analytes reported as N.D. were not detected above the stated reporting limit.

SEQUOIA ANALYTICAL

Nokowhat D. Herrera
Project Manager

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Gettler Ryan/Geostrategies	Client Project ID:	2169-93-4D/Arco 2169-Oakland	Sampled:	Dec 6, 1993
6747 Sierra Court, Ste J	Sample Matrix:	Soil	Received:	Dec 9, 1993
Dublin, CA 94568	Analysis Method:	EPA 3550/8015 Mod.	Reported:	Dec 22, 1993
Attention: Matt Donohue	First Sample #:	3L63001		

TOTAL EXTRACTABLE PETROLEUM HYDROCARBONS

Analyte	Reporting Limit mg/kg	Sample I.D. 3L63001 ADR-1-5.5	Sample I.D. 3L63002 ADR-1-12	Sample I.D. 3L63003 ADR-1-23	Sample I.D. 3L63004 ADR-2-5.5	Sample I.D. 3L63005 ADR-2-12	Sample I.D. 3L63006 ADR-2-15.5
Extractable Hydrocarbons	1.0	N.D.	36	N.D.	9.7	1,000	N.D.
Chromatogram Pattern:		--	Non-diesel mix < C14	--	Non-diesel mix < C13	Diesel + < C14	--

Quality Control Data

Report Limit Multiplication Factor:	1.0	1.0	1.0	1.0	50	1.0
Date Extracted:	12/15/93	12/15/93	12/15/93	12/15/93	12/15/93	12/15/93
Date Analyzed:	12/16/93	12/16/93	12/16/93	12/16/93	12/20/93	12/16/93
Instrument Identification:	GCHP-5	GCHP-5	GCHP-5	GCHP-5	GCHP-5	GCHP-5

Extractable Hydrocarbons are quantitated against a fresh diesel standard.
Analytes reported as N.D. were not detected above the stated reporting limit.

SEQUOIA ANALYTICAL

Nokowhat D. Herrera
Project Manager

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Gettler Ryan/Geostrategies	Client Project ID:	2169-93-4D/Arco 2169-Oakland	Sampled:	Dec 6, 1993
6747 Sierra Court, Ste J	Sample Matrix:	Soil	Received:	Dec 9, 1993
Dublin, CA 94568	Analysis Method:	EPA 3550/8015 Mod.	Reported:	Dec 22, 1993
Attention: Matt Donohue	First Sample #:	3L63007		

TOTAL EXTRACTABLE PETROLEUM HYDROCARBONS

Analyte	Reporting Limit mg/kg	Sample I.D. 3L63007 ADR-2-27.5	Sample I.D. 3L63011 AV-7-5.5	Sample I.D. 3L63012 AV-7-10.5	Sample I.D. 3L63013 AV-7-15.5
Extractable Hydrocarbons	1.0	N.D.	N.D.	47	N.D.
Chromatogram Pattern:		--	--	Diesel + <C13	--

Quality Control Data

Report Limit Multiplication Factor:	1.0	1.0	1.0	1.0
Date Extracted:	12/15/93	12/15/93	12/15/93	12/15/93
Date Analyzed:	12/16/93	12/16/93	12/17/93	12/16/93
Instrument Identification:	GCHP-5	GCHP-5	GCHP-5	GCHP-5

Extractable Hydrocarbons are quantitated against a fresh diesel standard.
Analytes reported as N.D. were not detected above the stated reporting limit.

SEQUOIA ANALYTICAL

Nokowhat D. Herrera
Project Manager

SEQUOIA ANALYTICAL
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Gettler Ryan/Geostrategies
6747 Sierra Court, Ste J
Dublin, CA 94568
Attention: Matt Donohue

Client Project ID: 2169-93-4D/Arco 2169-Oakland
Matrix: Solid
QC Sample Group: 3L63001-13

Reported: Dec 22, 1993

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl Benzene	Xylenes
Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Analyst:	C. Donohue	C. Donohue	C. Donohue	C. Donohue
MS/MSD Batch#:	G3L28910	G3L28910	G3L28910	G3L28910
Date Prepared:	12/15/93	12/15/93	12/15/93	12/15/93
Date Analyzed:	12/15/93	12/15/93	12/15/93	12/15/93
Instrument I.D.#:	GCHP-6	GCHP-6	GCHP-6	GCHP-6
Conc. Spiked:	0.20 mg/kg	0.20 mg/kg	0.20 mg/kg	0.60 mg/kg
Matrix Spike % Recovery:	88	89	90	89
Matrix Spike Duplicate % Recovery:	84	85	85	85
Relative % Difference:	4.7	4.6	5.7	4.6
LCS Batch#:				
Date Prepared:				
Date Analyzed:				
Instrument I.D.#:				
LCS % Recovery:				
% Recovery Control Limits:	55-145	47-149	47-155	56-140

Quality Assurance Statement: All standard operating procedures and quality control requirements have been met.

SEQUOIA ANALYTICAL

Nokowhat D. Herrera
Project Manager

Please Note:
The LCS is a control sample of known, interferent free matrix that is analyzed using the same reagents, preparation, and analytical methods employed for the samples. The matrix spike is an aliquot of sample fortified with known quantities of specific compounds and subjected to the entire analytical procedure. If the recovery of analytes from the matrix spike does not fall within specified control limits due to matrix interference, the LCS recovery is to be used to validate the batch.

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Gettler Ryan/Geostrategies	Client Project ID:	2169-93-4D/Arco 2169-Oakland
6747 Sierra Court, Ste J	Matrix:	Solid
Dublin, CA 94568		
Attention: Matt Donohue	QC Sample Group:	3L63001-07, 10-13

Reported: Dec 22, 1993

QUALITY CONTROL DATA REPORT

ANALYTE	Diesel
Method:	PA 8015 Mod. Mod.
Analyst:	A. Nagra
MS/MSD Batch#:	3L56301
Date Prepared:	12/14/93
Date Analyzed:	12/14/93
Instrument I.D.#:	GCHP-5
Conc. Spiked:	15 mg/kg
Matrix Spike % Recovery:	107
Matrix Spike Duplicate % Recovery:	80
Relative % Difference:	29

LCS Batch#:	BLK121493
Date Prepared:	12/14/93
Date Analyzed:	12/14/93
Instrument I.D.#:	GCHP-5
LCS % Recovery:	80
% Recovery Control Limits:	38-122

Quality Assurance Statement: All standard operating procedures and quality control requirements have been met.

SEQUOIA ANALYTICAL

Nokowhat D. Herrera
Project Manager

Please Note:
The LCS is a control sample of known, interferent free matrix that is analyzed using the same reagents, preparation, and analytical methods employed for the samples. The matrix spike is an aliquot of sample fortified with known quantities of specific compounds and subjected to the entire analytical procedure. If the recovery of analytes from the matrix spike does not fall within specified control limits due to matrix interference, the LCS recovery is to be used to validate the batch.

ARCO Products Company
Division of AtlanticRichfieldCompany

Chain of Custody

Task Order No. 2169-93-4D

ARCO Facility no. 2169	City (Facility) Oakland	Project manager (Consultant) Joel Coffman	Laboratory name Sequoia
ARCO engineer Michael Whelan	Telephone no. (ARCO) (415) 571-2434	Telephone no. (Consultant) (510) 551-8777	Fax no. (Consultant) (510) 551-7888
Consultant name Geostrategies	Address (Consultant) 6747 Sierra Court, Suite G, Dublin, CA 94568		Contract number 07-073

Method of shipment: Sequoia Courier

Sample I.D.	Lab no.	Container no.	Matrix: Soil	Water	Other	Preservation: Ice	Acid	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH EPA M602/8020/8015 gas	TPH Modified 8015 Gas ☐ Diesel ☑	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Metals ☐ VOA ☐ Semi VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐		
ADR-1-5.5	1	1	✓			✓		12/6/93			X	X		93126301					01			
ADR-1-12	1	1	✓			✓		12/6/93			X	X							02			
ADR-1-13	1	1	✓			✓		12/6/93			X	X							03			
ADR-2-5.5	1	1	✓			✓		12/6/93			X	X							04			
ADR-2-12	1	1	✓			✓		12/6/93			X	X							05			
ADR-2-15.5	1	1	✓			✓		12/6/93			X	X							06			
ADR-2-17.5	1	1	✓			✓		12/6/93			X	X							07			
AV-6-5.5	1	1	✓			✓		12/6/93			X								08			
AV-6-12.5	1	1	✓			✓		12/6/93			X								09			
AV-6-16	1	1	✓			✓		12/6/93			X								10			
AV-7-5.5	1	1	✓			✓		12/6/93			X	X							11			
AV-7-10.5	1	1	✓			✓		12/6/93			X	X							12			
AV-7-15.5	1	1	✓			✓		12/6/93			X	X							13			

Special detection Limit/reporting

Special QA/QC

Remarks

Lab number 931263.0

Turnaround time
- Priority Rush 1 Business Day ☐
- Rush 2 Business Days ☐
- Expedited 5 Business Days ☐
- Standard 10 Business Days ☑

Condition of sample:

Temperature received:

	Date	Time
Relinquished by sampler: Barbara Sieminski	12/09/93	2:25 PM
Relinquished by: Eric Vonnund	12/9/93	15:20
Relinquished by:	Date	Time

	Date	Time
Received by: Eric Vonnund		
Received by: [illegible]	1520 12/9/93	
Received by laboratory:	Date	Time

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APPC 3292 (2-91)

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. 2169-93-4D

Chain of Custody

ARCO Facility no. 2169	City (Facility) Oakland	Project manager (Consultant) Joel Coffman	Laboratory name Sequoia
ARCO engineer Michael Whelan	Telephone no. (ARCO) (415) 571-2434	Telephone no. (Consultant) (510) 551-8777	Fax no. (Consultant) (510) 551-7888
Consultant name GeoStrategies	Address (Consultant) 6747 Sierra Court, Suite G, Dublin, CA 94568		Contract number 07-073

Method of shipment: Sequoia Courier

Sample I.D.	Lab no.	Container no.	Matrix: Soil	Water	Other	Preservation: Ice	Acid	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH EPA M602/8020/8015 gas	TPH Modified 8015 Gas ☐ Diesel ☒	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP: Metals ☐ Semi VOA ☐ VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐
AS-5-55		1	✓			✓		12/7/93			X	X		01						
AS-5-10		1	✓			✓		12/7/93			X	X		02						
AS-5-24		1	✓			✓		12/7/93			X	X		03						
~~AS-4-35~~		1	✓			✓		12/7/93			X	X								
AS-4-15		1	✓			✓		12/7/93			X	X		04						
AS-4-24		1	✓			✓		12/7/93			X	X		05						

Special detection Limit/reporting:

Special QA/QC:

Remarks:

Lab number: 93126 39

Turnaround time:
- Priority Rush 1 Business Day ☐
- Rush 2 Business Days ☐
- Expedited 5 Business Days ☐
- Standard 10 Business Days ☒

Condition of sample:

Temperature received:

	Date	Time
Relinquished by sampler: Barbara Sieginski	12/09/93	225 PM
Relinquished by: [signature]	12/9/93	1525
Relinquished by:	Date	Time

	Date	Time
Received by: [signature]		
Received by: [signature]	12/9/93	
Received by laboratory:	Date	Time

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APPC-3292 (2-91)

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Gettler Ryan/Geostrategies
6747 Sierra Court, Ste J
Dublin, CA 94568
Attention: Matt Donohue

Project: 2169-93-4D, Arco 2169-Oakland

Enclosed are the results from 6 soil samples received at Sequoia Analytical on December 9,1993. The requested analyses are listed below:

SAMPLE #	SAMPLE DESCRIPTION	DATE OF COLLECTION	TEST METHOD
3K63901	Soil, AS-5-5.5	12/7/93	EPA 3550/8015 mod. EPA 5030/8015 mod./8020
3L63902	Soil, AS-5-12	12/7/93	EPA 3550/8015 mod. EPA 5030/8015 mod./8020
3L63903	Soil, AS-5-24	12/7/93	EPA 3550/8015 mod. EPA 5030/8015 mod./8020
3L63904	Soil, AS-4-15.5	12/7/93	EPA 3550/8015 mod. EPA 5030/8015 mod./8020
3L63905	Soil, AS-4-24	12/7/93	EPA 3550/8015 mod. EPA 5030/8015 mod./8020

Please contact me if you have any questions. In the meantime, thank you for the opportunity to work with you on this project.

Very truly yours,

SEQUOIA ANALYTICAL

Nokowhat D. Herrera
Project Manager

SEQUOIA ANALYTICAL
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Gettler Ryan/Geostrategies	Client Project ID:	2169-93-4D, Arco 2169-Oakland	Sampled:	Dec 7, 1993
6747 Sierra Court, Ste J	Sample Matrix:	Soil	Received:	Dec 9, 1993
Dublin, CA 94568	Analysis Method:	EPA 5030/8015 mod./8020	Reported:	Dec 22, 1993
Attention: Matt Donohue	First Sample #:	3L63901		

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit mg/kg	Sample I.D. 3L63901 AS-5-5.5	Sample I.D. 3L63902 AS-5-12	Sample I.D. 3L63903 AS-5-24	Sample I.D. 3L63904 AS-4-15.5	Sample I.D. 3L63905 AS-4-24	Sample I.D.
Purgeable Hydrocarbons	1.0	9.6	320	N.D.	58	N.D.	
Benzene	0.0050	0.093	2.0	0.0087	0.21	0.011	
Toluene	0.0050	0.022	7.5	N.D.	0.10	0.011	
Ethyl Benzene	0.0050	0.10	5.9	N.D.	0.73	N.D.	
Total Xylenes	0.0050	0.28	31	N.D.	3.0	0.019	
Chromatogram Pattern:		Discrete Peaks Gas	Gas	Discrete Peaks	Gas	Gas	

Quality Control Data

Report Limit Multiplication Factor:	1.0	20	1.0	5.0	1.0
Date Analyzed:	12/16/93	12/16/93	12/16/93	12/16/93	12/16/93
Instrument Identification:	GCHP-17	GCHP-6	GCHP-17	GCHP-17	GCHP-17
Surrogate Recovery, %: (QC Limits = 70-130%)	98	111	87	112	89

Purgeable Hydrocarbons are quantitated against a fresh gasoline standard.
Analytes reported as N.D. were not detected above the stated reporting limit.

SEQUOIA ANALYTICAL

Nokowhat D. Herrera
Project Manager

SEQUOIA ANALYTICAL

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Gettler Ryan/Geostrategies	Client Project ID:	2169-93-4D, Arco 2169-Oakland	Sampled:	Dec 7, 1993
6747 Sierra Court, Ste J	Sample Matrix:	Soil	Received:	Dec 9, 1993
Dublin, CA 94568	Analysis Method:	EPA 3550/8015 mod.	Reported:	Dec 22, 1993
Attention: Matt Donohue	First Sample #:	3K63901		

TOTAL EXTRACTABLE PETROLEUM HYDROCARBONS

Analyte	Reporting Limit mg/kg	Sample I.D. 3K63901 AS-5-5.5	Sample I.D. 3L63902 AS-5-12	Sample I.D. 3L63903 AS-5-24	Sample I.D. 3L63904 AS-4-15.5	Sample I.D. 3L63905 AS-4-24	Sample I.D.
Extractable Hydrocarbons	1.0	2.3	230	3.2	37	N.D.	
Chromatogram Pattern:		Non-Diesel Mix C9-C13	Diesel + Non-Diesel Mix, < C13	Discrete Peaks + C12-C20	Non-Diesel Mix < C13	--	

Quality Control Data

Report Limit Multiplication Factor:	1.0	10	1.0	1.0	1.0
Date Extracted:	12/15/93	12/15/93	12/15/93	12/15/93	12/15/93
Date Analyzed:	12/16/93	12/17/93	12/20/93	12/17/93	12/16/93
Instrument Identification:	GCHP-5	GCHP-5	GCHP-5	GCHP-5	GCHP-5

Extractable Hydrocarbons are quantitated against a fresh diesel standard.
Analytes reported as N.D. were not detected above the stated reporting limit.

SEQUOIA ANALYTICAL

Nokowhat D. Herrera
Project Manager

SEQUOIA ANALYTICAL
680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

Gettler Ryan/Geostrategies
6747 Sierra Court, Ste J
Dublin, CA 94568
Attention: Matt Donohue

Client Project ID: 2169-93-4D, Arco 2169-Oakland
Matrix: Solid
QC Sample Group: 3L63901 - 05

Reported: Dec 22, 1993

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl Benzene	Xylenes	Diesel
Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020	EPA 8015 Mod.
Analyst:	E.Cunanan	E.Cunanan	E.Cunanan	E.Cunanan	A. N.
MS/MSD Batch#:	G3K53601	G3K53601	G3K53601	G3K53601	3K56301
Date Prepared:	12/16/93	12/16/93	12/16/93	12/16/93	12/14/93
Date Analyzed:	12/16/93	12/16/93	12/16/93	12/16/93	12/14/93
Instrument I.D.#:	GCHP-6	GCHP-6	GCHP-6	GCHP-6	GCHP-5
Conc. Spiked:	0.20 mg/kg	0.20 mg/kg	0.20 mg/kg	0.60 mg/kg	15 mg/kg
Matrix Spike % Recovery:	73	76	78	77	107
Matrix Spike Duplicate % Recovery:	77	80	81	80	80
Relative % Difference:	5.3	5.1	3.8	3.8	29

LCS Batch#:	BLK121493
Date Prepared:	12/14/93
Date Analyzed:	12/14/93
Instrument I.D.#:	GCHP-35
LCS % Recovery:	80

% Recovery Control Limits:	55-1245	47-149	47-155	56-140	38-122

Quality Assurance Statement: All standard operating procedures and quality control requirements have been met.

SEQUOIA ANALYTICAL

Nokowhat D. Herrera
Project Manager

Please Note:
The LCS is a control sample of known, interferent free matrix that is analyzed using the same reagents, preparation, and analytical methods employed for the samples. The matrix spike is an aliquot of sample fortified with known quantities of specific compounds and subjected to the entire analytical procedure. If the recovery of analytes from the matrix spike does not fall within specified control limits due to matrix interference, the LCS recovery is to be used to validate the batch.

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. 2169-93-4D

Chain of Custody

ARCO Facility no. 2169	City (Facility) Oakland	Project manager (Consultant) Joel Coffman	Laboratory name Sequoia
ARCO engineer Michael Whelan	Telephone no. (ARCO) (415) 571-2434	Telephone no. (Consultant) (510) 551-8777	Fax no. (Consultant) (510) 551-7888
Consultant name GeoStrategies	Address (Consultant) 6747 Sierra Court, Suite G, Dublin, CA 94568		Contract number 07-073

Method of shipment: Sequoia Courier

Sample I.D.	Lab no.	Container no.	Matrix: Soil	Matrix: Water	Matrix: Other	Preservation: Ice	Preservation: Acid	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH gas EPA M602/8020/8015	TPH Modified 8015 Gas ☐ Diesel ☑	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Semi VOA ☐ Metals ☐ VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐		
AS-5-55	1	1	✓			✓		12/7/93			X	X		01								
AS-5-12	2	1	✓			✓		12/7/93			X	X		02								
AS-5-24	3	1	✓			✓		12/7/93			X	X		03								
~~AS-4-135~~	~~4~~	~~1~~	~~✓~~			~~✓~~		~~12/7/93~~			~~X~~	~~X~~										
AS-4-155	5	1	✓			✓		12/7/93			X	X		04								
AS-4-24	6	1	✓			✓		12/7/93			X	X		05								

Special detection Limit/reporting

Special QA/QC

Remarks

Lab number 93/2639

Turnaround time

- Priority Rush 1 Business Day ☐
- Rush 2 Business Days ☐
- Expedited 5 Business Days ☐
- Standard 10 Business Days ☑

Condition of sample:

Temperature received:

Relinquished by sampler: Barbara Sieminski	Date: 12/09/93	Time: 225 PM	Received by:
Relinquished by:	Date: 12/9/93	Time: 1525	Received by: 12/9/93
Relinquished by:	Date:	Time:	Received by laboratory: Date: Time:

Distribution: White copy — Laboratory; Canary copy — ARCO Environmental Engineering; Pink copy — Consultant

APPENDIX H

ANALYTICAL REPORTS
AND CHAIN-OF-CUSTODY FORMS
FOR AIR AND WATER SAMPLES
COLLECTED DURING VAPOR EXTRACTION/AIR SPARGING TESTS

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

Gettler Ryan/Geostrategies
2150 W. Winton Avenue
Hayward, CA 94545
Attention: Matt Donohue

Project: 2169-93-3A, Arco 2169-Oakland

Enclosed are the results from 9 air samples received at Sequoia Analytical on September 17,1993. The requested analyses are listed below:

SAMPLE #	SAMPLE DESCRIPTION	DATE OF COLLECTION	TEST METHOD
3I85001	Air, AV2I1	9/17/93	EPA 5030/8015/8020
3I85002	Air, AV2I2	9/17/93	EPA 5030/8015/8020
3I85003	Air, AV2I3	9/17/93	EPA 5030/8015/8020
3I85004	Air, AV5I	9/17/93	EPA 5030/8015/8020
3I85005	Air, A3I	9/17/93	EPA 5030/8015/8020
3I85006	Air, AV1I	9/17/93	EPA 5030/8015/8020
3I85007	Air, A1I	9/17/93	EPA 5030/8015/8020
3I85008	Air, AV3I	9/17/93	EPA 5030/8015/8020
3I85009	Air, A4I	9/17/93	EPA 5030/8015/8020

Please contact me if you have any questions. In the meantime, thank you for the opportunity to work with you on this project.

Very truly yours,

SEQUOIA ANALYTICAL

Nokowhat D. Herrera
Project Manager

927-A

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

Gettler Ryan/Geostrategies	Client Project ID:	2169-93-3A, Arco 2169-Oakland	Sampled:	Sep 17, 1993
2150 W. Winton Avenue	Sample Matrix:	Air	Received:	Sep 17, 1993
Hayward, CA 94545	Analysis Method:	EPA 5030/8015/8020	Reported:	Sep 21, 1993
Attention: Matt Donohue	First Sample #:	3I85001		

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit ppmv	Sample I.D. 3I85001 AV2I1	Sample I.D. 3I85002 AV2I2	Sample I.D. 3I85003 AV2I3	Sample I.D. 3I85004 AV5I	Sample I.D. 3I85005 A3I	Sample I.D. 3I85006 AV1I
Purgeable Hydrocarbons	2.3	5,300	4,500	5,300	200	750	2,900
Benzene	0.019	1,000	660	910	3.8	13	100
Toluene	0.016	610	980	800	7.7	6.1	290
Ethyl Benzene	0.014	23	69	35	1.9	3.7	53
Total Xylenes	0.014	97	300	130	9.7	8.1	280
Chromatogram Pattern:		Gas	Gas	Gas	Gas + Non-gas < C8	Gas + Non-gas < C8	Gas

Quality Control Data

Report Limit Multiplication Factor:	1000	1000	100	10	100	250
Date Analyzed:	9/19/93	9/19/93	9/19/93	9/17/93	9/17/93	9/19/93
Instrument Identification:	GCHP-3	GCHP-3	GCHP-3	GCHP-3	GCHP-3	GCHP-2
Surrogate Recovery, %: (QC Limits = 70-130%)	111	108	105	113	108	96

Purgeable Hydrocarbons are quantitated against a fresh gasoline standard.
Analytes reported as N.D. were not detected above the stated reporting limit.

SEQUOIA ANALYTICAL

Nokowhat D. Herrera
Project Manager

Please Note:

A molecular weight of 65 was used to calculate ppmv for Purgeable Hydrocarbons.

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

Gettler Ryan/Geostrategies	Client Project ID:	2169-93-3A, Arco 2169-Oakland	Sampled: Sep 17, 1993
2150 W. Winton Avenue	Sample Matrix:	Air	Received: Sep 17, 1993
Hayward, CA 94545	Analysis Method:	EPA 5030/8015/8020	Reported: Sep 21, 1993
Attention: Matt Donohue	First Sample #:	3I85007	

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit ppmv	Sample I.D. 3I85007 A1I	Sample I.D. 3I85008 AV3I	Sample I.D. 3I85009 A4I
Purgeable Hydrocarbons	2.3	3,300	11,000	110
Benzene	0.019	380	440	2.3
Toluene	0.016	580	270	5.6
Ethyl Benzene	0.014	44	76	3.0
Total Xylenes	0.014	190	280	14
Chromatogram Pattern:		Gas	Gas + Non-gas < C8	Gas

Quality Control Data

Report Limit Multiplication Factor:	1000	500	50
Date Analyzed:	9/19/93	9/17/93	9/17/93
Instrument Identification:	GCHP-2	GCHP-2	GCHP-3
Surrogate Recovery, %: (QC Limits = 70-130%)	92	130	84

Purgeable Hydrocarbons are quantitated against a fresh gasoline standard.
Analytes reported as N.D. were not detected above the stated reporting limit.

SEQUOIA ANALYTICAL

Nokowhat D. Herrera
Project Manager

Please Note:

A molecular weight of 65 was used to calculate ppmv for Purgeable Hydrocarbons.

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

Gettler Ryan/Geostrategies
2150 W. Winton Avenue
Hayward, CA 94545
Attention: Matt Donohue

Client Project ID: 2169-93-3A, Arco 2169-Oakland

QC Sample Group: 3I85006-08

Reported: Sep 21, 1993

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl-Benzene	Xylenes
Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Analyst:	A. Miraftab	A. Miraftab	A. Miraftab	A. Miraftab
Conc. Spiked:	10	10	10	30
Units:	µg/L	µg/L	µg/L	µg/L
LCS Batch#:	GBLK091993	GBLK091993	GBLK091993	GBLK091993
Date Prepared:	-	-	-	-
Date Analyzed:	9/19/93	9/19/93	9/19/93	9/19/93
Instrument I.D.#:	GCHP-2	GCHP-2	GCHP-2	GCHP-2
LCS % Recovery:	110	110	110	107
Control Limits:	80-120	80-120	80-120	80-120
MS/MSD Batch #:	3I74801	3I74801	3I74801	3I74801
Date Prepared:	-	-	-	-
Date Analyzed:	9/19/93	9/19/93	9/19/93	9/19/93
Instrument I.D.#:	GCHP-2	GCHP-2	GCHP-2	GCHP-2
Matrix Spike % Recovery:	110	110	110	107
Matrix Spike Duplicate % Recovery:	110	110	110	107
Relative % Difference:	0.0	0.0	0.0	0.0

Quality Assurance Statement: All standard operating procedures and quality control requirements have been met.

SEQUOIA ANALYTICAL

Nokowhat D. Herrera
Project Manager

Please Note:
The LCS is a control sample of known, interferent free matrix that is analyzed using the same reagents, preparation and analytical methods employed for the samples. The LCS % recovery data is used for validation of sample batch results. Due to matrix effects, the QC limits for MS/MSD's are advisory only and are not used to accept or reject batch results.

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

Gettler Ryan/Geostrategies
2150 W. Winton Avenue
Hayward, CA 94545
Attention: Matt Donohue

Client Project ID: 2169-93-3A, Arco 2169-Oakland

QC Sample Group: 3I85001-05, 09

Reported: 9/21

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl-Benzene	Xylenes
Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Analyst:	A. Miraftab	A. Miraftab	A. Miraftab	A. Miraftab
Conc. Spiked:	10	10	10	30
Units:	µg/L	µg/L	µg/L	µg/L
LCS Batch#:	GBLK091993	GBLK091993	GBLK091993	GBLK091993
Date Prepared:	-	-	-	-
Date Analyzed:	9/19/93	9/19/93	9/19/93	9/19/93
Instrument I.D.#:	GCHP-3	GCHP-3	GCHP-3	GCHP-3
LCS % Recovery:	100	100	100	103
Control Limits:	80-120	80-120	80-120	80-120
MS/MSD Batch #:	3I74801	3I74801	3I74801	3I74801
Date Prepared:	-	-	-	-
Date Analyzed:	9/19/93	9/19/93	9/19/93	9/19/93
Instrument I.D.#:	GCHP-3	GCHP-3	GCHP-3	GCHP-3
Matrix Spike % Recovery:	100	100	100	100
Matrix Spike Duplicate % Recovery:	100	100	100	103
Relative % Difference:	0.0	0.0	0.0	3.3

Quality Assurance Statement: All standard operating procedures and quality control requirements have been met.

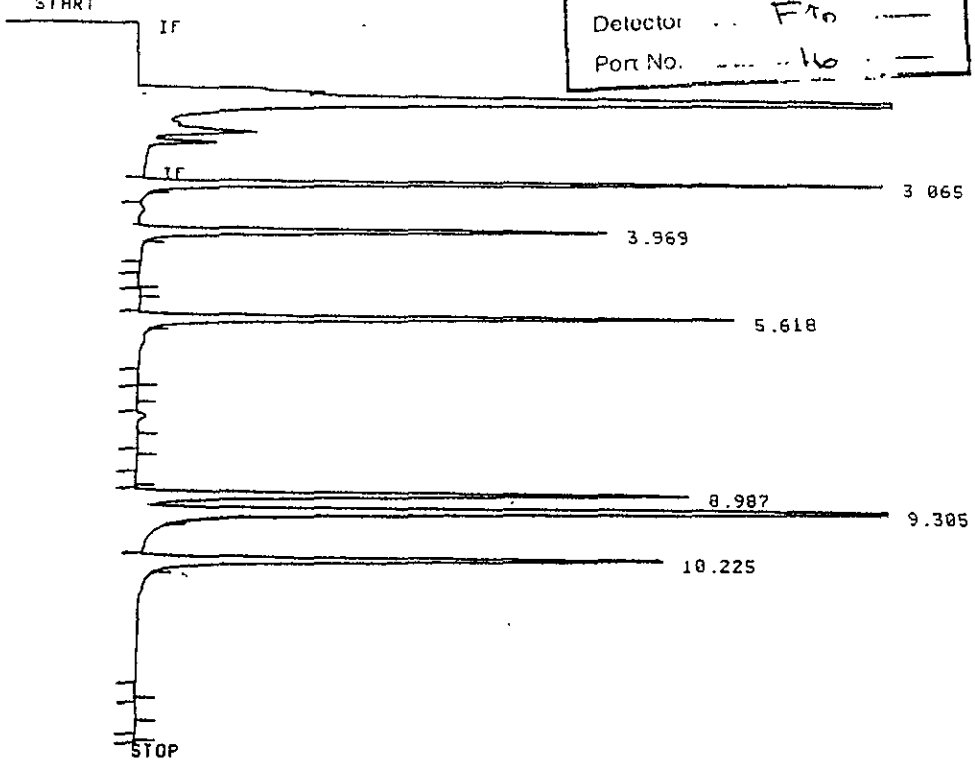
SEQUOIA ANALYTICAL

Nokowhat D. Herrera
Project Manager

Please Note:
The LCS is a control sample of known, interferent free matrix that is analyzed using the same reagents, preparation and analytical methods employed for the samples. The LCS % recovery data is used for validation of sample batch results. Due to matrix effects, the QC limits for MS/MSD's are advisory only and are not used to accept or reject batch results.

File ID	6SMD091993
Client ID	609 13938
Vol. Inj.	5A
Dil./Conc	20PPM
Detector	FID
Port No.	6

(1)



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RUN #30707-002

RUN# 30707 SEP 19, 1993 17:20:14

IDENTIFIER : GCHP-3 / FID
SIGNAL FILE: M:SIGNAL.BNC
AREA%

RT	AREA	TYPE	WIDTH	AREA%
3.065	566210	PB	.079	15.78632
3.969	425266	PB	.094	11.85671
5.618	549087	PB	.096	15.30670
8.987	514771	PU	.097	14.35217
9.305	1025284	VB	.104	28.58563
10.225	506174	PB	.101	14.11248

TOTAL AREA=3586712
MUL FACTOR=1.0000E+00

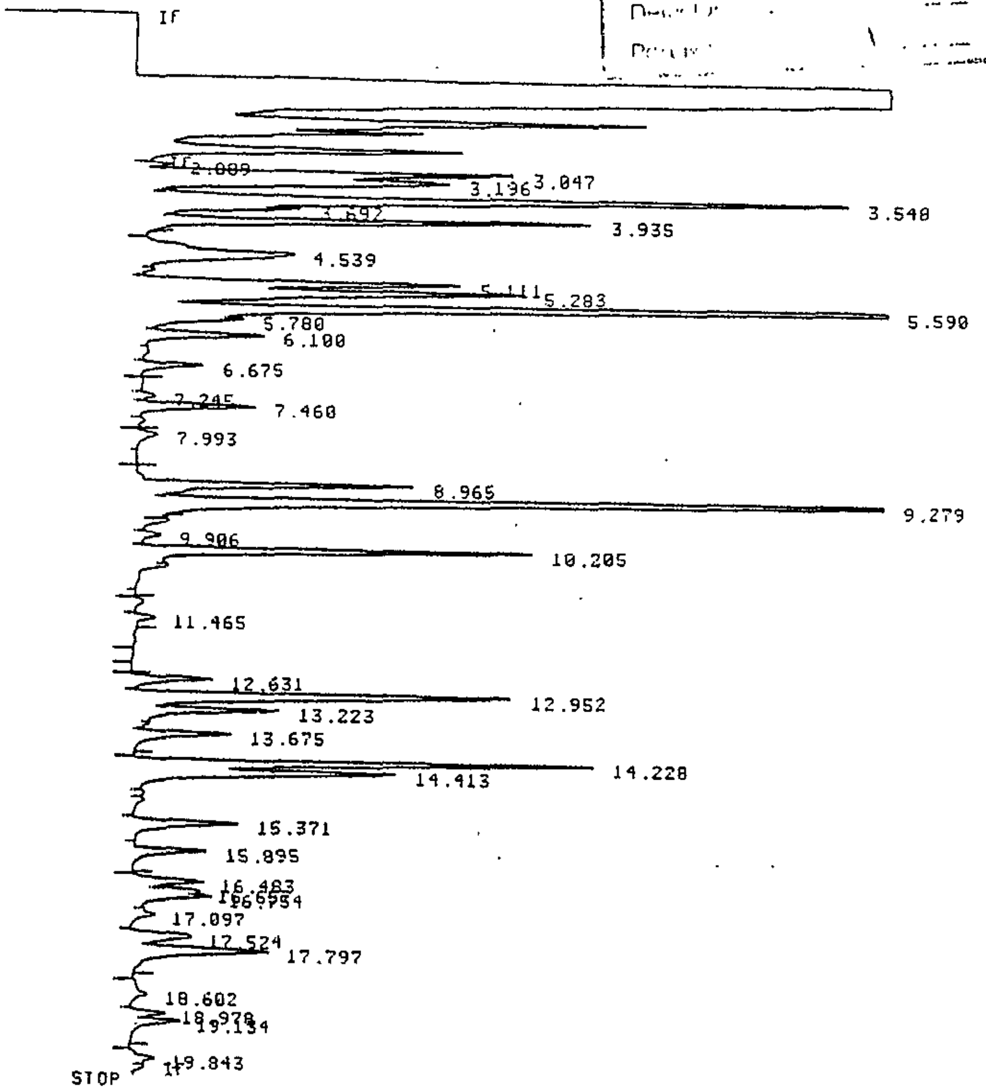
RUN #30707-003

(2)

File ID GSTD091993 A
Client ID G0902933B
Vol. Inj 1.0
Dil/C... 2500ppm
FID

* RUN #30708 SEP 19, 1993 17:49:08

START



STOP

Closing signal file M:SIGNAL .BNC

RUN #30708-002

RUN# 30708 SEP 19, 1993 17:49:08

IDENTIFIER : GCHP-3 / FID
SIGNAL FILE: M:SIGNAL.BNC
AREA%

RT	AREA	TYPE	WIDTH	AREA%
2.889	14657	BV	.068	.15602
3.047	355081	VV	.101	3.77966
3.196	392796	VV	.136	4.18112
3.548	879110	VV	.130	9.35770
3.692	124839	VV	.085	1.32885
3.935	403121	VB	.095	4.29102
4.539	329613	BV	.223	3.50857
5.111	357853	PV	.116	3.80917
5.283	549649	VV	.148	5.85075
5.590	1157251	VV	100	12.31837

RUN #30708-002

RUN# 30706 SEP 19, 1993 17 49:08

IDENTIFIER : GCHF-3 FID
SIGNAL FILE: M:SIGNAL BNC
AREA.

RT	AREA	TYPE	WIDTH	AREA%
2.889	14657	BV	.068	.15602
3.047	355081	VV	.101	3.77966
3.196	392796	VV	.136	4.18112
3.548	379110	VV	.130	9.35770
3.692	124839	VV	.085	1.32885
3.935	403121	VB	.095	4.29102
4.539	329613	BV	.223	3.50857
5.111	357855	PV	.116	3.80917
5.283	549649	VV	.148	5.85075
5.590	1157251	VV	.100	12.31837
5.780	125491	VV	.125	1.33579
6.100	142630	VV	.118	1.51823
6.675	55383	PB	.092	.58953
7.245	15159	PV	.095	.16136
7.460	130505	VV	.113	1.38916
7.993	26933	BP	.131	.28669
8.965	258289	PV	.100	2.74936
9.279	1019857	VB	.104	10.85588
9.906	19088	PP	.099	.20318
10.205	377140	PV	.099	4.01447
11.465	20323	PB	.096	.21633
12.631	83272	PV	.105	.88639
12.952	481566	VV	.131	5.12604
13.223	170218	VV	.118	1.81189
13.675	120654	VB	.123	1.28430
14.228	448381	BV	.101	4.77280
14.413	350692	VV	.137	3.73294
15.371	134655	PV	.128	1.43334
15.895	84501	VB	.115	.89947
16.483	85755	BV	.123	.91282
16.657	71507	VV	.104	.76116
16.754	95713	VV	.121	1.01882
17.097	42057	VP	.169	.44768
17.524	93905	PV	.156	.99957
17.797	214172	VB	.159	2.27976
18.602	28722	BP	.181	.30573
18.978	37328	PV	.103	.39734
19.134	63080	VB	.126	.67146
19.843	33577	BV	.127	.35741

TOTAL AREA=9.3945E+06
MUL FACTOR=1.0000E+00

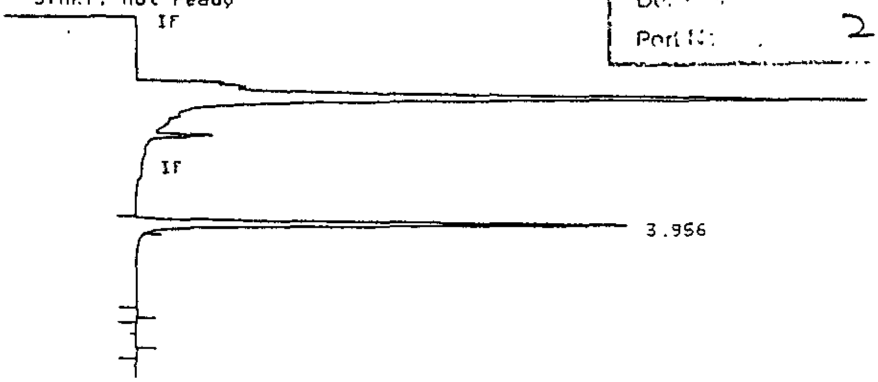
9395.425 / 2500 = 3.59 = CF
3.34 = CF
V.D = 7.5

File ID GB1609193
Client ID Meth Blk
Vol. Inj. 10mL
Dil/Conc
Det. Rin
Port No. 2

(3)

RUN #30708-003

RUN #30709 SEP 19, 1993 18:21:09
START: not ready

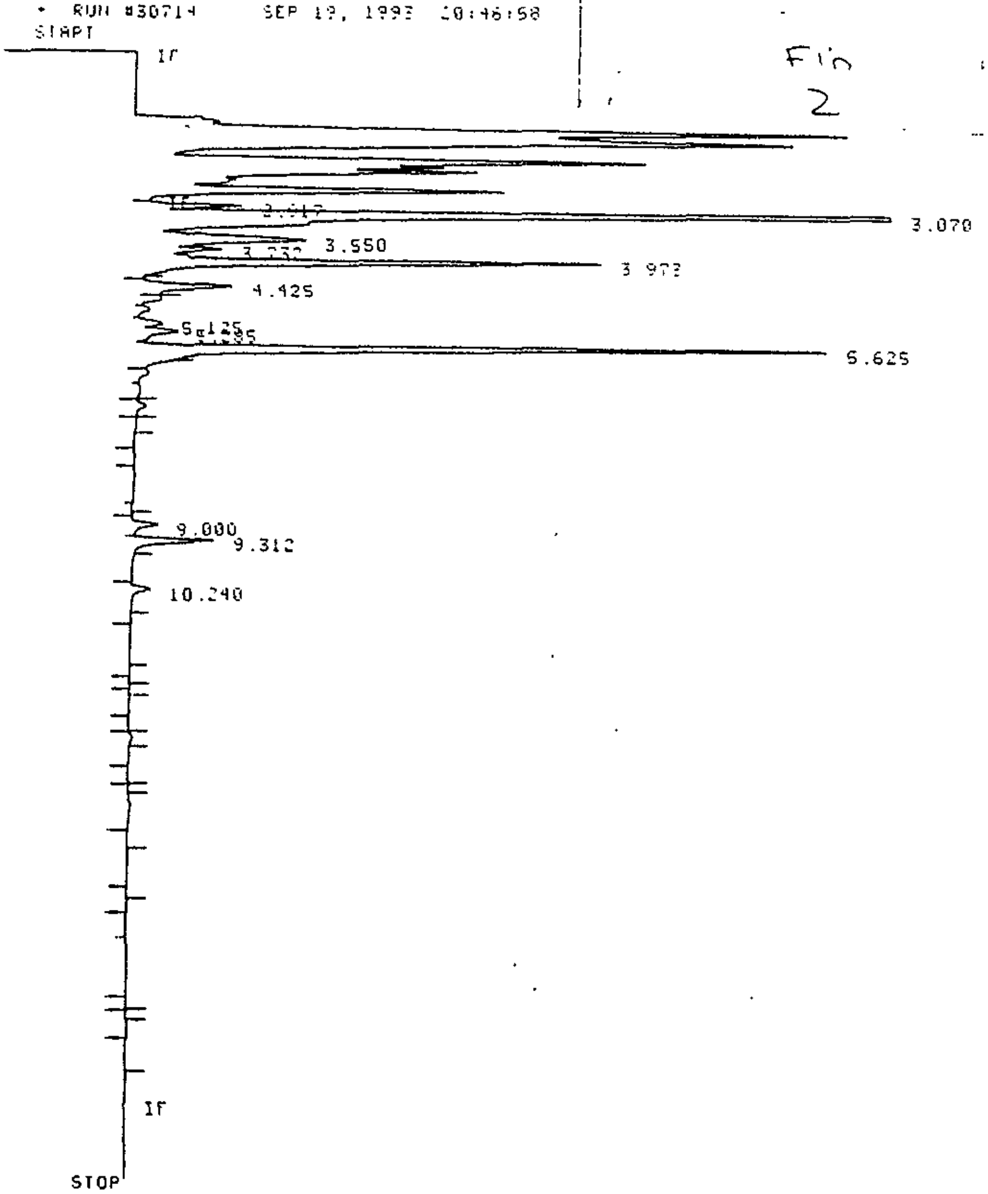


RUN #30713-004

(8)

File ID ~~GA9305 500~~ o/L
AU ZI 1
50x
Fin
2

* RUN #30714 SEP 19, 1993 20:46:58



Closing signal file M:SIGNAL .BNC

RUN #30714-002

RUN# 30714 SEP 19, 1993 20:46:58

IDENTIFIER : GCHP-3 / FID
SIGNAL FILE: M:SIGNAL.BNC
AREA%

RT	AREA	TYPE	WIDTH	AREA%
2.917	67643	BV	.074	2.30315
3.070	1153045	VV	.096	39.25954
3.550	253327	VV	.165	8.62542
3.732	66600	VV	.090	2.26764
3.973	479021	VB	.109	16.30998
4.425	85534	PB	.108	2.91231
5.125	25321	PV	.109	.86214
5.285	45626	VP	126	1.55350
5.625	626449	PB	.096	21.32969
9.000	27082	BV	.105	.92210
9.312	84743	VB	.107	2.88538
10.240	22590	BB	.112	.76916

TOTAL AREA=2936981
MUL FACTOR=1.0000E+00

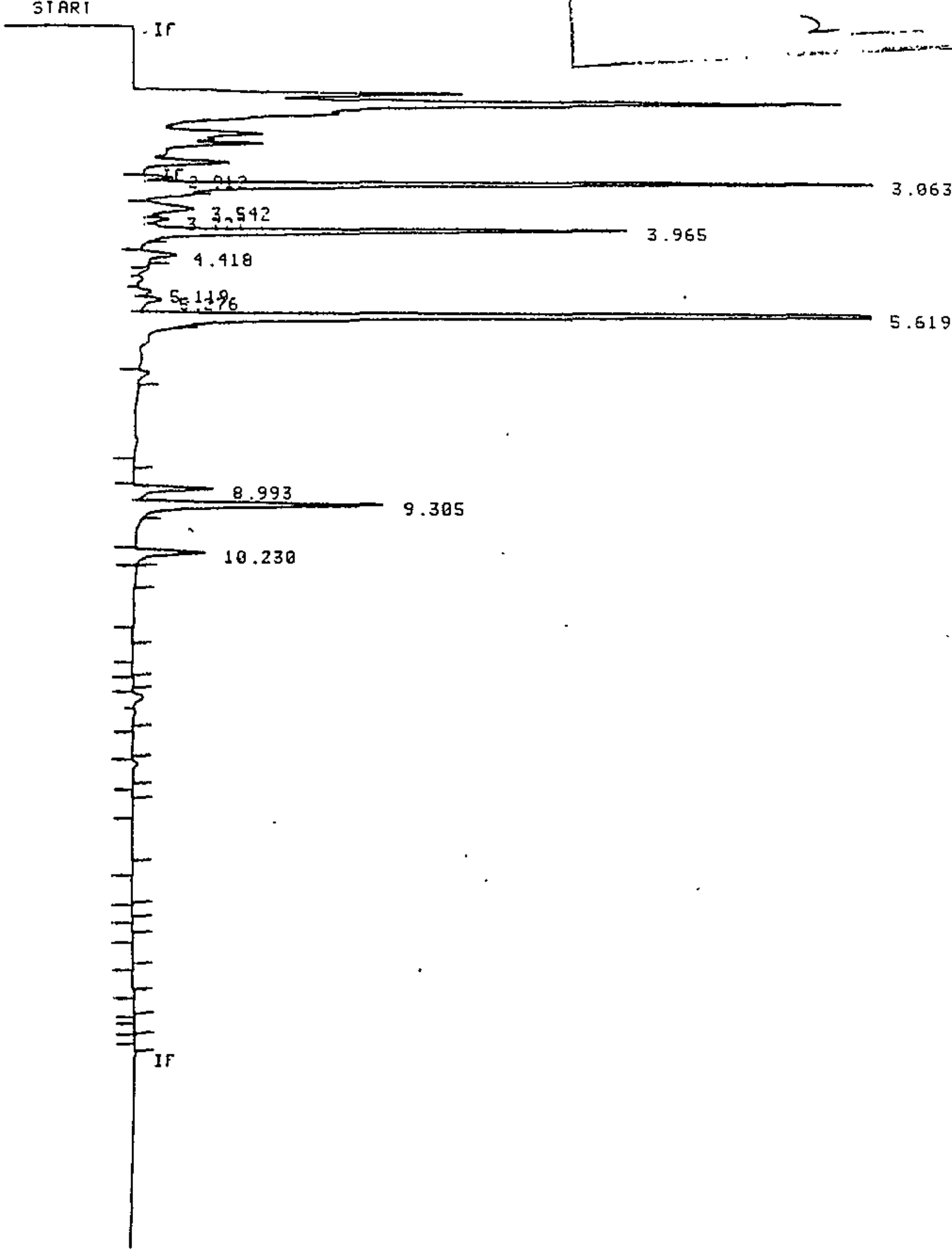
(2937 - 425)

RUN #30712-003

(7)

File ID GAY93 09 850 02 RS
AV2.I.2
50.7
Fio
2

• RUN #30713 SEP 19, 1993 20:07:39



RUN #30713-002

STOP

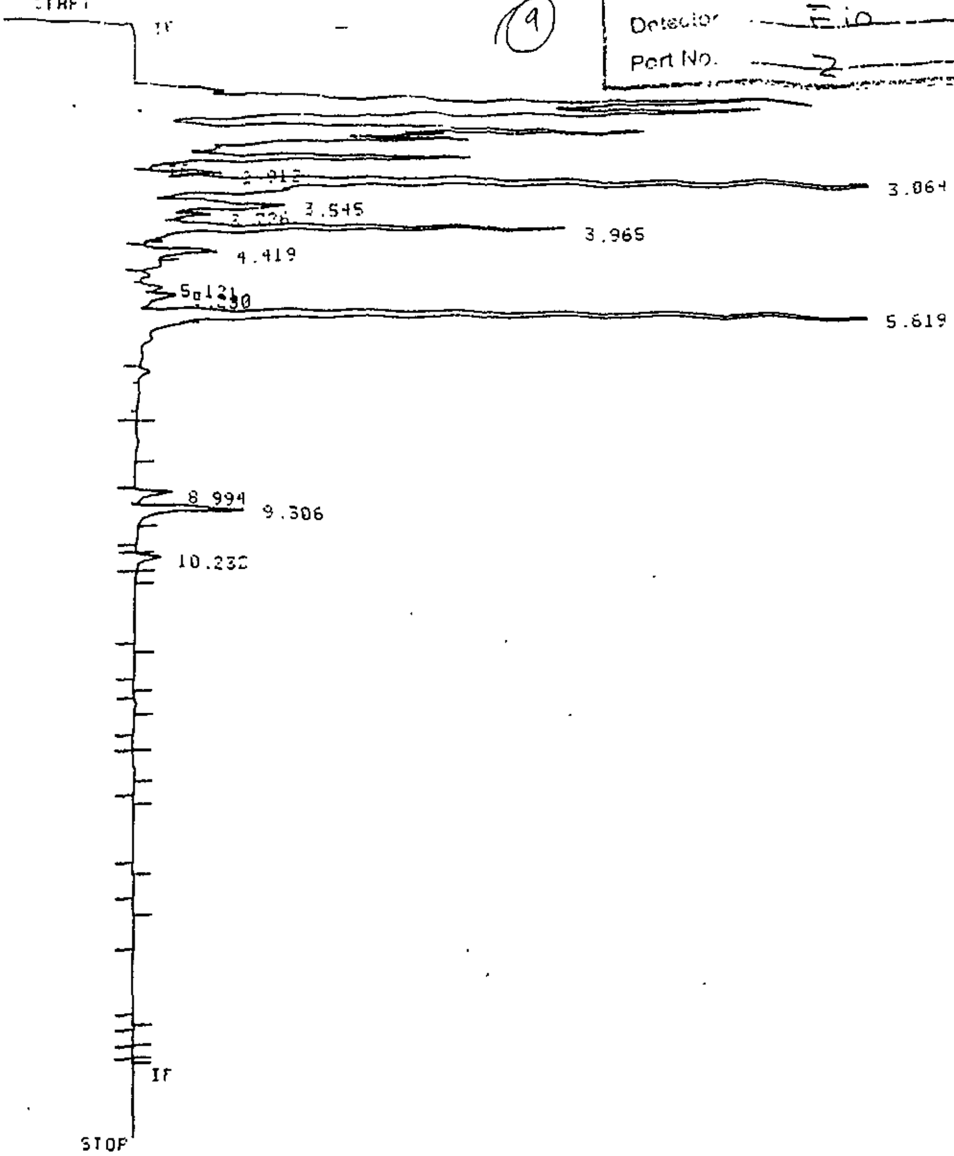
Closing signal file M:SIGNAL .BNC

File ID 6AY9309 S520 07A
Client ID AV 213
Vol Inj 502
Dil/Conc
Detector FID
Port No. 2

#30715

RUN #30715 SEP 19, 1993 21:14:49
START

(9)



Closing signal file M:SIGNAL .BNC

RUN #30715-002

RUN# 30715 SEP 19, 1993 21:14:49

IDENTIFIER : GCHP-3 / FID
SIGNAL FILE: M:SIGNAL.BNC
AREA%

RT	AREA	TYPE	WIDTH	AREA%
2.912	53141	BV	.073	1.80632
3.064	1030632	VV	.095	35.03232
3.545	224148	VV	.163	7.61904
3.726	59152	VV	.090	2.01064
3.965	446864	VB	.107	15.18940
4.419	71302	PB	.108	2.42363
5.121	22925	PV	.106	.77925
5.280	42058	VP	.127	1.42960
5.619	808805	PB	.096	27.49218
8.994	38657	BV	.103	1.31399
9.306	117593	VB	.109	3.99711
10.232	26670	BB	.102	.90654

TOTAL AREA=2941947
MUL FACTOR=1.0000E+00

TM = (2942 - 425)

RUN #30713-003

RUN# 30713 SEP 19, 1993 20:07:39

IDENTIFIER : GCHP-3 / FID
SIGNAL FILE: M:SIGNAL.BNC
AREA%

RT	AREA	TYPE	WIDTH	AREA%
2.912	13884	BP	.059	.52978
3.063	600887	PB	.079	22.92858
3.542	66284	BV	.138	2.52926
3.727	16566	VV	.073	.63212
3.965	447666	VB	.094	17.08199
4.418	33338	BB	.104	1.27211
5.119	14713	PV	.104	.56142
5.276	27766	VP	.122	1.05949
5.619	998690	PB	.094	38.10789
8.993	76848	PV	.099	2.93236
9.305	255272	VB	.105	9.74064
10.230	68776	PB	.099	2.62435

TOTAL AREA=2620690
MUL FACTOR=1.0000E+00

$$TPH = \frac{(2621 - 425)}{\left(\frac{3.59}{mg}\right)(0.05ml)}$$

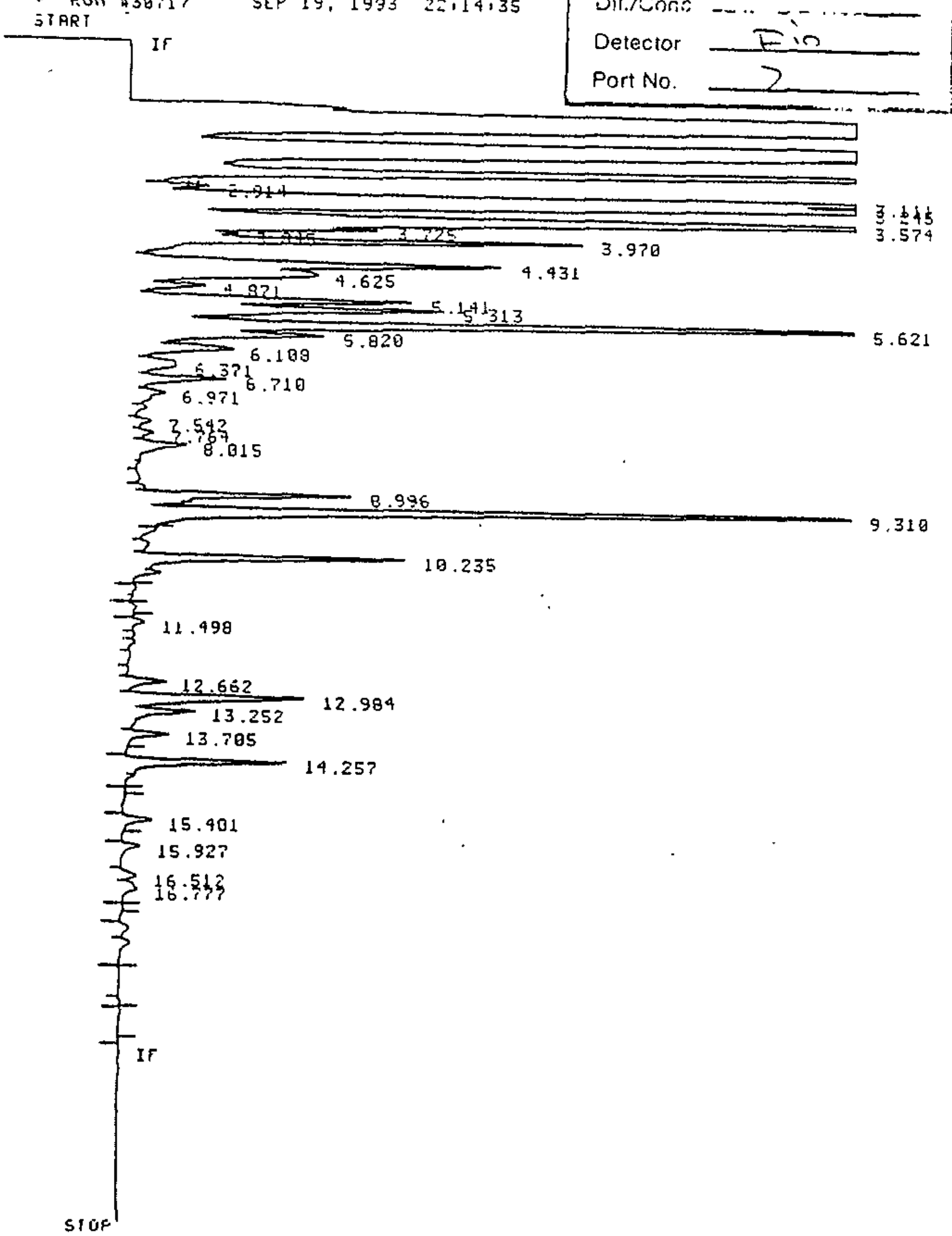
$$= 12,000\ mg/ml$$

RUN #30716-003

(11)

File ID	GAIC9309.850 OMKRE
Client ID	AVSI
Vol Inj.	5ml
Dil./Conc	
Detector	FID
Port No.	2

* RUN #30717 SEP 19, 1993 22:14:35



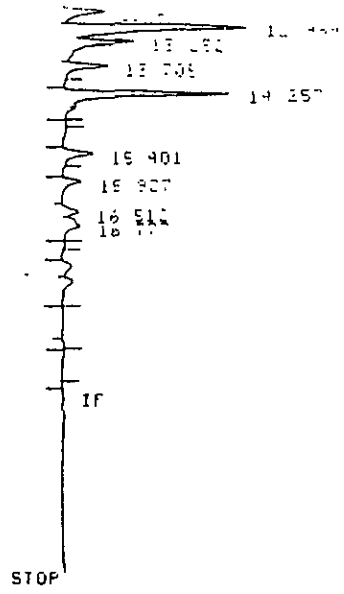
Closing signal file M:SIGNAL .BNC

RUN #30717-002

RUN# 30717 SEP 19, 1993 22:14:35

IDENTIFIER : GCHP-3 / FID
SIGNAL FILE: M:SIGNAL.BNC
APEA%

RT	AREA	TYPE	WIDTH	APEA%
2.914	37347	BV	.078	.38300
3.111	938805	VV	.117	9.62767
3.245	1162611	VV	.133	11.92295
3.574	1417559	VV	.153	14.53741
3.725	188817	VV	.083	1.93636
3.845	62622	VV	.070	.64220
3.970	460844	VP	106	4.72607
4 431	455404	PV	.127	4.67028
4.625	344597	VV	.194	3.53392
4 971	70265	VV	.108	72058
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]



Closing signal file M:SIGNAL .BNC

RUN #30717-002

RUN# 30717 SEP 19, 1993 22:14:35

IDENTIFIER : GCHP-3 / FID
SIGNAL FILE: M:SIGNAL.BNC
AREA%

RT	AREA	TYPE	WIDTH	AREA%
2.914	37347	BV	.078	.38300
3.111	938805	VV	.117	9.62767
3.245	1162611	VV	.133	11.92285
3.574	1417559	VV	.153	14.53741
3.725	188817	VV	.083	1.93636
3.845	62622	VV	.070	.64220
3.970	460844	VP	.106	4.72687
4.431	455404	PV	.127	4.67028
4.625	344597	VV	.194	3.53392
4.871	70265	VV	.108	.72058
5.141	313210	VV	.115	3.21204
5.313	460015	VV	.151	4.71756
5.621	1019084	VV	.107	10.45095
5.820	255470	VV	.137	2.61991
6.108	154869	VV	.158	1.58822
6.371	86550	VV	.220	.88759
6.710	108465	VV	.118	1.11233
6.971	55891	VV	.183	.57318
7.542	18221	PV	.106	.18686
7.764	20477	VV	.113	.21000
8.015	69998	VV	.140	.71785
8.996	196620	PV	.094	2.01639
9.310	842665	VB	.108	8.64173
10.235	269823	PV	.101	2.76710
11.498	13786	BV	.099	.14138
12.662	47822	PV	.115	.49043
12.984	244122	VV	.136	2.50353
13.252	95283	VV	.138	.97715
13.705	46481	VB	.107	.47667
14.257	178366	BV	.109	1.82919
15.401	36343	BB	.118	.37271
15.927	22006	BP	.116	.22568
16.512	22483	PV	.129	.23057
16.777	34198	VB	.200	.35071

TOTAL AREA=9.7511E+06
MUL FACTOR=1.0000E+00

$$TPH = \frac{(9751 - 425)}{\left(\frac{3.59}{kg}\right)(5ml)}$$

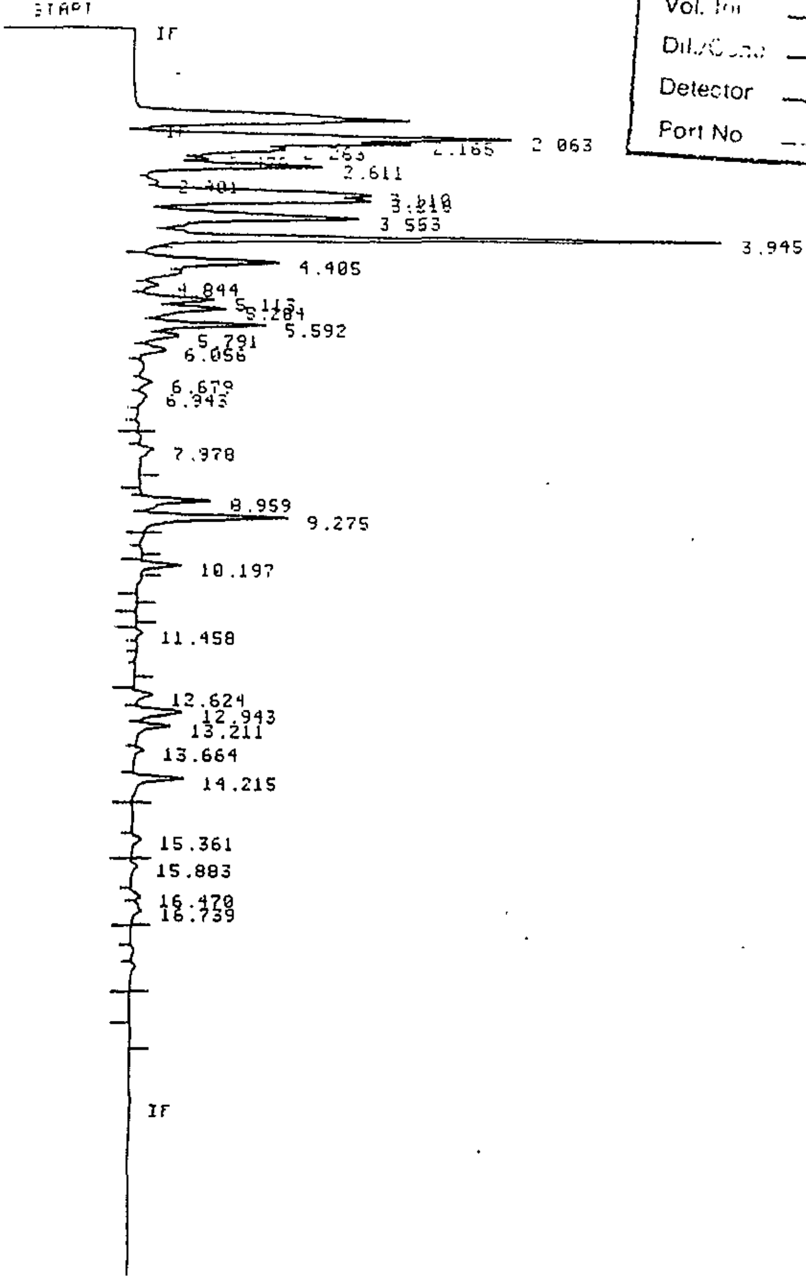
$$= 520\ kg/ml$$

10

File ID	RE 60AY58 09 800 054
Client ID	A3I
Vol. Inj	500A
Dil./Conc	
Detector	PID
Port No	8

* RUN #10765 SEP 20, 1993 11:56:41

START



RUN #10765-002

TIMETABLE STOP

Closing signal file H:SIGNAL .BNC

DL x100

RUN #10765-003

RUN# 10765 SEP 20, 1993 11:56:41

IDENTIFIER : GCHP-3 / PID
SIGNAL FILE: M:SIGNAL.BNC

BTEX AIR

ESTD%-AREA

RT	TYPE	AREA	WIDTH	CAL#	BTEX WATER	NAME	
2.063	BV	367967	.105	7	11.251	MTBE	
2.165	VV	222007	.086		.000		
2.263	VV	65903	.049		.000		
2.470	VV	46190	.077		.000		
2.611	VP	190566	.111		.000		
2.901	PV	10743	.091		.000		
3.110	VV	254979	.117	1	.398	BENZENE	70
3.216	VV	274378	.127		.000		
3.553	VV	332213	.164		.000		
3.945	VB	556534	.101	2	2.159	TRIFLUOROTOLUENE	
4.405	BV	170150	.129		.000		
4.844	VP	15385	.098		.000		
5.113	PV	81045	.114		.000		
5.284	VV	121290	.148		.000		
5.592	VV	135628	.111	3	.234	TOLUENE	23
5.791	VV	52412	.135		.000		
6.056	VV	38391	.146		.000		
6.679	VV	19421	.133		.000		
6.943	VP	15716	.157		.000		
7.978	VB	25531	.159		.000		
8.959	VV	76748	.111	4	.161	ETHYLBENZENE	14
9.275	VB	157974	.111	5	.275	P+M XYLENES	28
10.197	BB	36032	.091	6	.073	O-XYLENE	7.3
11.458	PV	6954	.100		.000		36
12.624	PV	23685	.124		.000		
12.943	VV	67573	.141		.000		
13.211	VV	51206	.138		.000		
13.664	VV	16051	.136		.000		
14.215	VB	61588	.122		.000		
15.361	PB	13261	.134		.000		
15.883	BP	10605	.139		.000		
16.470	PV	13459	.132		.000		
16.739	VB	20762	.200		.000		

TOTAL AREA=3552347
MUL FACTOR=1.0000E+00
SAMPLE AMT=5.0000E+03

RUN #10765-004

11

* RUN #10766 SEP 20, 1993 12:27:56
START

IF

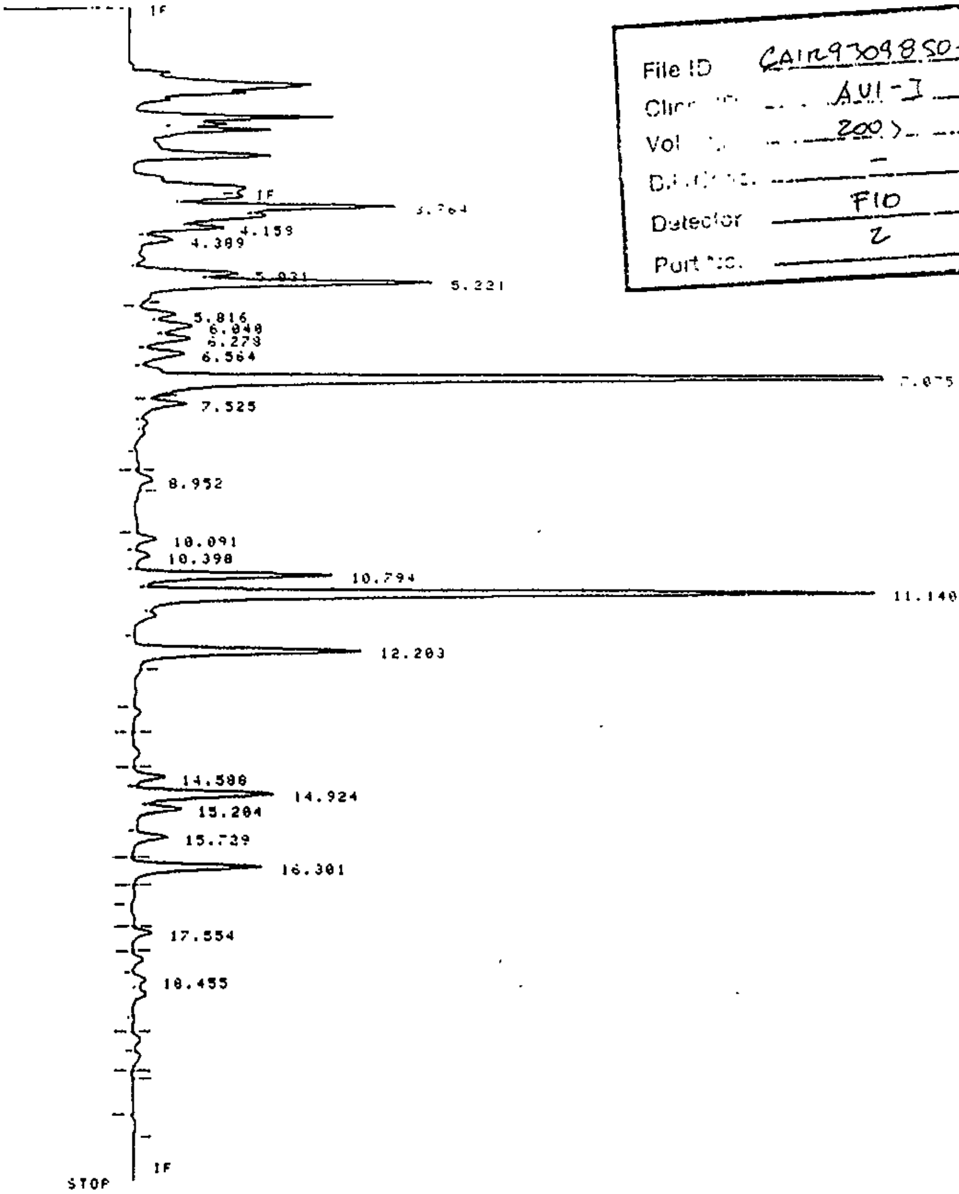
File ID GA93 09 850 09A
Client ID A4 1
Vol ... 1mL
Dil/Conc. ...
Detector PID

(11)

RUN #2421[illegible] SEP 19 1993 22:20:2[illegible]

START

File ID	CAIR9309850-06
Client ID	AVI-I
Vol	200
D.F.	—
Detector	FID
Port No.	2



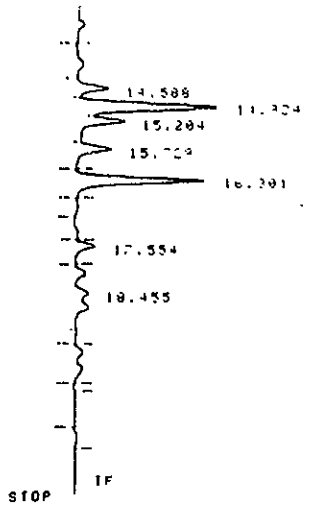
Closing signal file M:SIGNAL .BNC

RUN #24218-002

RUN# 24218 SEP 19, 1993 22:20:23

IDENTIFIER : GCHP-2 FID
SIGNAL FILE: M:SIGNAL.BNC
NO CALIB PEAKS FOUND
AREA%

RT	AREA	TYPE	WIDTH	AREA%
3.764	118563	PV	.112	5.13650
4.158	39311	VP	.114	1.70307
4.389	16763	PP	.118	.72622
5.031	67240	PV	.137	2.91304
5.221	219871	VB	.154	9.49080
5.816	24182	PV	.140	1.04764
6.040	45540	VV	.194	1.97327
6.279	36995	VV	.155	1.60273
6.564	32582	VP	.158	1.41155
7.075	581696	PB	.130	25.20079
7.525	23495	BP	.128	1.01787
8.952	11662	BB	.155	.50523
10.091	12549	BP	.127	.54366
10.398	10363	PV	.139	.44896
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]



Closing signal file M:SIGNAL .BHC

RUN #24218-002

RUN# 24218 SEP 19, 1993 22:20:23

IDENTIFIER 1 GCHP-2 FID
SIGNAL FILE: M:SIGNAL.BHC
NO CALIB PEAKS FOUND
AREA%

RT	AREA	TYPE	WIDTH	AREA%
3.764	118563	PV	.112	5.13650
4.158	39311	VP	.114	1.70307
4.369	16763	PP	.110	.72622
5.031	67240	PV	.137	2.91304
5.221	219071	VB	.154	9.49080
5.816	24102	PV	.140	1.04764
6.040	45548	VV	.184	1.97327
6.270	36995	VV	.155	1.60273
6.564	32582	VP	.158	1.41155
7.075	581696	PB	.130	25.20079
7.525	23495	BP	.128	1.01787
8.952	11662	BB	.155	.50523
10.091	12549	BP	.127	.54366
10.398	10363	PV	.139	.44896
10.794	125879	VV	.132	5.45345
11.140	491097	VV	.137	21.27578
12.203	146482	PB	.134	6.34257
14.588	23614	BV	.147	1.02303
14.934	107848	VV	.156	4.67229
15.204	38525	VV	.160	1.66902
15.729	26482	VB	.154	1.14728
16.301	86168	BB	.138	3.73305
17.554	11241	BB	.123	.48699
18.455	10969	PV	.161	.47521

TOTAL AREA=2308245
MUL FACTOR=1.0000E+00

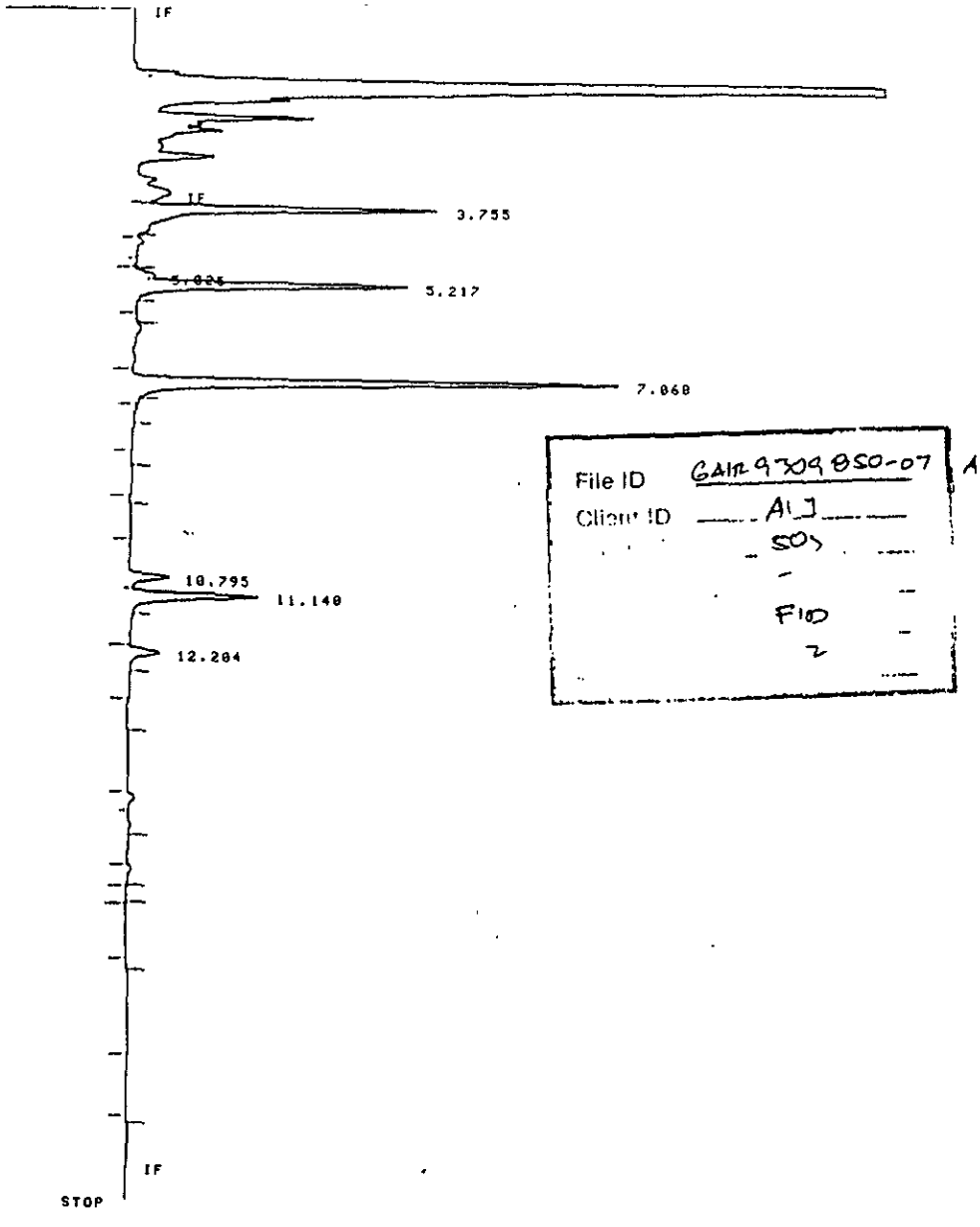
$$\frac{2308 - 196}{1.35\ (0.2\text{ml})} = 7800$$

RUN #24215-003

(9)

• RUN #24216 SEP 19, 1993 21:23:58

START



File ID GAIN9309050-07 A

Client ID ALL

SOS

-

FID

2

Closing signal file M:SIGNAL .BNC

RUN #24215-002

RUN #24216-003

RUN# 24216 SEP 19, 1993 21:23:58

IDENTIFIER : GCHP-2 FID
SIGNAL FILE: M:SIGNAL.BHC
NO CALIB PEAKS FOUND
AREA%

RT	AREA	TYPE	WIDTH	AREA%
3.755	182095	BB	.129	22.81503
5.025	12067	BV	.116	1.51190
5.217	181890	VB	.137	22.78935
7.068	295610	PB	.126	37.03755
10.795	22823	BV	.120	2.85954
11.140	82468	VB	.133	10.33258
12.204	21183	BB	.138	2.65406

TOTAL AREA= 798136
MUL FACTOR=1.0000E+00

$\frac{798 - 196}{1.35\,(0.05\text{M})} = 0900$

RUN #24216-004

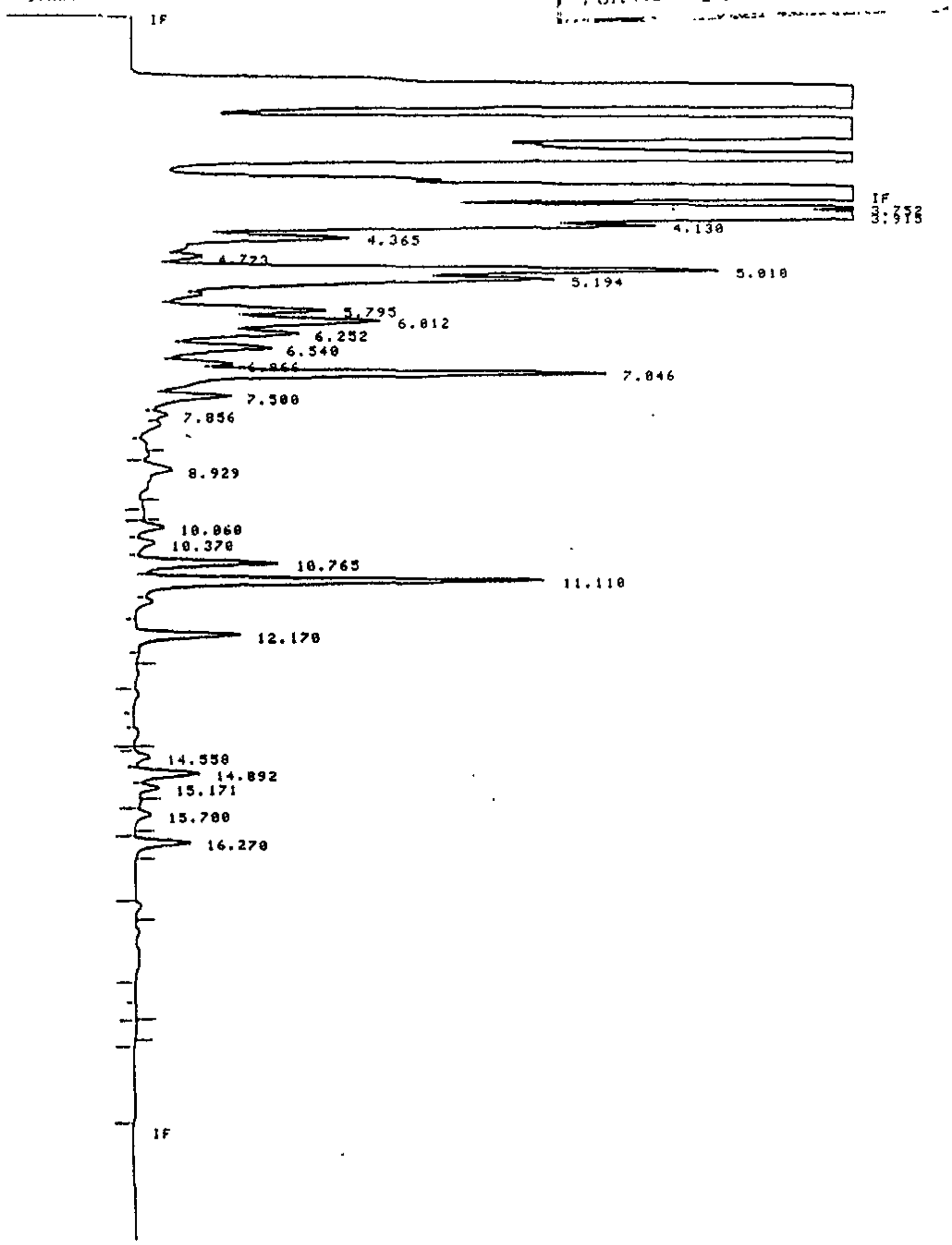
(10)

File: GAF9309850082
AN 31
100X
F io
Foil No 15

RUN #24244-004

(12)

RUN #24245 SEP 28, 1993 14:28:24
START



RUN #24245-002

RUN #24245-003

RUN# 24245 SEP 20, 1993 14:20:24

IDENTIFIER 1 GCHP-2 FID
SIGNAL FILE: MISIGNAL.BHC
NO CALIB PEAKS FOUND
AREA%

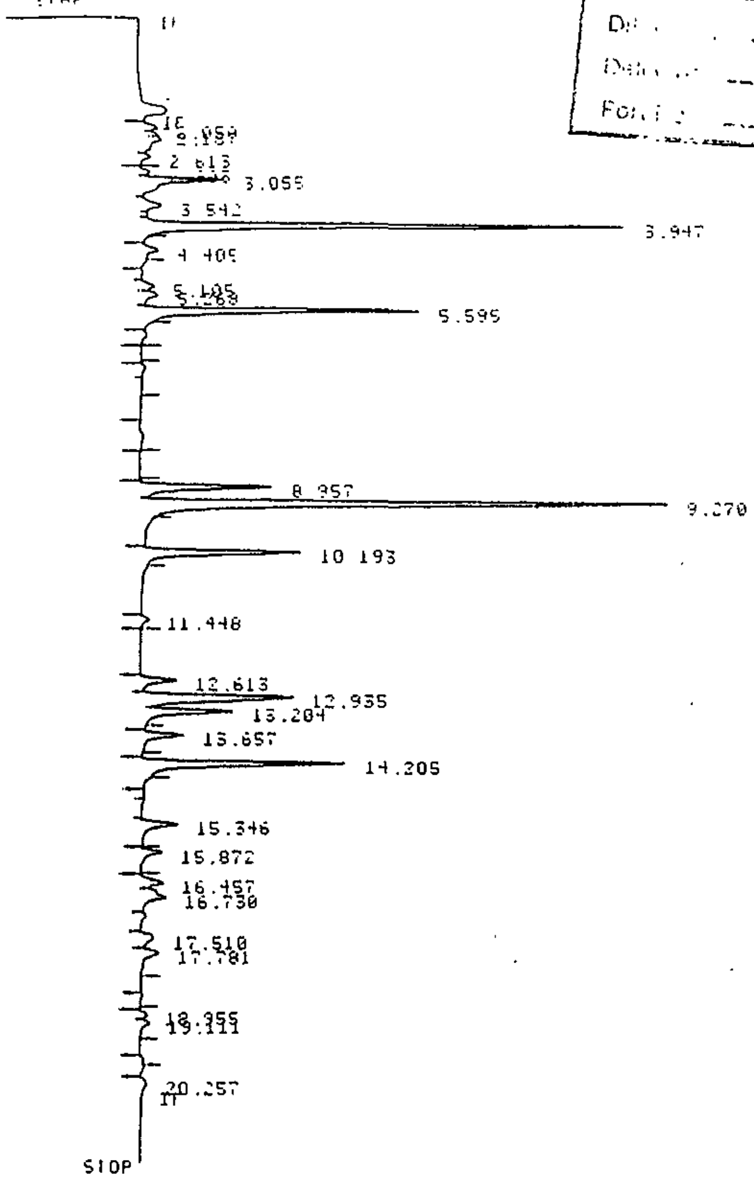
RT	AREA	TYPE	WIDTH	AREA%
3.752	212277	PV	.091	5.72112
3.915	805623	VV	.100	21.71253
4.130	212961	VP	.112	5.73956
4.365	81756	PP	.115	2.20342
4.723	15697	PP	.101	.42305
5.010	425704	PV	.153	11.47540
5.194	334051	VV	.172	9.00308
5.795	123485	VV	.150	3.32807
6.012	202301	VV	.185	5.45441
6.252	113723	VV	.161	3.06497
6.540	100909	VV	.174	2.71962
6.866	49481	VV	.127	1.33357
7.046	326440	VV	.144	8.79796
7.500	60594	VV	.151	1.63308
7.856	11013	VV	.125	.29681
8.929	31609	BB	.212	.85190
10.060	15536	BP	.126	.41871
10.370	13850	PV	.153	.37327
10.765	96079	VV	.133	2.58945
11.110	280443	VV	.136	7.55828
12.170	78046	PV	.144	2.10344
14.558	9705	BP	.127	.26156
14.892	47913	PV	.149	1.29131
15.171	12255	VB	.118	.33029
15.700	9273	BB	.123	.24992
16.270	39523	BB	.137	1.06519

TOTAL AREA=3710406
MUL FACTOR=1.0000E+00

(11)

Fi... ID: GMA93 09 550 09A
Ch... ID: A4 L
V...: 1mL
Di...:
D...: PID
Fo... #: 8

RUN #10766 SEP 20, 1993 12:27:56
START



STOP

Closing signal file N:SIGNAL .BNC

RUN #10766-002

RUN# 10766 SEP 20, 1993 12:27:56 [DL x 50]

IDENTIFIER : GCHP-3 / PID
SIGNAL FILE: N:SIGNAL.BNC

BTEX AIP

ESTD%-AREA

RT	TYPE	AREA	WIDTH	CAL#	BTEX WATER	NAME
2.050	BV	16009	.106	7	489	MTBE
2.187	VV	12213	.080		.000	
2.613	VB	9546	.100		.000	
2.903	PV	7935	.079		.000	
3.055	VP	91824	.113	1	.143	BENZENE
3.542	PV	24570	.131		.000	
3.947	VB	433995	.094	2	1.684	TRIFLUOROTOLUENE
4.405	PB	15875	.109		000	
5.105	PV	13572	107		.000	
5.268	VP	19455	.128		.000	
5.595	PB	247238	.094	3	.427	TOLUENE
8.957	PV	119967	095	4	252	ETHYLBENZENE

RUN #10766-002

RUN# 10766 SEP 20, 1993 12:27:56 [DL x 50]

IDENTIFIER : GCHP-3 / PID
SIGNAL FILE: H:SIGNAL.BNC

BTEX AIR

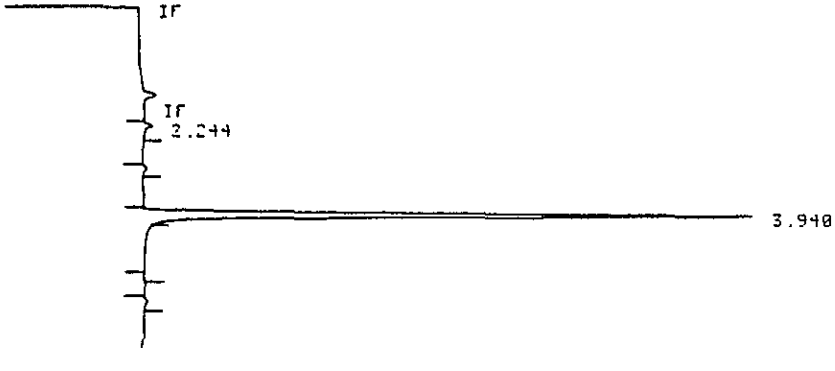
ESTD%-AREA

RT	TYPE	AREA	WIDTH	CAL#	BTEX WATER	NAME
2.050	BV	16009	.106	7	.489	MTBE
2.187	VV	12213	.080		.000	
2.613	VB	9546	.100		.000	
2.903	PV	7935	.079		.000	
3.055	VP	91824	.113	1	.143	BENZENE
3.542	PV	24570	.131		.000	
3.947	VB	433995	.094	2	1.684	TRIFLUOROTOLUENE
4.405	PB	15875	.109		.000	
5.105	PV	13572	.107		.000	
5.268	VP	19455	.128		.000	
5.595	PB	247238	.094	3	.427	TOLUENE
8.957	PV	119967	.095	4	.252	ETHYLBENZENE
9.270	VB	522824	.104	5	.912	P+M XYLENES
10.193	PB	148685	.098	6	.300	O-XYLENE
11.448	BB	7275	.092		.000	
12.613	PV	35698	.101		.000	
12.935	VV	192400	.131		.000	
13.204	VB	95368	.109		.000	
13.657	PB	39869	.101		.000	
14.205	PB	198503	.102		.000	
15.346	PB	42481	.119		.000	
15.872	BB	23458	.111		.000	
16.457	PV	29650	.126		.000	
16.730	VV	53129	.202		.000	
17.510	PV	24731	.176		.000	
17.781	VB	29750	.164		.000	
18.955	BV	7432	.102		.000	
19.111	VB	11236	.116		.000	
20.257 I	BH	11730	.174		.000	

TOTAL AREA=2486418
MUL FACTOR=1.0000E+00
SAMPLE AMT=5.0000E+03

RUN #10766-003 (12)

* RUN #10767 SEP 20, 1993 12:57:02
START



ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. 2169-93-3A

Chain of Custody

ARCO Facility no. 2169	City (Facility) OAKLAND	Project manager (Consultant) JOEL COFFMAN	Laboratory name SEQUOIA
ARCO engineer MIKE WHELAN	Telephone no. (ARCO)	Telephone no. (Consultant) (510) 783 7500	Fax no. (Consultant) (510) 783 1089
Consultant name GETTLER-RYAN INC	Address (Consultant) 2150 W WINTON AVE, HAYWARD CA 94545		Contract number

Method of shipment: GR

Sample I.D.	Lab no.	Container no.	Matrix: Soil	Matrix: Water	Matrix: Other	Preservation: Ice	Preservation: Acid	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH EPA M602/8020/8015	TPH Modified 8015 Gas ☐ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Metals ☐ VOA ☐ Semi VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐	
AV2I1		1			X			9-17-93	1100		X						9309 850				-1
AV2I2		2			X			9-17-93	1300		X										-2
AV2I3		3			X			"	1400		X										-3
AV5I		4			X			"	1500		X										-4
A3I		5			X			"	1530		X										-5
AVII		6			X			"	1630		X										-6
AIII		7			X			"	1710		X										-7
AV3I		8			X			"	1740		X										-8
A4I		9			X			"	1805		X										-9

Special detection Limit/reporting: STD 9309850

Special QA/QC: STD

Remarks: INFLUENT AV2 SAMPLES A1 > 100,000 PPM FID GR 9927

Lab number

Turnaround time

- Priority Rush 1 Business Day: X
- Rush 2 Business Days: [ ]
- Expedited 5 Business Days: ☐
- Standard 10 Business Days: ☐

Condition of sample:

Temperature received:

	Date	Time	
Relinquished by sampler: Dan McCoy	9-17-93	1815	Received by: Brian McDevitt
Relinquished by: Brian McDevitt	9-17-93	1940	Received by:
Relinquished by:	Date	Time	Received by laboratory: Stephen Ho — Date 9/17/93 — Time 1940

Distribution: White copy — Laboratory; Canary copy — ARCO Environmental Engineering; Pink copy — Consultant

APPC-3292 (2-91)

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

Gettler Ryan/Geostrategies
2150 W. Winton Avenue
Hayward, CA 94545
Attention: Matt Donohue

Project: 2169-93-3A, Arco 2169-Oakland

Enclosed are the results from 6 air samples received at Sequoia Analytical on September 15,1993. The requested analyses are listed below:

SAMPLE #	SAMPLE DESCRIPTION	DATE OF COLLECTION	TEST METHOD
3I72001	Air, IAV4-1	9/15/93	EPA 5030/8015/8020
3I72002	Air, IAV4-2	9/15/93	EPA 5030/8015/8020
3I72003	Air, IAV4-3	9/15/93	EPA 5030/8015/8020
3I72004	Air, IAR2-1	9/15/93	EPA 5030/8015/8020
3I72005	Air, IAR2-2	9/15/93	EPA 5030/8015/8020
3I72006	Air, EFFAR2	9/15/93	EPA 5030/8015/8020

Please contact me if you have any questions. In the meantime, thank you for the opportunity to work with you on this project.

Very truly yours,

SEQUOIA ANALYTICAL

Nokowhat D. Herrera
Project Manager

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

Gettler Ryan/Geostrategies	Client Project ID:	2169-93-3A, Arco 2169-Oakland	Sampled:	Sep 15, 1993
2150 W. Winton Avenue	Sample Matrix:	Air	Received:	Sep 15, 1993
Hayward, CA 94545	Analysis Method:	EPA 5030/8015/8020	Reported:	Sep 17, 1993
Attention: Matt Donohue	First Sample #:	3I72001		

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit ppmv	Sample I.D. 3I72001 IAV4-1	Sample I.D. 3I72002 IAV4-2	Sample I.D. 3I72003 IAV4-3	Sample I.D. 3I72004 IAR2-1	Sample I.D. 3I72005 IAR2-2	Sample I.D. 3I72006 EFFAR2
Purgeable Hydrocarbons	2.3	7,900	11,000	15,000	100	90	15
Benzene	0.019	690	600	720	0.50	1.8	0.63
Toluene	0.016	430	450	350	1.3	0.88	0.90
Ethyl Benzene	0.014	58	62	39	0.55	0.32	0.18
Total Xylenes	0.014	250	280	130	2.8	1.8	0.99
Chromatogram Pattern:		Gas	Gas + Non-Gas < C8	Gas	Gas + Non-Gas < C8	Gas + Non-Gas < C8	Gas

Quality Control Data

Report Limit Multiplication Factor:	250	250	250	10	5.0	1.0
Date Analyzed:	9/16/93	9/16/93	9/16/93	9/16/93	9/16/93	9/16/93
Instrument Identification:	GCHP-2	GCHP-2	GCHP-3	GCHP-2	GCHP-3	GCHP-2
Surrogate Recovery, %: (QC Limits = 70-130%) * - Coelution Confirmed	133 *	171*	139 *	127	124	102

Purgeable Hydrocarbons are quantitated against a *fresh gasoline standard.*
Analytes reported as N.D. were not detected above the stated reporting limit.

SEQUOIA ANALYTICAL

Nokowhat D. Herrera
Project Manager

Please Note:

A molecular weight of 65 was used to calculate ppmv for Purgeable Hydrocarbons.

SEQUOIA ANALYTICAL
680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

Gettler Ryan/Geostrategies
2150 W. Winton Avenue
Hayward, CA 94545
Attention: Matt Donohue

Client Project ID: 2169-93-3A, Arco 2169-Oakland
Matrix: Water
QC Sample Group: 3I72001 - 02, 04 -05

Reported: Sep 17, 1993

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl-Benzene	Xylenes
Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Analyst:	M.Nipp	M.Nipp	M.Nipp	M.Nipp
Conc. Spiked:	10	10	10	30
Units:	µg/L	µg/L	µg/L	µg/L
LCS Batch#:	GBLK091693	GBLK091693	GBLK091693	GBLK091693
Date Prepared:	9/16/93	9/16/93	9/16/93	9/16/93
Date Analyzed:	9/16/93	9/16/93	9/16/93	9/16/93
Instrument I.D.#:	GCHP-2	GCHP-2	GCHP-2	GCHP-2
LCS % Recovery:	96	96	96	93
Control Limits:	80-120	80-120	80-120	80-120
MS/MSD Batch #:	G3I45102	G3I45102	G3I45102	G3I45102
Date Prepared:	9/16/93	9/16/93	9/16/93	9/16/93
Date Analyzed:	9/16/93	9/16/93	9/16/93	9/16/93
Instrument I.D.#:	GCHP-2	GCHP-2	GCHP-2	GCHP-2
Matrix Spike % Recovery:	97	97	97	97
Matrix Spike Duplicate % Recovery:	100	100	100	100
Relative % Difference:	3.0	3.0	3.0	3.0

Quality Assurance Statement: All standard operating procedures and quality control requirements have been met.

SEQUOIA ANALYTICAL

Nokowhat D. Herrera
Project Manager

Please Note:
The LCS is a control sample of known, interferent free matrix that is analyzed using the same reagents, preparation and analytical methods employed for the samples. The LCS % recovery data is used for validation of sample batch results. Due to matrix effects, the QC limits for MS/MSD's are advisory only and are not used to accept or reject batch results.

SEQUOIA ANALYTICAL
680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

Gettler Ryan/Geostrategies
2150 W. Winton Avenue
Hayward, CA 94545
Attention: Matt Donohue

Client Project ID: 2169-93-3A, Arco 2169-Oakland
Matrix: Water
QC Sample Group: 3I72003

Reported: Sep 17, 1993

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl-Benzene	Xylenes
Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Analyst:	M.Nipp	M.Nipp	M.Nipp	M.Nipp
Conc. Spiked:	10	10	10	30
Units:	µg/L	µg/L	µg/L	µg/L
LCS Batch#:	GBLK091693	GBLK091693	GBLK091693	GBLK091693
Date Prepared:	9/16/93	9/16/93	9/16/93	9/16/93
Date Analyzed:	9/16/93	9/16/93	9/16/93	9/16/93
Instrument I.D.#:	GCHP-3	GCHP-3	GCHP-3	GCHP-3
LCS % Recovery:	96	97	97	97
Control Limits:	80-120	80-120	80-120	80-120
MS/MSD Batch #:	G3I4501	G3I4501	G3I4501	G3I4501
Date Prepared:	9/16/93	9/16/93	9/16/93	9/16/93
Date Analyzed:	9/16/93	9/16/93	9/16/93	9/16/93
Instrument I.D.#:	GCHP-3	GCHP-3	GCHP-3	GCHP-3
Matrix Spike % Recovery:	91	90	91	90
Matrix Spike Duplicate % Recovery:	96	95	97	97
Relative % Difference:	5.3	5.4	6.4	7.5

Quality Assurance Statement: All standard operating procedures and quality control requirements have been met.

SEQUOIA ANALYTICAL

Nokowhat D. Herrera
Project Manager

Please Note:
The LCS is a control sample of known, interferent free matrix that is analyzed using the same reagents, preparation and analytical methods employed for the samples. The LCS % recovery data is used for validation of sample batch results. Due to matrix effects, the QC limits for MS/MSD's are advisory only and are not used to accept or reject batch results.

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. 2169-93-3A

Chain of Custody

ARCO Facility no. 2169	City (Facility) OAKLAND	Project manager (Consultant) JOEL COFFMAN	Laboratory name SEQUOIA
ARCO engineer MIKE WHELAN	Telephone no. (ARCO)	Telephone no. (Consultant) (510) 783-7500 / Fax no. (Consultant) (510) 783-1089	Contract number
Consultant name GETTLER-RYAN INC	Address (Consultant) 2150 W. WINTON AVE HAYWARD CA 94545		

Sample I.D.	Lab no.	Container no.	Matrix: Soil	Matrix: Water	Matrix: Other	Preservation: Ice	Preservation: Acid	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH EPA M602/8020/8015	TPH Modified 8015 Gas ☐ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Metals ☐ VOA ☐ Semi VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐		
IAV4-1		1			X			9-15-93	1215						9309720				-01	A		
IAV4-2		2			X			9-15-93	1300								↓		-02	A		
IAV4-3		3			X			9-15-93	1500										-03	A		
IARZ-1		4			X			9-15-93	1615										-04	A		
IARZ-2		5			X			9-15-93	1700										-05	A		
EFFARZ		6			X			9-15-93	17~~10~~								↓		-06	A		

Method of shipment

Special detection Limit/reporting: STD

Special QA/QC: STD

Remarks: 9927.15
24 HR TAT
OVA READINGS
Containers 1,2,3
> 100,000 PPm

Lab number

Turnaround time
- Priority Rush 1 Business Day ☒
- Rush 2 Business Days ☐
- Expedited 5 Business Days ☐
- Standard 10 Business Days ☐

Condition of sample:

Temperature received:

Relinquished by sampler	Date	Time	Received by
[signature]	9/15/93	1823	[signature]
Relinquished by [signature]	9/15/93	1851	Received by
Relinquished by	Date	Time	Received by laboratory / Date / Time

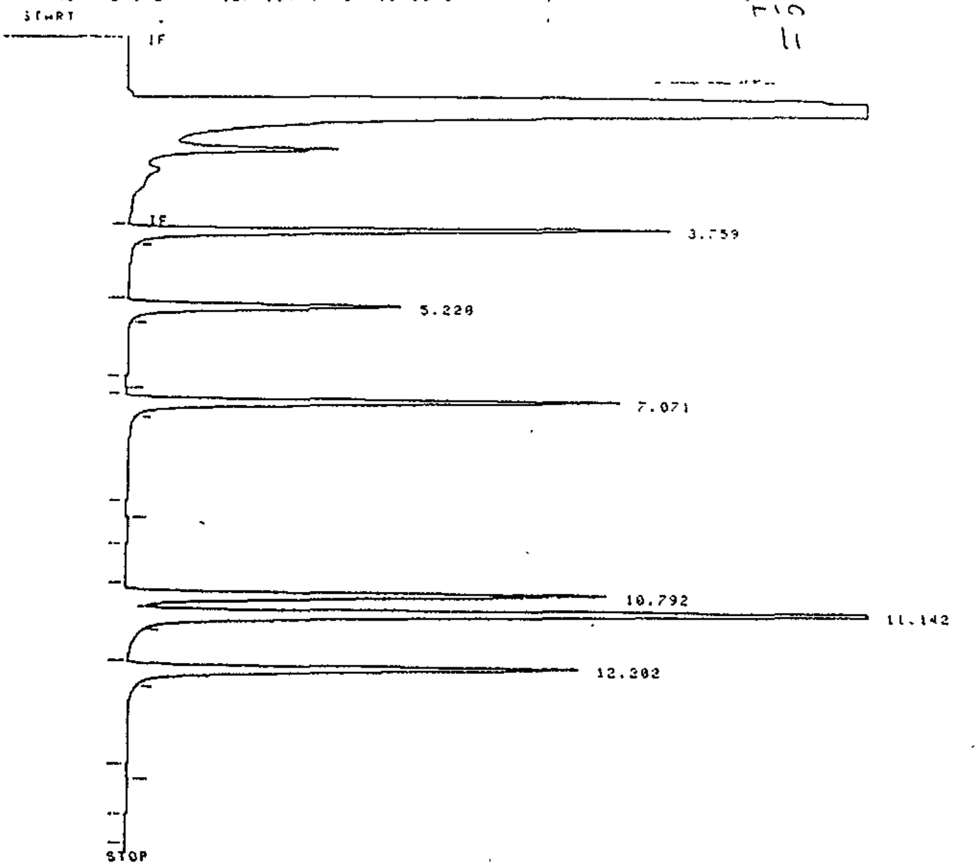
Distribution: White copy — Laboratory; Canary copy — ARCO Environmental Engineering; Pink copy — Consultant
APPC-3292 (2-91)

(1)

List ... run report ..... NO
List run parameters .... NO
List timetable . ... NO
List calibration table .... NO
List remote method .... NO
Formatted before report ..... YES
Formatted after report ...... YES
Skip perforations in report . YES
Skip perforations in plot ... YES

File ID GSTDA1698
Orig ID GSTDA1392C
5λ
2ppm
FID
11

* RUN #24072 SEP 16, 1993 08:10:34
START



Closing signal file M:SIGNAL .BNC

RUN #24872-002

RUN# 24872 SEP 16, 1993 08:10:34

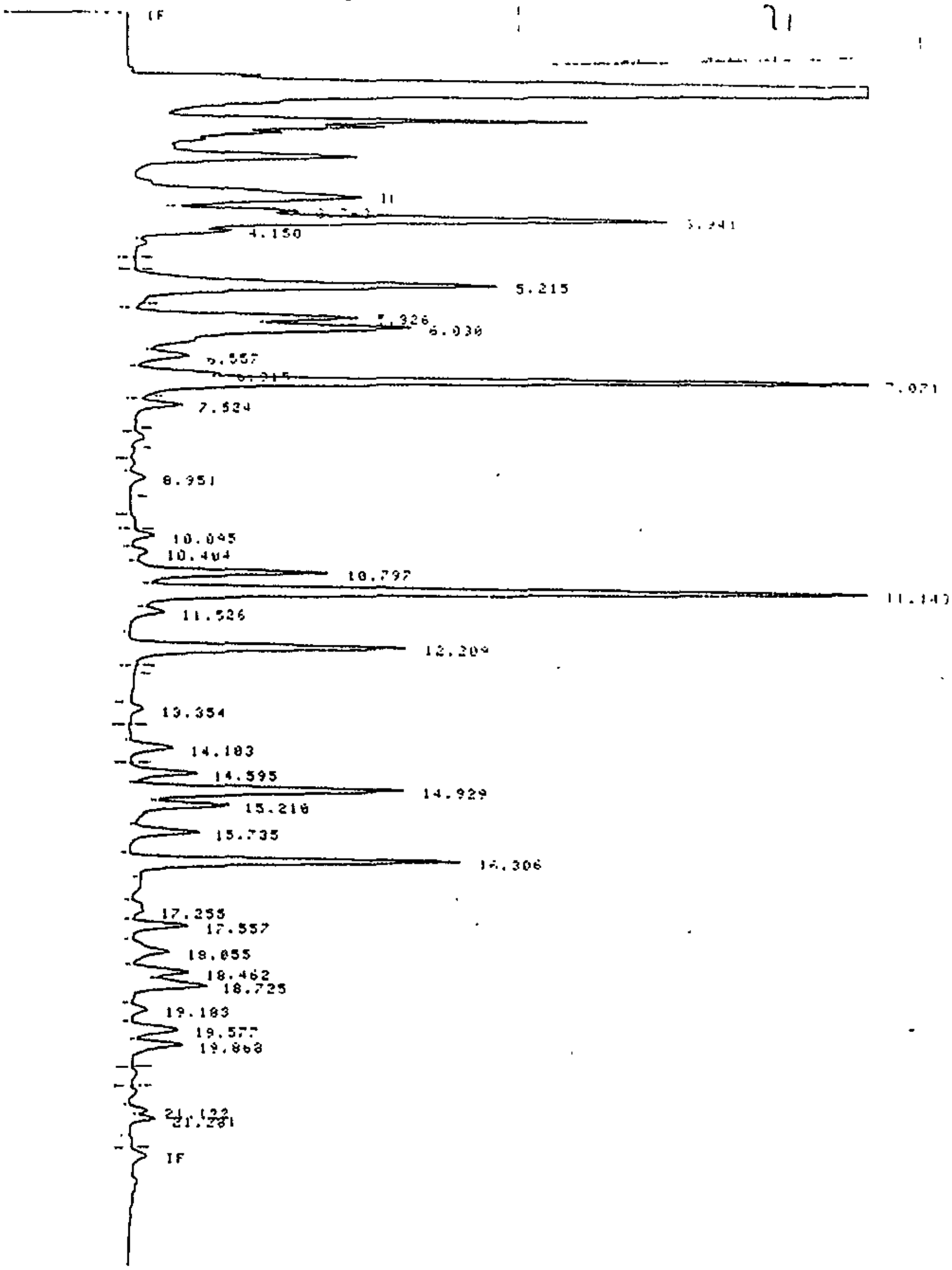
IDENTIFIER : GCHP-2 FID
SIGNAL FILE: M:SIGNAL.BNC
NO CALIB PEAKS FOUND
AREA%

RT	AREA	TYPE	WIDTH	AREA%
3.759	302081	BB	.114	15.41885
5.220	178083	BB	.134	9.09214
7.071	299811	PB	.125	15.30704
10.792	291924	PV	.126	14.90436
11.142	594322	VB	.129	30.34347
12.202	292507	PB	.134	14.93413

TOTAL AREA=1958648
MUL FACTOR=1.0000E+00

RUN #24073 SEP 15, 199?, 09:41:10
START

GSTD... A
GSTD...B.
10λ
250ppm
F in
71



RUN #24073-002

STOP

Closing signal file M:SIGNAL .BNC

RUN #24873-001

RUN# 24073 SEP 16, 1993 09:41:10

IDENTIFIER : GCHP-2 FID
SIGNAL FILE: M:SIGNAL.BNC
NO CALIB PEAKS FOUND
AREA%

RT	AREA	TYPE	WIDTH	AREA%
1.763	51570	BV	.086	1.33205
3.941	392735	VV	.155	10.25942
4.150	41464	VP	.105	1.11175
5.215	321041	BB	.132	8.60372
5.326	161222	BV	.149	4.32066
6.030	293702	VV	.218	7.87105
6.557	42031	VP	.164	1.12641
6.915	37492	PV	.094	1.00476
7.071	488191	VB	.130	13.08324
7.524	23982	BP	.117	.64270
8.951	13649	PB	.165	.36579
10.095	13654	BP	.125	.36592
10.404	12306	PV	.138	.32979
10.737	143865	VV	.149	3.85550
11.143	498739	VV	.134	13.36593
11.526	29887	VP	.172	.80095
12.209	180106	PB	.135	4.82674
13.354	9108	BB	.134	.24409
14.103	30931	VB	.146	.82893
14.595	49512	BV	.150	1.32689
14.929	207435	VV	.155	5.55914
15.210	80514	VV	.162	2.15773
15.735	53001	VP	.155	1.42040
16.306	223033	PV	.138	5.97716
17.255	20200	VV	.267	.54135
17.557	42548	VV	.145	1.14026
18.055	42982	VV	.216	1.15189
18.462	45274	VV	.156	1.21332
18.725	71470	VV	.190	1.91536
19.183	12514	VV	.148	.33537
19.577	39743	VV	.173	1.06509
19.868	39235	VB	.153	1.05148
21.122	11904	PV	.123	.31902
21.281	16311	VP	.127	.43713

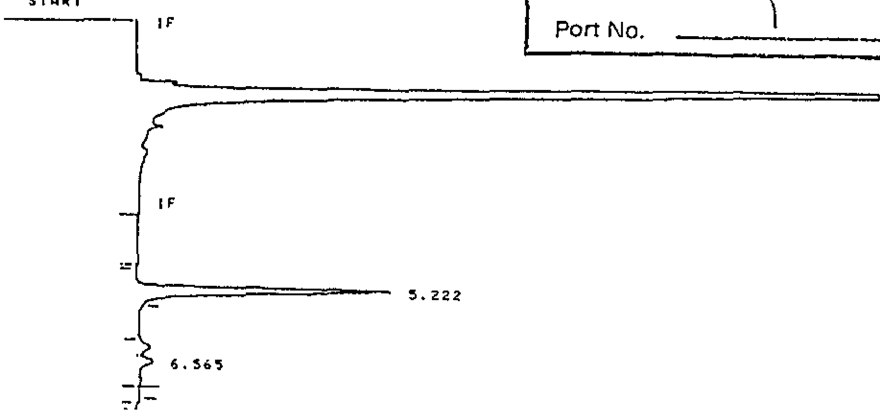
TOTAL AREA=3731421
MUL FACTOR=1.0000E+00

(3)

File ID	GB1409165S3
Clent ID	meth. Blk
Vol.	10mL
Dil./Conc.	
Detector	FID
Port No.	1

RUN #24873-004

* RUN #24874 SEP 16. 1993 09:17:10
START



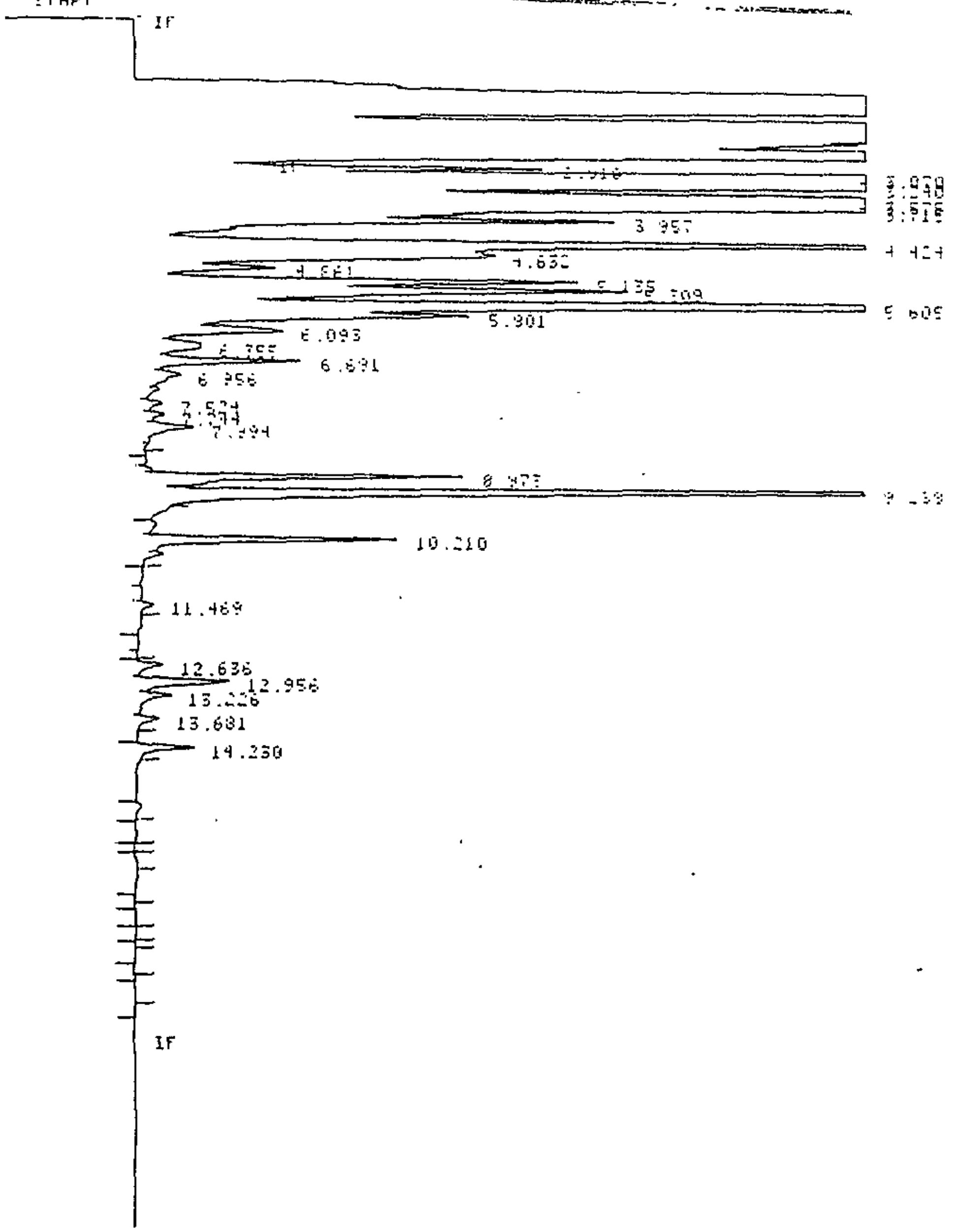
GH3 0972001A
1AV4-1
200X

(10)

RUN #30569-002

Inj.
Dil.
Detec. FID
Port No. 2

+ RUN #30570   SEP 16, 1993 12:34:20
START



RUN #30570-002

TIMETABLE STOP

Closing signal file M:SIGNAL .BNC

RUN #30570-003

RUN# 30570   SEP 16, 1993 12:34:20

IDENTIFIER : GCHS-3 . FID
SIGNAL FILE: A:SIGNAL.BNC
AREA%

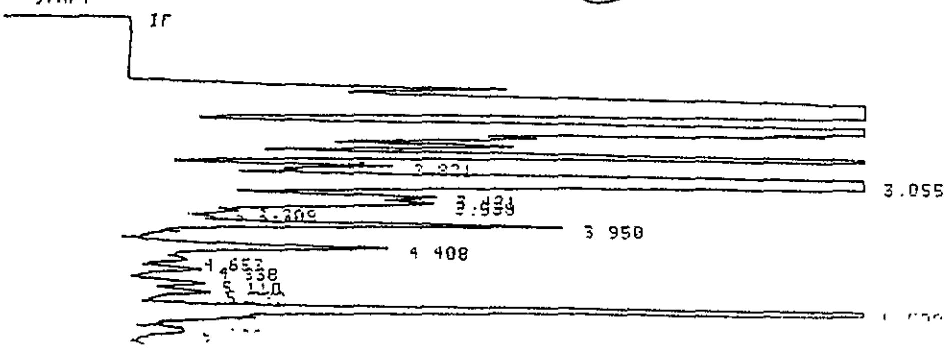
RT	AREA	TYPE	WIDTH	AREA%
2.310	221906	BV	.076	1.01435
3.070	5091633	VV	.130	23.24021
3.240	3052950	VV	.127	13.96204
3.575	3443634	VV	.176	15.74995
3.715	929666	VV	.990	4.25175
3.957	451856	VV	.106	2.06679
4.424	1191259	PV	.135	5.44801
4.652	587530	VV	.181	2.68696
4.861	119234	VV	.109	.54530
5.135	492919	VV	.119	2.25416
5.309	708791	VV	.154	3.24153
5.605	2513541	VV	.103	11.49523
5.801	417127	VV	.135	1.90766
6.093	203879	VV	.160	.93240
6.355	101922	VV	.216	.46611
6.691	167929	VV	.112	.76799
6.956	57901	VV	.181	.26480
7.524	19170	PV	.110	.08767
7.744	23020	VV	.115	.10528
7.994	78187	VV	.155	.35757
8.973	329557	PV	.107	1.50717
9.298	1122556	VB	.103	5.13391
10.210	253719	PV	.102	1.16032
11.469	11785	PB	.088	.05390
12.636	29862	BV	.114	.13657
12.956	126149	VV	.135	.57692
13.226	47458	VV	.136	.21704
13.681	23024	VB	.105	.10530
14.230	57780	BB	.101	.26425

TOTAL AREA=2.1866E+07
MUL FACTOR=1.0000E+00

$$\frac{21866 - 376}{0.2\,\text{ml}\,(3.44)} > 21{,}235\,\mu g$$

RUN #30570-004

* RUN #30571   SEP 16, 1993 13:05:37   (11)
START



(9)

IAV 4-2

2002

250

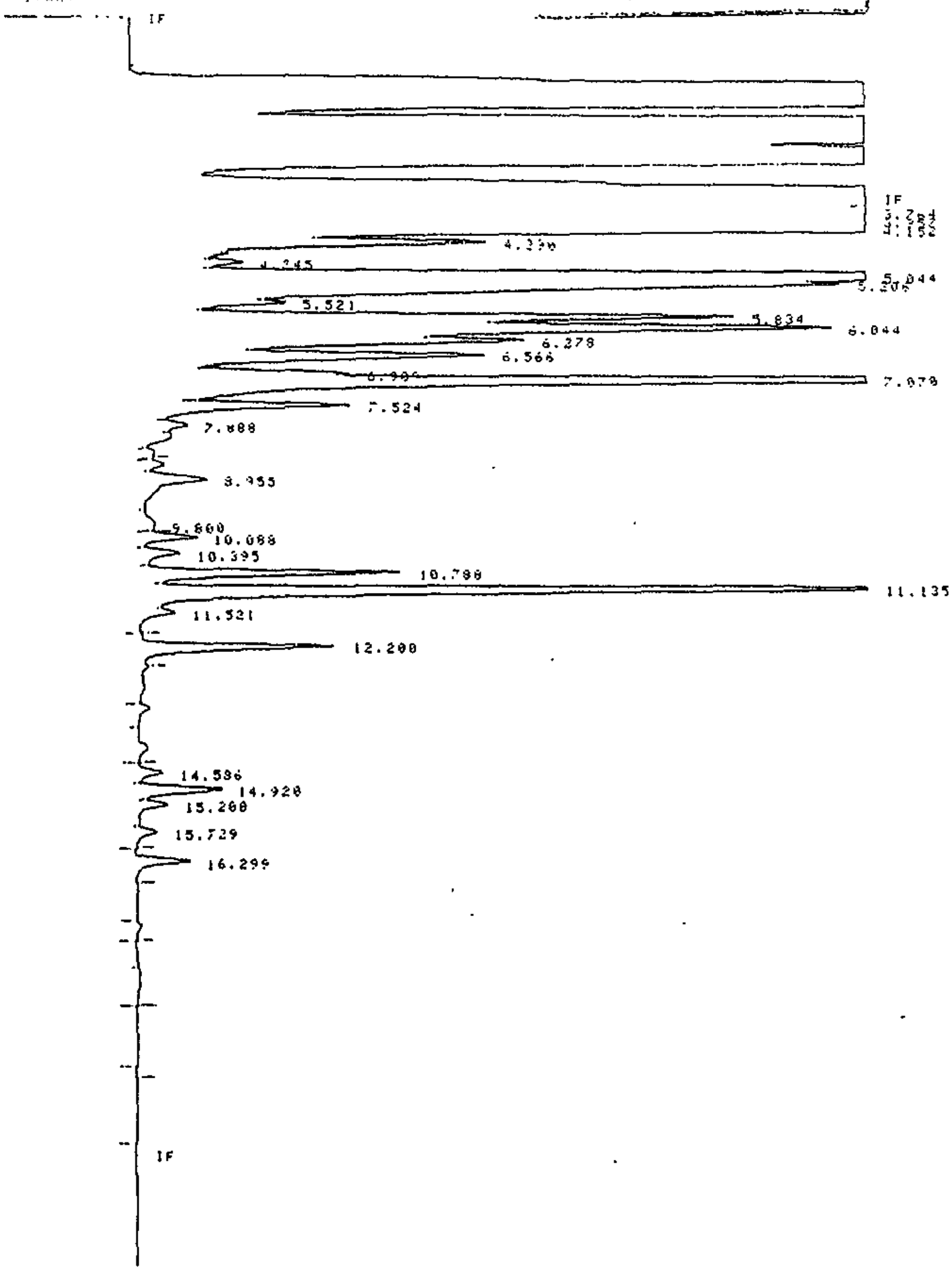
FID

2

RUN #24AT4-004

RUN #24030 SEP 1993

START



RUN #24080-002

PRINT THIS SIDE PART NUMBER 5181-1219 HEWLETT-PACKARD

PRINT THIS SIDE

RUN #24080-003

RUN# 24080 SEP 16, 1993 12:38:04

IDENTIFIER : GCMP-L FID
SIGNAL FILE: MISIGNAL.SIG
NO CALIB PEAKS FOUND
AREA%

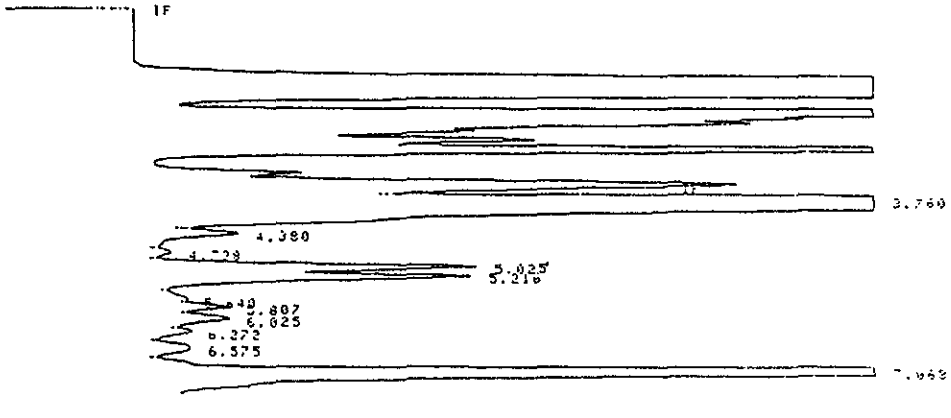
RT	AREA	TYPE	WIDTH	AREA%
3.764	544759	BV	.095	[illegible]
3.957	2025013	VV	.174	[illegible]
4.152	552072	P	.109	[illegible]
4.390	113694	PP	.114	[illegible]
4.745	18456	PV	.101	.21194
5.044	930309	VV	.166	11.26442
5.306	535885	VV	.170	6.15392
5.521	49798	VP	.118	.57186
5.834	395483	PV	.150	4.54159
6.044	579359	VV	.185	6.65316
6.278	252069	VV	.158	2.89399
6.500	221310	VP	.158	2.54145
6.909	66791	PV	.093	.76701
7.070	1047522	VB	.130	12.02938
7.524	101185	BF	.127	1.16197
7.388	16366	PV	.126	.18794
8.955	61265	PP	.209	.70355
9.300	4220	PB	.132	.04846
10.088	28838	BP	.121	.33117
10.395	26453	PV	.143	.30373
10.798	169603	VV	.134	1.94768
11.135	603440	VV	.134	6.92970
11.521	24682	VB	.147	.28344
13.200	125390	BB	.133	1.43994
14.586	19114	BV	.149	.21950
14.920	66599	VV	.155	.76480
15.200	24173	VV	.154	.27759
15.729	16406	VB	.157	.18840
16.299	38028	PB	.136	.43670

TOTAL AREA=8.7080E+06
MUL FACTOR=1.0000E+00

$$TPH = \frac{8708 - 178}{(0.2)(1.42)} = 30{,}000 \text{ mg/L}$$

RUN #24080-004 (10)

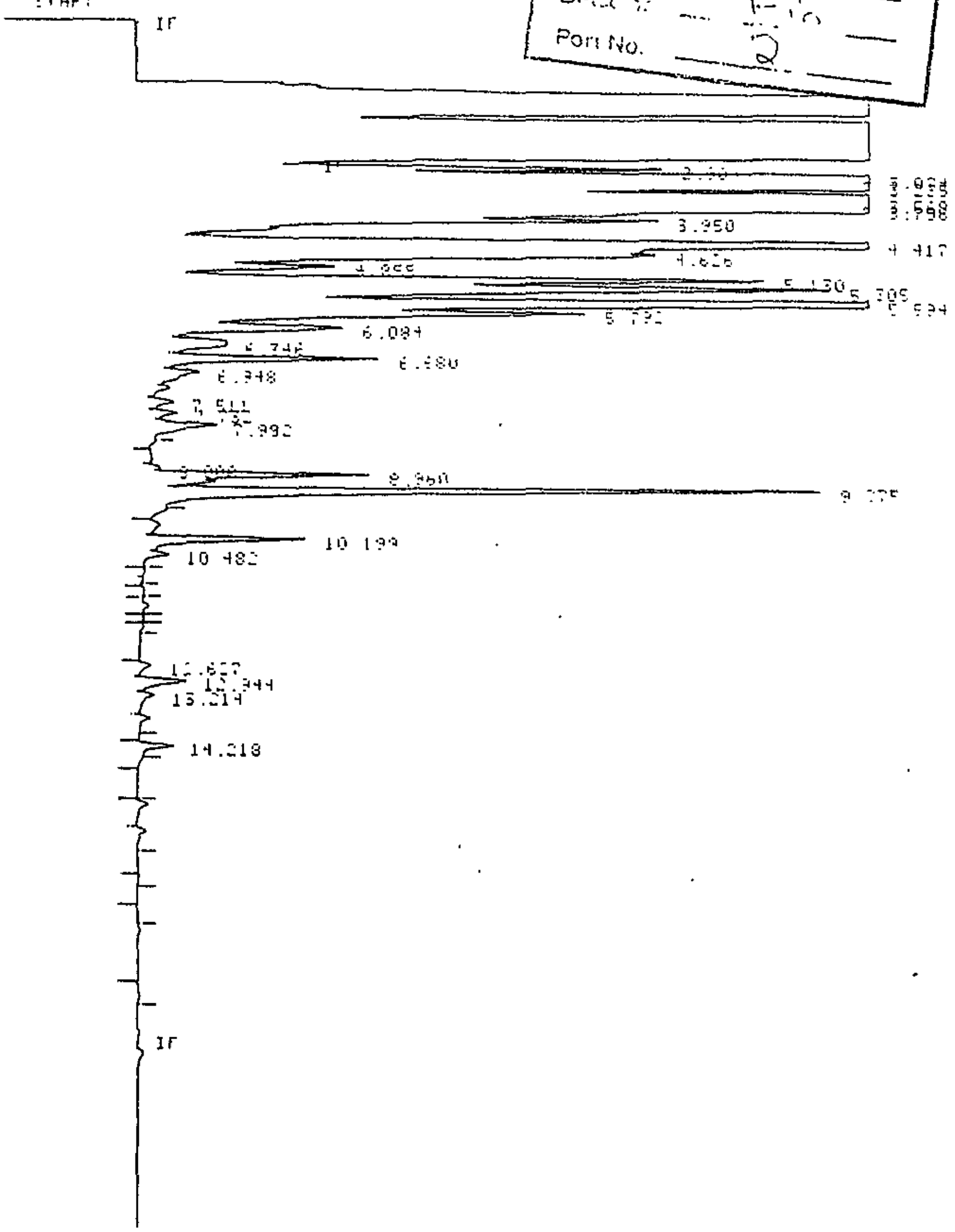
RUN #24081 SEP 16, 1993 13:17:50
START



RUN #30571-00- (12)

+ RUN #30572 SEP 16, 1995 13:46:13
START

File ID GAN93 07 720 03
Sample ID IAV 4-3
2wk
Detector FID
Port No. 2



RUN #30572-002

STOP

Closing signal file M:SIGNAL .BNC

RUN #30572-003

RUN# 30572   SEP 16, 1993 13:46:13

IDENTIFIER : GCHA-3 . FID
SIGNAL FILE: N:SIGNAL.BNC
AREA%

RT	AREA	TYPE	WIDTH	AREA%
2.904	280276	BV	.076	1.04321
3.074	5930205	VV	.138	22.07277
3.235	4366979	VV	.131	16.25430
3.568	4816346	VV	.185	17.92688
3.706	1469825	VV	.091	5.47083
3.950	472785	VV	.106	1.75975
4.417	1961254	PV	.156	7.29997
4.626	616852	VV	.131	2.29598
4.955	172667	VV	.113	.64269
5.130	729372	VV	.125	2.71479
5.305	1028850	VV	.158	3.82948
5.594	2327470	VV	.108	8.66306
5.792	560585	VV	.136	2.08655
6.094	273319	VV	.157	1.01732
6.346	134906	VV	.110	.50213
6.690	239374	VV	.111	.89097
6.949	76830	VV	.172	.28597
7.511	23602	PV	.106	.08785
7.732	25380	VV	.105	.09447
7.992	90969	VB	.143	.33860
8.800	8719	PV	.077	.03245
8.960	205012	VV	.096	.76307
9.275	726997	VB	.110	2.70595
10.199	159288	VV	.101	.59288
10.482	28044	VB	.119	.10438
12.627	15376	BV	.123	.05723
12.944	64990	VV	.136	.24190
13.214	25386	VV	.150	.09449
14.219	34987	PB	.101	.13022

TOTAL AREA=2.6867E+07
MUL FACTOR=1.0000E+00

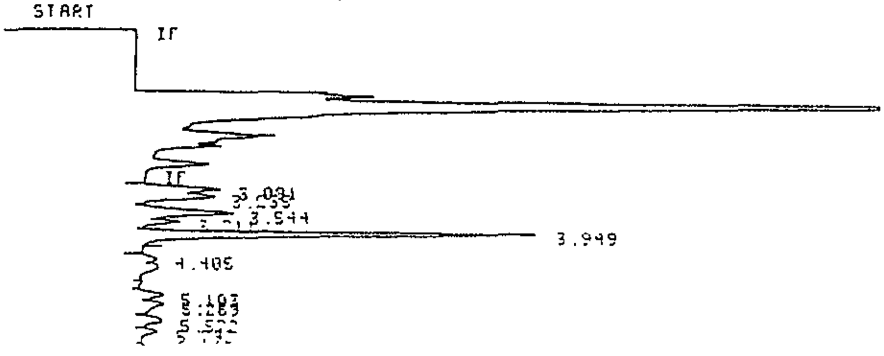
$$\frac{26867 - 374}{0.2mL\ (3.44)} = $$

38504 µg/L

RUN #30572-004

(M)

+ RUN #30573   SEP 16, 1993 14:16:38
START



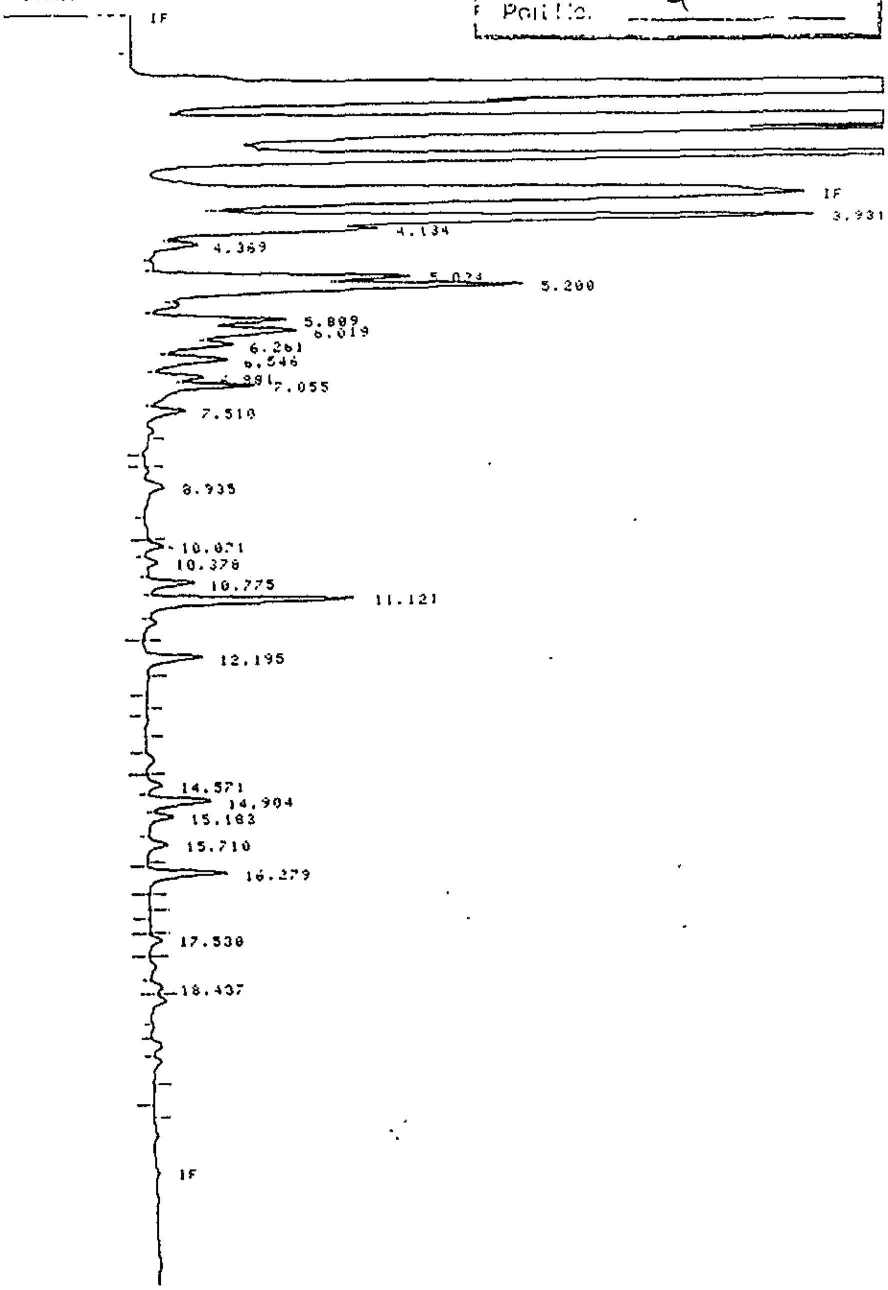
(2)

[illegible]	GA189309 720-04A
[illegible]	IAV 2-1
Vol Inj	5ul
[illegible]	10
[illegible]	FID
Port No.	4

RUN #24082-003

RUN #24083 SEP 16, 1993 14:20:42

START



RUN #24083-002

RUN #24083-003

RUN# 24083 SEP 16, 1993 14:20:42

IDENTIFIER : GCHP-2 FID
SIGNAL FILE: MISIGNAL.BIN
NO CALIB REMKS FOUND
AREA%

RT	AREA	TYPE	WIDTH	AREA%
3.321	541022	BV	.132	25.76510
4.124	101609	VP	.107	4.83892
4.264	19394	PP	.112	.92312
5.024	186453	VV	.142	8.87946
5.200	293771	VV	.165	14.02838
5.969	103821	VV	.153	4.90617
6.019	136811	VV	.189	6.51535
6.361	71313	VV	.163	3.39614
6.546	69144	VV	.172	3.29285
6.881	40154	VV	.142	1.91226
7.055	86242	VV	.161	4.10710
7.510	28678	VP	.149	1.36535
8.935	21142	PP	.207	1.00685
10.071	10350	BP	.121	.49290
10.378	10053	PV	.142	.47875
10.775	35632	VV	.144	1.69690
11.121	137034	VV	.135	6.52597
12.135	37753	PB	.134	1.79791
14.571	12318	BV	.153	.58662
14.904	49834	VV	.155	2.37324
15.183	20768	VV	.151	.98903
15.710	16479	VB	.161	.78478
16.279	52739	BB	.135	2.51159
17.530	7714	BB	.120	.36736
18.437	5415	PB	.120	.25788

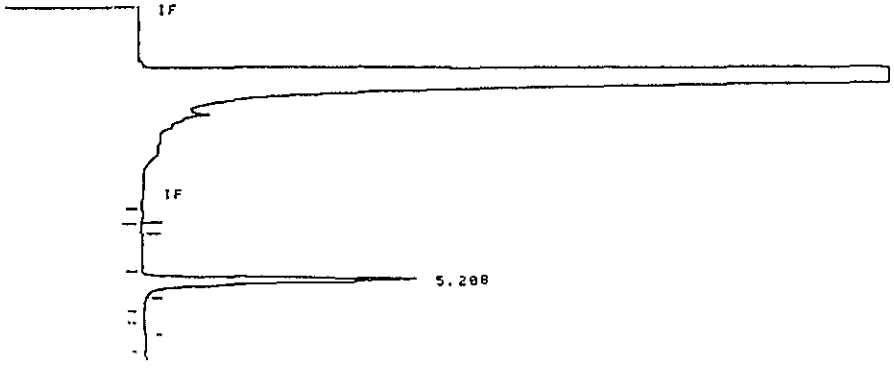
TOTAL AREA=2099826
MUL FACTOR=1.0000E+00

$$TPH = \frac{2099 - 178}{(5)(1.42)} = 270 \text{ mg/L}$$

RUN #24083-004

(13)

RUN #24084 SEP 16, 1993 15:00:24
START

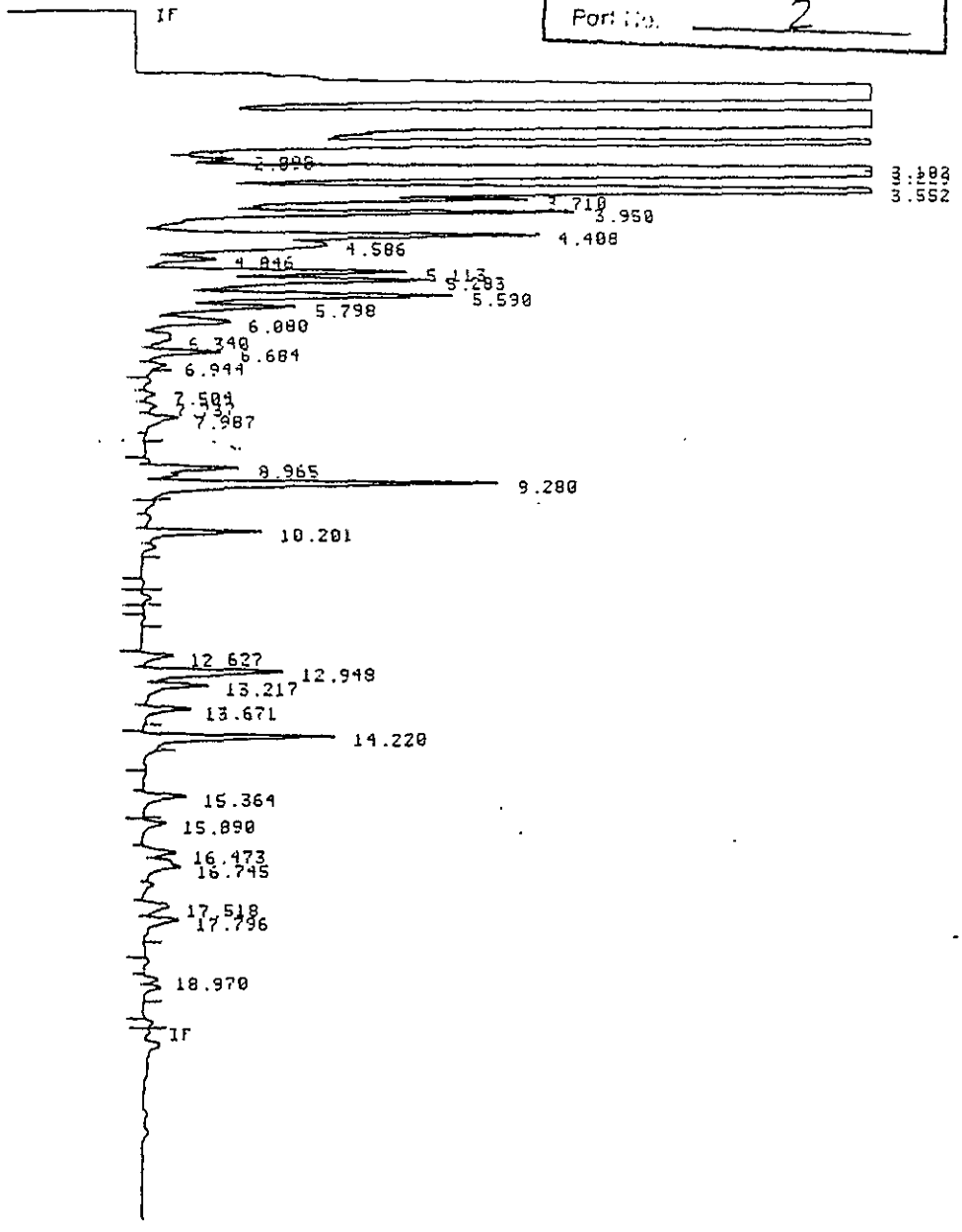


File ID	~~GA1309-720-05A~~
Client ID	SAV2-2
Vol. Inj.	10ml
Dil./Conc.	5
Detector	FID
Port No.	2

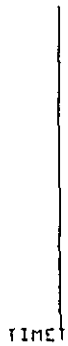
RUN #30573-003

(K)

* RUN #30574 SEP 16, 1993 14:47:29
START



RUN #30574-002



TIMETABLE STOP

Closing signal file M:SIGNAL .SNC

RUN #30574-003

RUN# 30574 SEP 16, 1993 14:47:29

IDENTIFIER : GCHP-3 ,' FID
SIGNAL FILE: M:SIGNAL.BNC
AREA%

RT	AREA	TYPE	WIDTH	AREA%
2.898	35252	BV	.075	.40407
3.102	1156757	VV	.112	13.25902
3.229	1278064	VV	.129	14.64948
3.552	1596455	VV	.147	18.29895
3.710	317993	VV	.085	3.64491
3.950	428640	VP	.105	4.91317
4.408	474180	PV	.125	5.43516
4.586	324170	VV	.089	3.71571
4.846	65855	VV	.103	.75485
5.113	284394	VV	.113	3.25979
5.283	393531	VV	.145	4.51075
5.590	373447	VV	.126	4.28054
5.798	186927	VV	.130	2.14260
6.080	116236	VV	.145	1.33232
6.340	43336	VV	.199	.49673
6.684	73362	VP	.101	.84089
6.944	15259	PB	.091	.17490
7.504	12551	PV	.096	.14386
7.737	16538	VV	.117	.18956
7.987	52961	VV	.154	.60705
8.965	87150	VV	.095	.99893
9.280	382064	VB	.111	4.38848
10.201	115451	PV	.099	1.32353
12.627	37474	BV	.113	.42954
12.948	193009	VV	.137	2.21252
13.217	86745	VV	.131	.99429
13.671	53228	VB	.109	.61011
14.220	189622	PB	.102	2.17349
15.364	55027	PB	.126	.63073
15.890	28296	BP	.119	.32434
16.473	44737	PV	.130	.51279
16.745	84311	VV	.217	.96639
17.518	47366	PV	.176	.54292
17.796	56550	VB	.156	.64819
18.970	16566	PV	.106	.18988

TOTAL AREA=8.7243E+06
MUL FACTOR=1.0000E+00

$$\frac{8724 - 372}{(3.44)(10)} = 240$$

RUN #30574-004

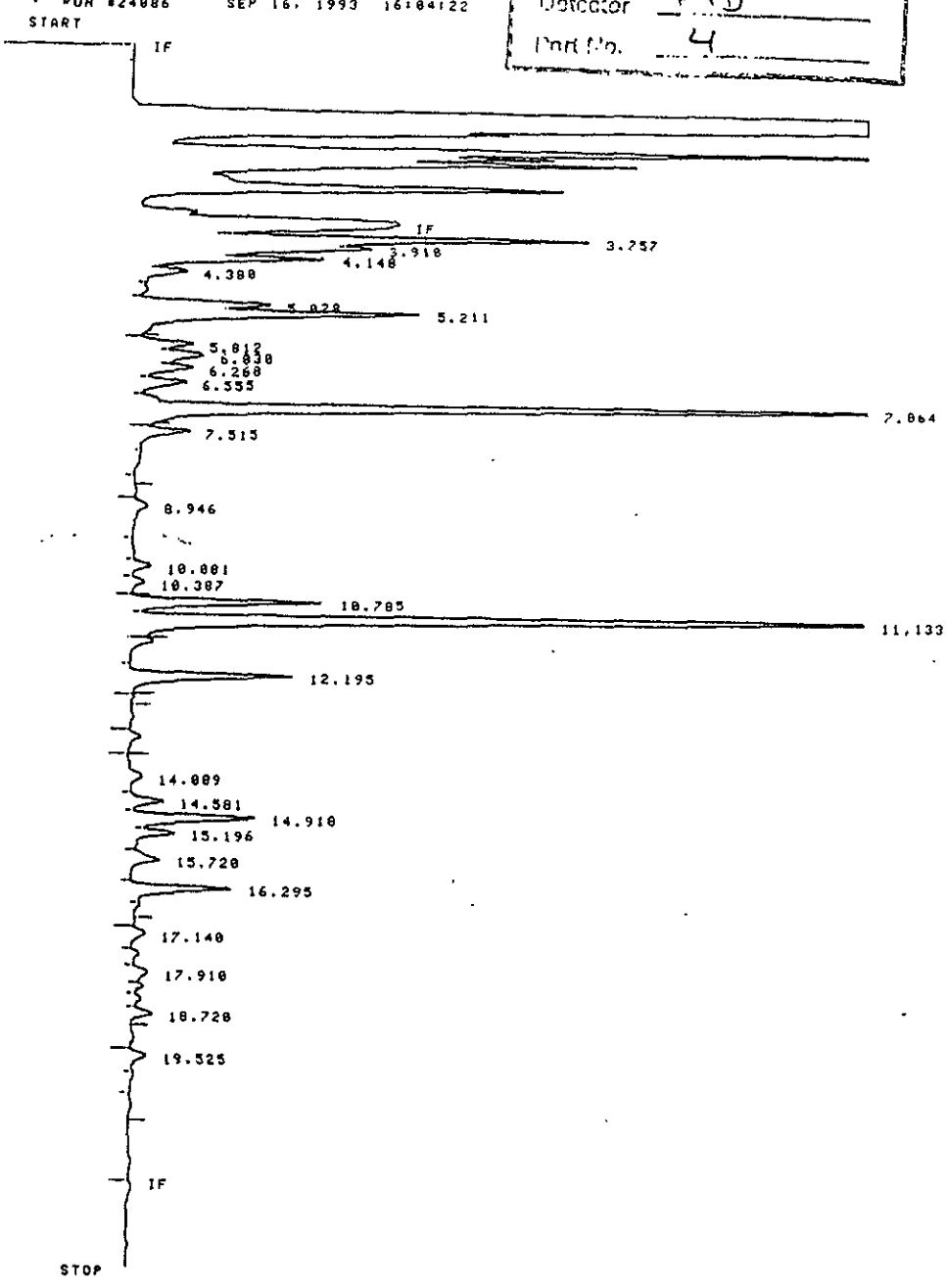
* RUN #30575 SEP 16, 1993 15:33:27
START

IF

File ID GAIR 930720.061
Client ID REF AIR 2
Vol. Inj. 50 µ
Dil./Conc. 1
Detector FID
Part No. 4

(15)

PUN #24085-003



Closing signal file M:SIGNAL .BHC

RUN #24086-002

RUN# 24086 SEP 16, 1993 16:04:22

IDENTIFIER : GCHP-2 FID
SIGNAL FILE: M:SIGNAL.BHC
NO CALIB PEAKS FOUND
AREA%

RT	AREA	TYPE	WIDTH	AREA%
3.757	200294	BV	.111	7.73461
3.918	123017	VV	.148	4.75846
4.148	82787	VP	.113	3.19693
4.380	19649	PP	.117	.75877
5.028	90398	PV	.140	3.49084
5.211	219994	VB	.160	8.49536
5.812	38528	BV	.148	1.48781
6.030	58463	VV	.189	2.25763
6.268	40573	VV	.159	1.56678
[illegible]	[illegible]	VB	[illegible]	[illegible]

RUN #24086-003

RUN# 24086 SEP 15, 1993 [illegible]

IDENTIFIER : DUMP-2 FID
SIGNAL FILE: MISIGNAL.ENC
NO CALIB PEAKS FOUND
AREA%

RT	AREA	TYPE	WIDTH	AREA%
3.757	200294	BV	.111	7.73461
3.918	123017	VV	.148	4.75045
4.148	82787	VB	.113	3.19633
4.389	19649	PP	.117	.75877
5.028	90399	PV	.140	3.49084
5.211	213994	VB	.160	8.49536
5.812	38528	BV	.148	1.48781
6.030	58463	VV	.189	2.25763
6.268	40573	VV	.159	1.56678
6.555	35502	VP	.156	1.37096
7.064	521750	PB	.129	20.14806
7.515	27543	BP	.124	1.06361
8.346	14984	BP	.209	.57863
10.081	13962	VP	.142	.53916
10.387	7729	PB	.119	.29847
10.735	115633	BV	.125	4.46725
11.133	529503	VB	.130	20.44769
12.195	106736	PB	.134	4.12368
14.089	14197	BV	.202	.54824
14.581	27472	VV	.157	1.06087
14.913	99523	VV	.153	3.84340
15.196	38958	VV	.168	1.50441
15.720	29527	VP	.199	1.14022
16.295	70036	PV	.140	2.70453
17.140	12237	BP	.174	.47255
17.910	18948	VV	.209	.73170
18.720	17597	VB	.168	.67953
19.525	13928	BV	.163	.53785

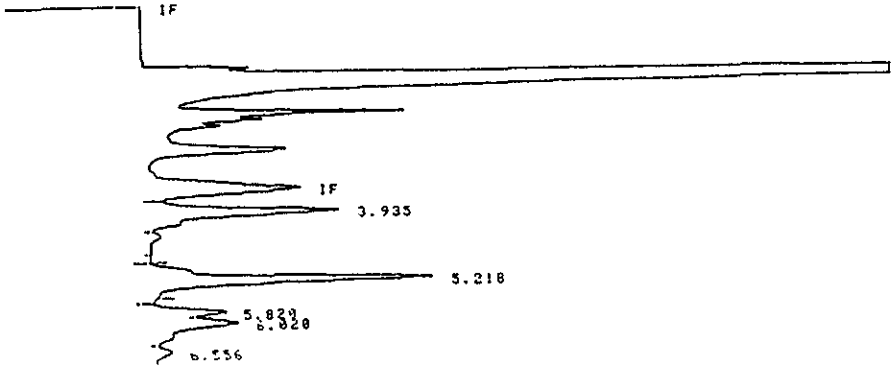
TOTAL AREA=2589273
AUL FACTOR=1.0000E+00

$TPH = \frac{2589 - 178}{(50)(1.42)} = 39 \text{ mg/L}$

(16)

RUN #24086-003

RUN #24087 SEP 16, 1993 16:48:15
START



SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

Gettler Ryan/Geostrategies
2150 W. Winton Avenue
Hayward, CA 94545
Attention: Matt Donohue

Project: 2169-93-3A, Arco 2169-Oakland

Enclosed are the results from 2 soil samples, 2 water samples, received at Sequoia Analytical on September 17,1993. The requested analyses are listed below:

SAMPLE #	SAMPLE DESCRIPTION	DATE OF COLLECTION	TEST METHOD
3I84901	Solid, AV-4	9/15/93	Lead
3I84902	Solid, AR-2	9/15/93	Lead
3I84903	Water, AS2A	9/15/93	EPA 5030/8015/8020
3I84904	Water, AS2B	9/15/93	EPA 5030/8015/8020

Please contact me if you have any questions. In the meantime, thank you for the opportunity to work with you on this project.

Very truly yours,

SEQUOIA ANALYTICAL

Nokowhat D. Herrera
Project Manager

927-A

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

Gettler Ryan/Geostrategies	Client Project ID:	2169-93-3A, Arco 2169-Oakland	Sampled:	Sep 15, 1993
2150 W. Winton Avenue	Sample Descript:	Solid	Received:	Sep 17, 1993
Hayward, CA 94545	Analysis for:	Lead		
Attention: Matt Donohue	First Sample #:	3I84901	Analyzed:	Sep 21, 1993
			Reported:	Sep 21, 1993

LABORATORY ANALYSIS FOR: Lead

Sample Number	Sample Description	Detection Limit mg/kg	Sample Result mg/kg
3I84901	AV-4	0.25	3.0
3I84902	AR-2	0.25	9.6

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL

Nokowhat D. Herrera
Project Manager

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

Gettler Ryan/Geostrategies	Client Project ID:	2169-93-3A, Arco 2169-Oakland	Sampled:	Sep 15, 1993
2150 W. Winton Avenue	Sample Matrix:	Water	Received:	Sep 17, 1993
Hayward, CA 94545	Analysis Method:	EPA 5030/8015/8020	Reported:	Sep 21, 1993
Attention: Matt Donohue	First Sample #:	3I84903		

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit µg/L	Sample I.D. 3I84903 AS2A	Sample I.D. 3I84904 AS2B	Sample I.D.	Sample I.D.	Sample I.D.	Sample I.D.
Purgeable Hydrocarbons	50	130	270				
Benzene	0.50	7.8	12				
Toluene	0.50	8.2	10				
Ethyl Benzene	0.50	N.D.	1.0				
Total Xylenes	0.50	30	60				
Chromatogram Pattern:		Gas	Gas				

Quality Control Data

Report Limit Multiplication Factor:	2.0	1.0
Date Analyzed:	9/19/93	9/18/93
Instrument Identification:	GCHP-2	GCHP-3
Surrogate Recovery, %: (QC Limits = 70-130%)	91	98

Purgeable Hydrocarbons are quantitated against a fresh gasoline standard.
Analytes reported as N.D. were not detected above the stated reporting limit.

SEQUOIA ANALYTICAL

Nokowhat D. Herrera
Project Manager

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

Gettler Ryan/Geostrategies
2150 W. Winton Avenue
Hayward, CA 94545
Attention: Matt Donohue

Client Project ID: 2169-93-3A, Arco 2169-Oakland
Matrix: Solid

QC Sample Group: 3I84901 - 02

Reported: Sep 21, 1993

QUALITY CONTROL DATA REPORT

ANALYTE	Lead

Method:	EPA 7421
Analyst:	J.Martinez
Conc. Spiked:	0.50
Units:	mg/kg
LCS Batch#:	BLK092093
Date Prepared:	9/20/93
Date Analyzed:	9/21/93
Instrument I.D.#:	MV-1
LCS % Recovery:	112
Control Limits:	75-125

MS/MSD Batch #:	3I84001
Date Prepared:	9/20/93
Date Analyzed:	9/21/93
Instrument I.D.#:	MV-1
Matrix Spike % Recovery:	113
Matrix Spike Duplicate % Recovery:	157
Relative % Difference:	33

Quality Assurance Statement: All standard operating procedures and quality control requirements have been met.

SEQUOIA ANALYTICAL

Nokowhat D. Herrera
Project Manager

Please Note:
The LCS is a control sample of known, interferent free matrix that is analyzed using the same reagents, preparation and analytical methods employed for the samples. The LCS % recovery data is used for validation of sample batch results. Due to matrix effects, the QC limits for MS/MSD's are advisory only and are not used to accept or reject batch results.

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

Gettler Ryan/Geostrategies
2150 W. Winton Avenue
Hayward, CA 94545
Attention: Matt Donohue

Client Project ID: 2169-93-3A, Arco 2169-Oakland
Matrix: Water

QC Sample Group: 3I84903

Reported: Sep 21, 1993

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl-Benzene	Xylenes
Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Analyst:	A. Miraftab	A. Miraftab	A. Miraftab	A. Miraftab
Conc. Spiked:	10	10	10	30
Units:	µg/L	µg/L	µg/L	µg/L
LCS Batch#:	GBLK091993	GBLK091993	GBLK091993	GBLK091993
Date Prepared:	9/19/93	9/19/93	9/19/93	9/19/93
Date Analyzed:	9/19/93	9/19/93	9/19/93	9/19/93
Instrument I.D.#:	GCHP-2	GCHP-2	GCHP-2	GCHP-2
LCS % Recovery:	110	110	110	107
Control Limits:	80-120	80-120	80-120	80-120
MS/MSD Batch #:	G3I74801	G3I74801	G3I74801	G3I74801
Date Prepared:	9/19/93	9/19/93	9/19/93	9/19/93
Date Analyzed:	9/19/93	9/19/93	9/19/93	9/19/93
Instrument I.D.#:	GCHP-2	GCHP-2	GCHP-2	GCHP-2
Matrix Spike % Recovery:	110	110	110	107
Matrix Spike Duplicate % Recovery:	110	110	110	107
Relative % Difference:	0.0	0.0	0.0	0.0

Quality Assurance Statement: All standard operating procedures and quality control requirements have been met.

SEQUOIA ANALYTICAL

Nokowhat D. Herrera
Project Manager

Please Note:
The LCS is a control sample of known, interferent free matrix that is analyzed using the same reagents, preparation and analytical methods employed for the samples. The LCS % recovery data is used for validation of sample batch results. Due to matrix effects, the QC limits for MS/MSD's are advisory only and are not used to accept or reject batch results.

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

Gettler Ryan/Geostrategies	Client Project ID:	2169-93-3A, Arco 2169-Oakland
2150 W. Winton Avenue	Matrix:	Water
Hayward, CA 94545		
Attention: Matt Donohue	QC Sample Group: 3I84904	Reported: Sep 21, 1993

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl-Benzene	Xylenes
Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Analyst:	A. Miraftab	A. Miraftab	A. Miraftab	A. Miraftab
Conc. Spiked:	10	10	10	30
Units:	µg/L	µg/L	µg/L	µg/L
LCS Batch#:	GBLK091893	GBLK091893	GBLK091893	GBLK091893
Date Prepared:	9/18/93	9/18/93	9/18/93	9/18/93
Date Analyzed:	9/18/93	9/18/93	9/18/93	9/18/93
Instrument I.D.#:	GCHP-3	GCHP-3	GCHP-3	GCHP-3
LCS % Recovery:	110	110	110	110
Control Limits:	80-120	80-120	80-120	80-120
MS/MSD Batch #:	G3I63601	G3I63601	G3I63601	G3I63601
Date Prepared:	9/18/93	9/18/93	9/18/93	9/18/93
Date Analyzed:	9/18/93	9/18/93	9/18/93	9/18/93
Instrument I.D.#:	GCHP-3	GCHP-3	GCHP-3	GCHP-3
Matrix Spike % Recovery:	99	97	97	97
Matrix Spike Duplicate % Recovery:	96	96	98	100
Relative % Difference:	3.1	1.0	1.0	3.4

Quality Assurance Statement: All standard operating procedures and quality control requirements have been met.

SEQUOIA ANALYTICAL

Nokowhat D. Herrera
Project Manager

Please Note:
The LCS is a control sample of known, interferent free matrix that is analyzed using the same reagents, preparation and analytical methods employed for the samples. The LCS % recovery data is used for validation of sample batch results. Due to matrix effects, the QC limits for MS/MSD's are advisory only and are not used to accept or reject batch results.

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. ~~9727~~ 2169-93-3A

Chain of Custody

ARCO Facility no. 2169	City (Facility) OAKLAND	Project manager (Consultant) Joel Coffman	Laboratory name SEQUOIA
ARCO engineer Mike Whelan	Telephone no. (ARCO)	Telephone no. (Consultant) (510) 783-7500	Fax no. (Consultant) (510) 783-1089
Consultant name GETTLER-RYAN INC	Address (Consultant) 2150 W. WINTON AVE, HAYWARD, CA 94545		Contract number

Sample I.D.	Lab no.	Container no.	Matrix: Soil	Matrix: Water	Matrix: Other (CARB)	Preservation: Ice	Preservation: Acid	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH EPA M602/8020/8015	TPH Modified 8015 Gas ☐ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Metals ☐ Semi VOA ☐ VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐		
AV-4		1			X	X		9/15-93	1220											X		-1
AR-2		2			X	X		9-15-93	1430											X		-2
~~AS2A~~		~~1~~		~~X~~		~~X~~	~~X~~	~~9-15-93~~	~~1200~~		~~X~~											
AS2A		2		X		X	X	9-15-93	1200		X											-3
~~AS2B~~		~~1~~		~~X~~		~~X~~	~~X~~	~~9-15-93~~	~~1215~~		~~X~~											
AS2B		2		X		X	X	9-15-93	1215		X											-4

Condition of sample:

Temperature received:

	Date	Time	
Relinquished by sampler	9-17-93	0810	Received by
Relinquished by	9-17-93	10:35	Received by
Relinquished by	Date	Time	Received by laboratory: Date 9/17/93 Time 1035

Special detection Limit/reporting
STD
9309849

Special QA/QC
STD

Remarks
GR #
9927.12
24 hr TAT

Lab number

Turnaround time
Priority Rush 1 Business Day ☐
Rush 2 Business Days ☐
Expedited 5 Business Days ☐
Standard 10 Business Days X

Distribution: White copy — Laboratory; Canary copy — ARCO Environmental Engineering; Pink copy — Consultant
APPC-3292 (2-91)

GTEL
ENVIRONMENTAL
LABORATORIES, INC.

Northwest Region
4080 Pike Lane
Suite C
Concord, CA 94520
(510) 685-7852
(800) 544-3422 Inside CA
FAX (510) 825-0720

Arco Representative: Mike Whelan
Facility Number: 2169
Project ID: Oakland
Work Order Number: C3-09-0327

September 22, 1993.

Joel Coffman
Gettler-Ryan, Inc.
2150 W. Winton Ave.
Hayward, CA 94545

Enclosed please find the analytical results for samples received by GTEL Environmental Laboratories, Inc. on 09/17/93, under task order number 2169-93-3A.

A formal Quality Assurance/Quality Control (QA/QC) program is maintained by GTEL, which is designed to meet or exceed the EPA requirements. Analytical work for this project met QA/QC criteria, unless otherwise stated in the footnotes.

GTEL is certified by the California State Department of Health Services, Laboratory certification number E1075, to perform analyses for drinking water, wastewater, and hazardous waste materials according to EPA protocols.

If you have any questions concerning this analysis or if we can be of further assistance, please call our Customer Service Representative.

Sincerely,

GTEL Environmental Laboratories, Inc.

Ron Warnow
Asst Lab Director for

Eileen F. Bullen
Laboratory Director

Arco Representative: Mike Whelan
Facility Number: 2169
Project ID: Oakland
Work Order Number: C3-09-0327

Table 1

ANALYTICAL RESULTS

Aromatic Volatile Organics and
Total Petroleum Hydrocarbons as Gasoline in Air

EPA Methods 8020 and Modified 8015[a]

GTEL Sample Number		01	02	03	A091993
Client Identification		AV2-I1	AV2-I2	AV2-I3	METHOD BLANK
Date Sampled		09/17/93	09/17/93	09/17/93	--
Date Analyzed		09/19/93	09/19/93	09/19/93	09/19/93
Analyte	Detection Limit, ug/L	Concentration, ug/L			
Benzene	0.5	6900	9700	9000	<0.5
Toluene	0.5	5000	9400	7100	<0.5
Ethylbenzene	0.5	230	830	400	<0.5
Xylene, total	0.5	940	3600	1600	<0.5
BTEX, total	--	13000	24000	18000	--
TPH as Gasoline	10	80000	100000	96000	<10
Detection Limit Multiplier		50	50	50	1
BFB surrogate, % recovery		107	103	103	104

a. Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986. Modification for TPH as gasoline as per California State Water Resources Control Board LUFT Manual protocols, May 1988 revision. Bromofluorobenzene surrogate recovery acceptability limits are 70-130%.

GTEL ENVIRONMENTAL LABORATORIES, INC.

Arco Representative: Mike Whelan
Facility Number: 2169
Project ID: Oakland
Work Order Number: C3-09-0327

QC Check Sample Results

Analyte	Source	Date of Analysis	Expected Value	Units	Recovery[a], %
Modified EPA 8020:					
Benzene	Supelco	09/19/93	50	ug/L	114
Toluene	Supelco	09/19/93	50	ug/L	113
Ethylbenzene	Supelco	09/19/93	50	ug/L	115
Xylene, total	Supelco	09/19/93	150	ug/L	119

Note: Sample duplicates were over ranged.

GTEL ENVIRONMENTAL LABORATORIES, INC.

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. 2169-93-3A

Chain of Custody

ARCO Facility no. 2169	City (Facility) OAKLAND	Project manager (Consultant) JOEL COFFMAN	Laboratory name
ARCO engineer Mike Whelan	Telephone no. (ARCO)	Telephone no. (Consultant) (510) 733-7500	Fax no. (Consultant) (510) 783-1089
Consultant name GETTLER-RYAN INC	Address (Consultant) 2150 W. WINTON AVE, HAYWARD CA 94545		Contract number

Method of shipment: GI

Sample I.D.	Lab no.	Container no.	Matrix: Soil	Matrix: Water	Matrix: Other (Air)	Preservation: Ice	Preservation: Acid	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH EPA M602/8020/8015	TPH Modified 8015 Gas ☐ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Metals ☐ Semi VOA ☐ VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐		
AV2-I1		1			X			9-17-93	1100		X											
AV2-I2		2			X			9-17-93	1300		X											
AV1-I3		3			X			9-17-93	1400		X											

Special detection Limit/reporting: STD

Special QA/QC: STD

9/22/93

Remarks: GR#9927 results by MONDAY

Lab number

Turnaround time

- Priority Rush 1 Business Day
- Rush 2 Business Days ☐
- Expedited 5 Business Days ☐
- Standard 10 Business Days ☐

Condition of sample:		Temperature received:	
Relinquished by sampler	Date 9/13/93 Time 1800	Received by	
Relinquished by	Date 9-17-93 Time 7:10	Received by	
Relinquished by	Date	Received by laboratory (Corinne) Baldock	Date 9/17/93 Time 7:10 PM

Distribution: White copy — Laboratory; Canary copy — ARCO Environmental Engineering; Pink copy — Consultant

APPENDIX I

RADIUS OF INFLUENCE CALCULATIONS

RADIUS OF INFLUENCE CALCULATIONS

Given:

AV-4 = Vacuum Pressure (P_w) = 69 inches H_2O = 338.25 inches H_2O absolute
AV-5 = Observation Well Pressure (P_r) = 0.46 inches H_2O = 407.71 inches H_2O
Observation Well Distance (r) = 38 feet
Extraction Well Radius (R_w) = 2 inches = 0.167 feet
Atmospheric Pressure (P_a) = 407.25 inches of H_2O

Find: The radius (R_i) where the observed well pressure would be 0.2 inches H_2O or 407.05 inches H_2O absolute. Since the following equations for determining R_i are based on the radius of influence defined at a point where the observed pressure equals atmospheric pressure, the value of P_a must be modified to account for our definition of the radius of influence. This is done by setting P_a equal to atmospheric less the defined 0.2 inches H_2O (P_a=407.05 inches H_2O).

Assumptions:

(1) Steady flow-steady state radial flow
(2) Homogeneous, isotropic media

Solution:

$$P_r = (P_w^2 + (P_a^2 - P_w^2)\ln(\frac{r}{R_w})/\ln(\frac{R_i}{R_w}))^{1/2}$$ (1) Observation Well Pressure *

(Radius of Influence Calculation Continued)

Solved for "R_i"

$$R_i = R_w e^{\frac{\ln(r/R_w)(P_a^2 - P_w^2)}{(P_r^2 - P_w^2)}}$$ (2) Radius of Influence

$$R_i = 0.167 feet\ e^{\frac{\ln(38/0.167)(407.05^2 - 338.25^2)}{(407.71^2 - 338.25^2)}}$$ (3)Radius of Influence Calculated

Therefore, R_i = 35 feet.

* Johnson, Paul C. P.h.D., Shell Development Westhollow Research Center, *Soil Remediation Workshop*, Long Beach, California. 1993.

RADIUS OF INFLUENCE CALCULATIONS

Given:

AV-2 = Vacuum Pressure (P_w) = 17.6 inches H_2O = 389.6 inches H_2O absolute
AR-1 = Observation Well Vacuum (P_r) = 0.33 inches H_2O = 406.92 inches H_2O
Observation Well Distance (r) = 30 feet
Extraction Well Radius (R_w) = 1 inches = 0.0833 feet
Atmospheric Pressure (P_a) = 407.25 inches of H_2O

Find: The radius (R_i) where the observed well pressure would be 0.2 inches H_2O or 407.05 inches H_2O absolute. Since the following equations for determining R_i are based on the radius of influence defined at a point where the observed pressure equals atmospheric pressure, the value of P_a must be modified to account for our definition of the radius of influence. This is done by setting P_a equal to atmospheric less the defined 0.2 inches H_2O (P_a=407.05 inches H_2O).

Assumptions:

(1) Steady flow-steady state radial flow
(2) Homogeneous, isotropic media

Solution:

$$P_r = (P_w^2 + (P_a^2 - P_w^2)\ln(\frac{r}{R_w})/\ln(\frac{R_i}{R_w}))^{1/2}$$

(1) Observation Well Pressure *

(Radius of Influence Calculation Continued)

Solved for "R_i"

$$R_i = R_w e^{\frac{\ln(r/R_w)(P_a^2 - P_w^2)}{(P_r^2 - P_w^2)}}$$ **(2)** Radius of Influence

$$R_i = 0.0833 feet\ e^{\frac{\ln(30/0.0833)(407.05^2 - 389.6^2)}{(406.92^2 - 389.6^2)}}$$ **(3)**Radius of Influence Calculated

Therefore, R_i = 31 feet.

* Johnson, Paul C. P.h.D., Shell Development Westhollow Research Center, *Soil Remediation Workshop*, Long Beach, California. 1993.