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Orion
Environmental
Associates

315 Washington St.
Oakland, CA 94607
Tel (510) 763-1355
FAX (510) 452-9280

3315 Almaden Expressway, Suite 34
San Jose, CA 95118
Phone: (408) 264-7723
FAX: (408) 264-2435

Michele A. Bellows, P.E
Senior Associate

ADDITIONAL SUBSURFACE INVESTIGATION

at

ARCO Station 6148
5131 Shattuck Avenue
Oakland, California

61035.05
01/21/93

Report prepared for

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

by

RESNA Industries Inc.

Robert D. Campbell
Staff Geologist

Joel Coffman
Project Geologist

REGISTERED GEOLOGIST
JAMES LEWIS NELSON
No. 1463
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

James L. Nelson
Certified Engineering Geologist 1463

January 27, 1993

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

DATE: January 27, 1993
PROJECT NUMBER: 61035.05
SUBJECT: Final - Additional Subsurface Investigation at ARCO Station 6148, 5131 Shattuck Ave., Oakland, California.

FROM: Robert Campbell
TITLE: Staff Geologist

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Mr. Richard Hiett, RWQCB, San Francisco Bay Region
Mr. Joel Coffman, RESNA Industries Inc.

Copies: 1 to RESNA project file no. 61035.05

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(Continued)

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ADDITIONAL SUBSURFACE INVESTIGATION
at
ARCO Station 6148
5131 Shattuck Avenue
Oakland, California

For ARCO Products Company

INTRODUCTION

At the request of ARCO Products Company (ARCO), RESNA Industries Inc. (RESNA) performed an additional subsurface investigation at ARCO Station 6148, located at 5131 Shattuck Avenue in Oakland, California. This investigation was initiated in response to the results of previous investigations conducted at the site. The purpose of this investigation was to further investigate the lateral and vertical extents of gasoline hydrocarbons in the subsurface soil and groundwater and to monitor the gradient of the first encountered groundwater beneath the site.

The work performed for this investigation included performing research to identify and locate water supply and monitoring wells within a ½-mile radius of the site, performing a records research to identify potential secondary sources for hydrocarbons detected in soil and groundwater at the site, drilling four soil borings, collecting and describing soil samples from the borings (B-5 through B-8), installing four 4-inch diameter groundwater monitoring wells (MW-4 through MW-7) in the borings, measuring groundwater levels, sampling groundwater from the monitoring wells, directing laboratory analysis of selected soil and groundwater samples, surveying wellhead elevations, and preparing this report which presents field procedures, results and conclusions. This work was performed as outlined in the RESNA Work Plan (RESNA, September 29, 1992).

SITE DESCRIPTION AND BACKGROUND

General

The site is an operating gasoline station located on the southwestern corner of the intersection of 52nd Street and Shattuck Avenue in Oakland, California. The site location is shown on the Site Vicinity Map (Plate 1). The site is on a relatively flat lot at an elevation of approximately 110 feet above mean sea level.

Presently, according to information provided by ARCO, there are three 12,000 gallon underground gasoline-storage tanks (USTs) located in the western portion of the site. The locations of the USTs and pertinent site features are shown on the Generalized Site Plan (Plate 2).

Regional and Local Hydrogeology

ARCO Station 6148 is located west of the East Bay Hills. This area lies within the Berkeley Alluvial Plain, which is a subarea of the East Bay Alluvial Plain. Soils in this area are mapped as older alluvium which consist of a heterogeneous mixture of poorly consolidated to unconsolidated clay, silt, sand, and gravel units (Helley and others, 1979). The sediments were derived mainly from bedrock underlying the hills and represent successive coalescing alluvial fans deposited during the Pleistocene epoch.

The sediments found beneath the East Bay Alluvial Plain are believed to be about 200 feet thick in the Berkeley area. Water-yielding capabilities of the sediments are highly variable. Generally, high yields come only from wells that are screened through several water-bearing sand and gravel beds. Groundwater in the East Bay Plain occurs predominantly under confined conditions and tends to flow toward the San Francisco Bay to the west and southwest (Hickenbottom and Muir, 1988).

WELL RESEARCH

Information regarding wells in the vicinity of the site was provided to RESNA by Andreas Godfry of County of Alameda Public Works Agency (CAPWA).

The research was performed for the area located within ½-mile radius of the site in order to evaluate groundwater usage in the vicinity of the site. The CAPWA records indicate that 19 wells are located within ½-mile of the site; six cathodic protection wells, seven monitoring wells, two piezometric wells, one industrial well, one geotechnical well, one abandoned well, and one domestic well. Well survey data is shown on Table 1 and locations of wells located within ½-mile radius of the site are shown on Plate 3, Well Location Map.

Four of the cathodic protection wells (D1, D2, L2, and N2) belong to East Bay Municipal Utility District (EBMUD) and are approximately 50 feet deep. The other two cathodic protection wells (D3 and M2) belong to Pacific Gas and Electric (PG&E) and are 120 feet deep. These cathodic protection wells are located ¼- to ½-mile northeast and southeast of the site.

Three of the monitoring wells (M3 through M5) belong to Chevron USA Inc., and are approximately 30 feet deep, with depth to water levels (DTW) at approximately 13 feet. These wells are located approximately ¼-mile northeast of the site. Two monitoring wells (R2 and R3) belong to Pacific Rim Development and are located ⅛-mile southeast of the site. Monitoring wells R2 and R3 are approximately 31 and 35 feet deep and DTW at approximately 17 feet. One of the monitoring wells (G8) belongs to the City Of Oakland and is located approximately ¼-mile to the east of the site. This well is approximately 33 feet deep with DTW at approximately 18 feet. Monitoring well (A1) belongs to Wayne Kelly Auto Parts and is located approximately ½-mile to the south of the site. Monitoring well A1 is approximately 35 feet deep with DTW at approximately 14 feet.

Two piezometric wells (G6 and G7) belong to the City of Oakland and are located ¼-mile to the east of the site. Wells (G6 and G7) are approximately 28 feet deep with DTW at approximately 18 and 23 feet, respectively.

The one industrial well (J1) belongs to Marshall Steel Company and is located approximately ¼-mile north of the site. This well is approximately 40 feet deep. The one abandoned well (N1) belongs to Mrs. H. Gotelli and is located approximately ¼-mile to the east of the site. This former well was approximately 85 feet deep with DTW at approximately 9 feet. The one geotechnical well (R1) belongs to the Children's Hospital and is located approximately ¼-mile to the west of the site. This well is approximately 150 feet deep. The one domestic well (M1) belongs to Angela Delucchi and is located approximately ½-mile to the northeast of the site. Domestic well M1 is approximately 75 feet deep with DTW at approximately 5 feet.

PRELIMINARY RECORDS RESEARCH

A preliminary records research was conducted to locate possible secondary sources for hydrocarbons detected in the soil and groundwater within ½-mile radius on the site using aerial photographs and data 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). Aerial photographs taken in 1950, 1969, and in 1988 did not indicate the presence of other gasoline service stations immediately adjacent to the site. Before 1950, the subject site appears to have been a community park or vacant lot. During 1969, the subject site appears to have been occupied by a commercial building. The site appears to have been developed as a service station sometime between 1969 and 1988. The VISTA records search report and map showing known environmental risk sites within a 1-mile radius of the site is attached in Appendix A. The VISTA database search report indicates that nine leaking underground storage tank (LUST) facilities are situated within a ½-mile radius upgradient, crossgradient, and downgradient from the subject site. The closest potential secondary sources to the subject site include, AUTOPRO (designated as site 25) located at 5200 Telegraph Avenue in Oakland, California; two Chevron Service Stations (sites 23 and 26) located at 5101 and 5500 Telegraph Avenue in Oakland, California; Kelly Auto Parts (site 28) located at 4400 Telegraph Avenue in Oakland, California; BP Oil Service Station (former Mobile Station) located at 5425 Martin Luther King Avenue in Oakland, California (site 37); and Chevron Service Station (site 38) located at 5509 Martin Luther King in Oakland, California, which reportedly has two leaks at this address. According to the Report on Releases of Hazardous

Substances from Underground Storage Tanks, all the above referenced sites are reported to have unauthorized releases of hydrocarbons into the soil and groundwater.

PREVIOUS WORK

Previous subsurface environmental investigations performed at the site are summarized in Appendix B, Previous Work.

FIELD WORK

Drilling

Field work at the site was conducted in accordance with the field protocol and the Site Safety Plan (RESNA, October 26, 1992). A description of the field methods is included in Appendix C, Field Methods. A well construction permit was acquired from the Alameda County Flood Control and Water Conservation District, Zone 7 (ACFCWCD) prior to drilling at the site. A copy of the permit is included in Appendix D, Well Construction Permit. On October 27 and 28, 1992, four soil borings (B-5 through B-8) were drilled using a Mobile Drill B-61 rig with 10.25 diameter hollow-stem augers and four groundwater wells (MW-4 through MW-7) were constructed in the borings to further evaluate the presence and extent of gasoline hydrocarbons in soil and groundwater beneath the site. Soil boring B-5 was drilled southeast (crossgradient) of the USTs, soil boring B-6 was drilled southwest (downgradient) of the existing USTs, soil boring B-7 was drilled north (upgradient) of the existing USTs, and soil boring B-8 was drilled northeast (upgradient) of the existing USTs. The locations of the borings/wells are indicated on Plate 2.

Soil Sampling and Description

A total of 45 soil samples were collected from the soil borings B-5 through B-8 for description and possible laboratory analysis. A summary of the Unified Soil Classification System used to identify the soil encountered during drilling is presented on Plate 4, and the description of the soil encountered in the borings is presented on the Logs of Borings, Plates 5 through 12. Soil samples from the borings B-5 through B-8 were collected at intervals of

5 feet or less from the ground surface to the total depth of the borings. Sampling procedures are described in Appendix C. Field measure of organic vapors were also measured with an organic vapor meter (OVM) which provides a qualitative only field analysis of organic vapor content of soil samples. OVM readings are also shown on the boring logs, Plates 5 through 12 under the column titled P.I.D. (photoionization detector).

Monitoring Well Construction and Development

Four groundwater monitoring wells (MW-4 through MW-7) were constructed in borings B-5 through B-8, respectively. Groundwater monitoring wells MW-4 through MW-7 were completed with 4-inch-diameter, Schedule 40, poly vinylchloride (PVC) casing. Well casings were set in wells MW-4 through MW-7 to depths of approximately 26½, 25, 27, and 27 feet, respectively. The screened casings for the monitoring wells consist of 4-inch-diameter, 0.020 inch-wide machine-slotted PVC set from the total depth of the well to approximate depths of 11½, 10, 12, and 12 feet in wells MW-4 through MW-7, respectively. Blank PVC casing was set from the top of the screened casing to within a few inches below the ground surface and secured with 4-inch expandable locking well caps. Each well was covered with highway rated christie box cemented to grade. The monitoring wells were hand-developed by a RESNA field technician using a pneumatic pump on November 6, 1992, to remove fine-grained sediments and allow better communication between the water-bearing zone and the groundwater monitoring well. Details regarding well construction and development are described in Appendix C.

Groundwater Level Measurement and Sampling

Monitoring wells MW-1 through MW-7 were monitored on November 12 and December 9, 1992. DTW levels were measured in the groundwater monitoring wells and water samples were collected and visually inspected for floating product. Monitoring well MW-2 and MW-3 contained a sheen on November 12 and December 9, 1992. Groundwater elevations for the wells without floating product were calculated by subtracting the measured depth-to-water from the elevation of the wellhead top of casing. Groundwater monitoring wells MW-4 through MW-7 were purged and sampled on November 12, 1992. Samples were submitted to a State-certified laboratory in accordance with Chain of Custody protocol. Monitoring

well MW-1 was not sampled on November 12, 1992 because it had previously been sampled by EMCON on October 7, 1992. Monitoring wells MW-2 and MW-3 were not sampled by EMCON on October 7, 1992, due to the presence of floating product (0.31 feet and sheen, respectively). Appendix C contains a description of subjective analyses and groundwater sampling procedures for the November 12, 1992 sampling.

Wellhead Survey

On November 9, 1992, the wellheads for the new groundwater monitoring wells were surveyed to a local National Geodetic Vertical Datum benchmark by John E. Koch, a California licensed surveyor. The results of this wellhead survey are included in Appendix E, Wellhead Survey.

LABORATORY METHODS

Soil and groundwater samples collected by RESNA field personnel were preserved as required by the applicable analytical method and delivered, with Chain of Custody Records, to Sequoia Analytical Laboratories of Redwood City, California, a State-certified laboratory (Hazardous Waste Testing Laboratory Certification #1210) for soil and water analyses. Water samples collected from MW-1 by EMCON field personnel on October 7, 1992, were preserved as required by the applicable analytical method and delivered with Chain of Custody Records to Columbia Analytical in San Jose, California, a State-certified laboratory (Hazardous Waste Testing Laboratory Certification #1426) for water analyses.

Soil Samples

Selected soil samples collected from borings B-5 through B-8 were analyzed in accordance with Alameda County Health Care Services Agency (ACHCSA) requirements for the gasoline constituents benzene, toluene, ethylbenzene, total xylenes (BTEX) and TPHg using modified Environmental Protection Agency (EPA) Methods 5030/8015/8020. Selected soil samples collected from boring B-6 were also tested for particle size distribution by weight to help determine the aquifer characteristics in the first encountered water beneath the site.

The soil samples were selected for laboratory analysis based on:

- Location above first-encountered groundwater;
- Location in a potential confining or perching layer below first-encountered groundwater; and
- Areas where the presence of gasoline hydrocarbons was suspected.

Stockpile Soil Samples

On October 27, 1992, four soil samples (CSS-A through D) were collected from the soil stockpile generated during the drilling of onsite borings B-5 through B-8. These samples were submitted under Chain of Custody Record to Sequoia Analytical, composited in the laboratory, and analyzed for TPHg using EPA Method 8015, Toxicity Characteristic Leaching Procedure (TCLP) for BTEX, and for Soluble Threshold Limit Concentration (STLC) for lead, and reactivity, corrosivity, and ignitability (RCI). The purpose for these analyses was to determine the proper method for disposal of the 4 cubic yards of drill cuttings. The drill cuttings were removed from the site and taken to BFI Landfill in Livermore, California on December 1, 1992. The Waste Manifest Forms are included in Appendix F. The Chain of Custody Record is attached in Appendix G.

Water Samples

Monitoring well MW-1 was sampled by EMCON on October 7, 1992, and analyzed for BTEX, TPHg, and total petroleum hydrocarbons as diesel (TPHd) by EPA Method 3510/California DHS LUFT Method, halogenated volatile organic compounds (VOCs) by EPA Methods 5030/601, and total oil and grease by SM 5520 C&F. Monitoring wells MW-4 through MW-7 were sampled by RESNA on November 12, 1992 and analyzed in accordance with ACHCSA requirements for BTEX and TPHg by modified EPA Methods 5030/8015/8020.

FIELD WORK RESULTS

Drilling

The earth materials encountered at the site consisted primarily of silty clay to clayey sand with gravel and silty sand to sandy gravel. Clayey sand with silt, brick and glass fragments (fill) was encountered immediately below the baserock and pavement and extended to the depths of approximately 5 to 7 feet. Below this fill material, silty clay to silty gravel was encountered between approximate depths of 7 and 15 feet. Below this material a water-bearing silty sand to sandy gravel was encountered between approximate depths of 12 and 30 feet. Groundwater was first encountered within this water-bearing material at an approximate depth of 18 feet and stabilized at depths of approximately 14 and 18 feet. These data are summarized in the logs of borings, Plates 5 through 12. Graphic interpretation of the soil encountered beneath the site during this investigation and previous investigations is shown on the Geologic Cross Sections C-C', D-D', and E-E' (Plates 13 through 15). Interpretation of subsurface conditions encountered during previous investigations at the site are shown on Plate 2B (Geologic Cross Sections A-A' and B-B') included in Appendix B. The areas depicted on the geologic cross sections are shown on Plates 2 and 1B.

Field OVM readings collected during the drilling of borings B-5 through B-8 were nondetectable with exception to samples collected from the capillary fringe section located above the first encountered groundwater beneath the site. Field OVM readings for borings B-5 through B-8 are shown on the boring logs, Plates 5 through 12.

Subjective Groundwater Analyses

During measurement of DTW levels on October 7, November 12, and December 9, 1992, 0.31 feet of floating product was observed in well MW-2 on October 7, a sheen was observed in well MW-2 on November 12, and 0.02 feet of floating product was observed in well MW-2 on December 9, 1992. After purging well MW-3 on October 7, 1992, 0.02 feet of floating product was observed in well MW-3, while a sheen was observed on November 12 and product droplets were observed in well MW-3 on December 9, 1992. No evidence

of product was observed in the new wells MW-4 through MW-7 on November 12 and December 9, 1992. Subjective analyses results for the presence of floating product in groundwater are summarized in Table 2, Cumulative Groundwater Monitoring Data.

Groundwater Gradient

The groundwater gradient and flow direction of first-encountered groundwater at the site, based on DTW levels collected from wells MW-1 and MW-4 through MW-7 in November and December 1992 is inferred to be approximately 0.02 to 0.03 to the southwest. DTW levels and groundwater elevations are summarized in Table 2. Plates 16 and 17, Groundwater Gradient Maps, are graphic interpretations of the groundwater elevations for November 12 and December 9, 1992.

RESULTS OF LABORATORY ANALYSES

Soil Samples

Analytical results of soil samples collected from borings B-5 through B-8 indicated nondetectable concentrations of TPHg (less than 1.0 ppm) and BTEX (less than 0.0050 ppm) with the following exceptions: 0.13 ppm benzene and 0.0050 ppm total xylenes in the sample collected from boring B-5 at a depth of 14½ feet; 190 ppm TPHg, 0.24 ppm benzene, 0.55 toluene, 1.0 ethylbenzene, and 1.3 total xylenes in the sample collected from boring B-6 at a depth 16½ feet; and 0.025 ppm total xylenes in the sampled collected from boring B-7 at a depth of 29½ feet.

Analytical results of composited stockpile soil samples (CSS-A through D) indicated nondetectable concentrations of TPHg and BTEX, 0.079 ppm lead, greater than 100 degrees centigrade ignitability, non-reactive with respect to cyanide and water, and corrosivity of pH 7.3. The detected lead is within normal background concentrations based on data from Lindsay (1979) and Scott (1991). The results of laboratory analyses of soil samples are summarized in Table 3, Results of Laboratory Analyses of Soil Samples-TPHg, BTEX, Lead, and RCI. Chain of Custody forms and copies of laboratory reports for soil samples are included in Appendix G.

Results of particle size distribution tests of soil samples collected from the water-bearing unit in boring B-6, at depths of 17½, 19½, 21, and 25 feet indicate a material consisting predominantly of a fine to coarse grained sand with amounts of fines ranging from 2 to 18 percent of total volume. A Particle Size Distribution Graph (Plate 18) graphically depicts grain size versus cumulative percent passing through the various tyler sieves. The soil sample collected at 21 feet contained the greater percentage of fines.

Water Samples

The results of laboratory analyses of water samples are summarized in Table 4, Results of Laboratory Analyses of Water Samples and on Plate 19, Concentrations of TPHg/Benzene in Groundwater. Laboratory analytical results for water samples collected from monitoring wells MW-1 and MW-4 through MW-7 indicated TPHg concentrations of 2,900 parts per billion (ppb) in the sample collected from monitoring well MW-5, 590 ppb in the sample collected from MW-5, 77 ppb in the sample collected from well MW-4, 51 ppb in the sample collected from well MW-6, and nondetectable TPHg (less than 50 ppb) in the sample collected from monitoring well MW-7. Monitoring wells MW-2 and MW-3 contained floating product and were not sampled. Benzene was detected in samples collected from the monitoring wells in the following concentrations: 1,300 ppb in well MW-5; 200 ppb in well MW-1; 32 ppb in well MW-4; 2.6 ppb in well MW-6; and 1.8 in well MW-7. Toluene, ethylbenzene, and total xylenes concentrations of samples collected from the monitoring wells are shown on Table 4. Analytical results of water samples collected from well MW-1 indicated nondetectable concentrations of TOG (less than 0.5 ppm), TPHd (less than 50 ppb), and most volatile organic compounds (less than 5 ppb), with the exception of 23 ppb tetrachloroethene (PCE), 1.5 ppb trichloroethene (TCE), and 0.6 ppb chloroform (cf). Chain of Custody records and laboratory analyses reports are included in Appendix G.

DISCUSSION OF RESULTS

Hydrocarbon Impacted Soil

The presently interpreted extent of hydrocarbon impacted soil beneath the site is presented on the Geologic Cross Sections C-C' through E-E', Plates 13 through 15, and on Geologic

Cross Sections A-A' and B-B', Plate 2B. The majority of gasoline hydrocarbons in the soil at the site were previously detected in borings B-1 through B-4 at approximately 17½ and 18½ feet, and recently in boring B-6 at depths between approximately 16½ and 18½ feet in the silty sand to sandy gravel unit, directly above first-encountered water. The majority of gasoline hydrocarbons in soil appear to be limited to the capillary fringe zone and maybe related to lateral migration of hydrocarbons along the top of water table.

Hydrocarbon Impacted Groundwater

Groundwater most impacted by gasoline hydrocarbons appear to be limited to the areas directly down gradient from the USTs and the former waste-oil tank at the site. Wells MW-2 and MW-3, in the immediate vicinity of the former waste-oil tank contained floating product (gasoline) and product sheen (gasoline), respectively. Water analyzed from well MW-1 also indicated concentrations of PCE, TCE, and chloroform. However, the method of analysis used, EPA Method 8010, is a gas chromatograph method. Verification of these compounds should be evaluated by analyzing future groundwater samples using EPA Method 8240, which provides more accurate VOC results.

CONCLUSIONS

RESNA concludes the following, based on the results of this investigation:

- There are approximately nineteen (19) wells within a ½-mile radius of the site including; six (6) cathodic protection wells, seven (7) monitoring wells, two (2) piezometric wells, one (1) industrial well, one (1) geotechnical well, one (1) domestic well, and one (1) abandoned well.

- A preliminary records research indicated that there were no gasoline-service stations in the immediate vicinity of the site and four (4) service stations and two (2) auto shops are present within a ½-mile radius of the site. All six above referenced sites have reported unauthorized releases of hydrocarbons, as according to the Report On Releases of Hazardous Substances From Underground Storage Tanks.

- The soil samples collected from the water-bearing zone in boring B-6 appears to be predominantly a well graded fine to coarse grained sand with fine sediment content ranging from 2 to 18 percent of total volume.

- The majority of gasoline hydrocarbons in the soil at the site appears to be at depths between approximately 16 to 18½ feet, within the capillary fringe zone located above first encountered groundwater.

- The vertical extents of gasoline hydrocarbons in the soil has been delineated to nondetectable concentrations (less than 1.0 ppm TPHg) in the northwestern (B-7), in the northeastern (B-8), and southeastern (B-5) portion of the site.

- Gasoline hydrocarbon impact to soils in the vadose zone (above capillary fringe to surface) appears to have been delineated to nondectectable concentrations (less than 1.0 ppm TPHg) at the perimeter of the site.

- Groundwater most impacted by gasoline hydrocarbons at the site appears to be limited to the southeastern portion of the site near the USTs and former waste-oil tank.

- Groundwater does not appear to be impacted by waste-oil hydrocarbons at the site as evidenced by nondectectable concentrations of TOG (less than 0.5 ppm) and diesel (less than 50 ppb) in samples collected from monitoring well MW-1.

LIMITATIONS

This report was prepared in accordance with generally accepted standards of environmental geological practice in California at the time this investigation was performed. This investigation was conducted solely for the purpose of evaluating environmental conditions of the soil and groundwater with respect to gasoline and waste-oil related 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 investigation is made

from a limited number of observation points. Subsurface conditions may vary away from the data points available.

DISTRIBUTION

It is recommended that copies of this report be forwarded to:

Mr. Richard Hiett
Regional Water Quality Control Board
San Francisco Bay Region
2101 Webster Street, Suite 500
Oakland, California 94612

Ms. Susan Hugo
Alameda County Health Care Services Agency
80 Swan Way, Room 200
Oakland, California 94621

REFERENCES

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Base: U.S. Geological Survey
7.5-Minute Quadrangles
Oakland East/West, California.
Photorevised 1980

N

LEGEND

⊙ = Site Location

Approximate Scale

2000 1000 0 2000 4000

feet

RESNA
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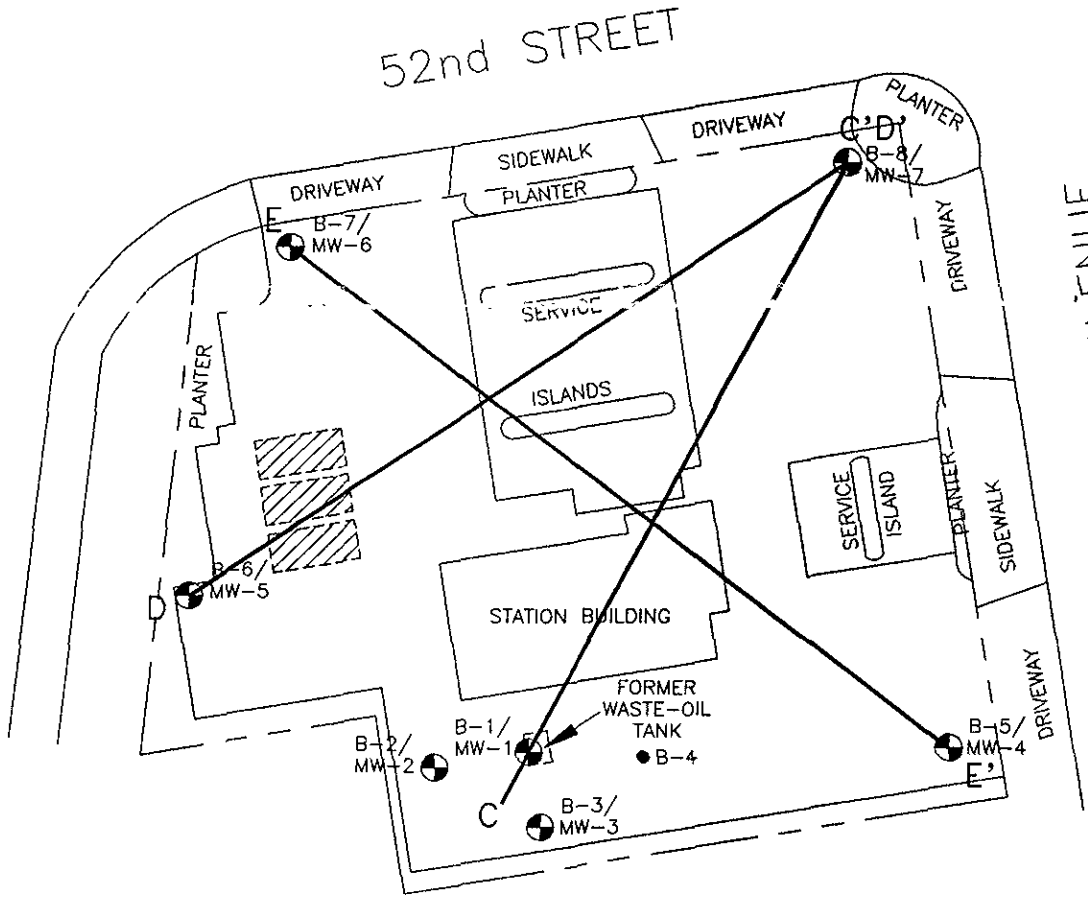
PROJECT 61035.05

SITE VICINITY MAP
ARCO Station 6148
5131 Shattuck Avenue
Oakland, California

PLATE
1



EXPLANATION

= Existing underground storage tanks

B-4 ● = Soil boring (RESNA, December 1991)

B-8/MW-7 = Monitoring well (RESNA, December 1991 and October 1992)

E — E' = Geologic cross section

N

Approximate Scale

40 20 0 40 80

feet

Source: Based on data supplied by John Koch, Surveyor, 11/09/92.

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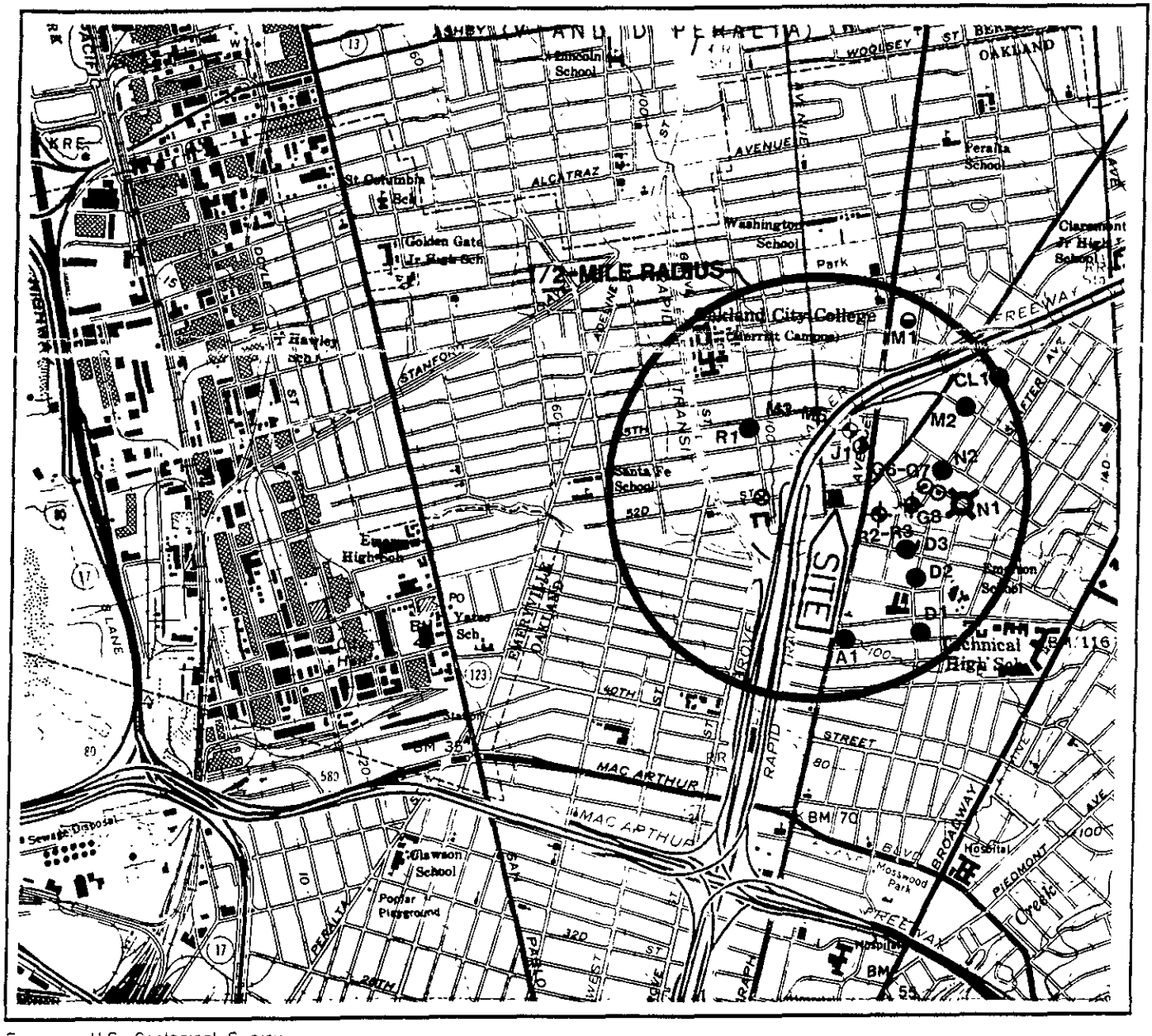
GENERALIZED SITE PLAN
ARCO Station 6148
5131 Shattuck Avenue
Oakland, California

PLATE
2



Source U S Geological Survey
7.5–Minute Quadrangle
Oakland West, California.
Photorevised 1980.

◑ = Industrial well
⊕ = Monitoring well
⊠ = Destroyed well
● = Cathodic well
◒ = Domestic well
⊙ = Piezometric well
⊗ = Geotechnical well

Approximate Scale

2000 1000 0 2000 4000

feet

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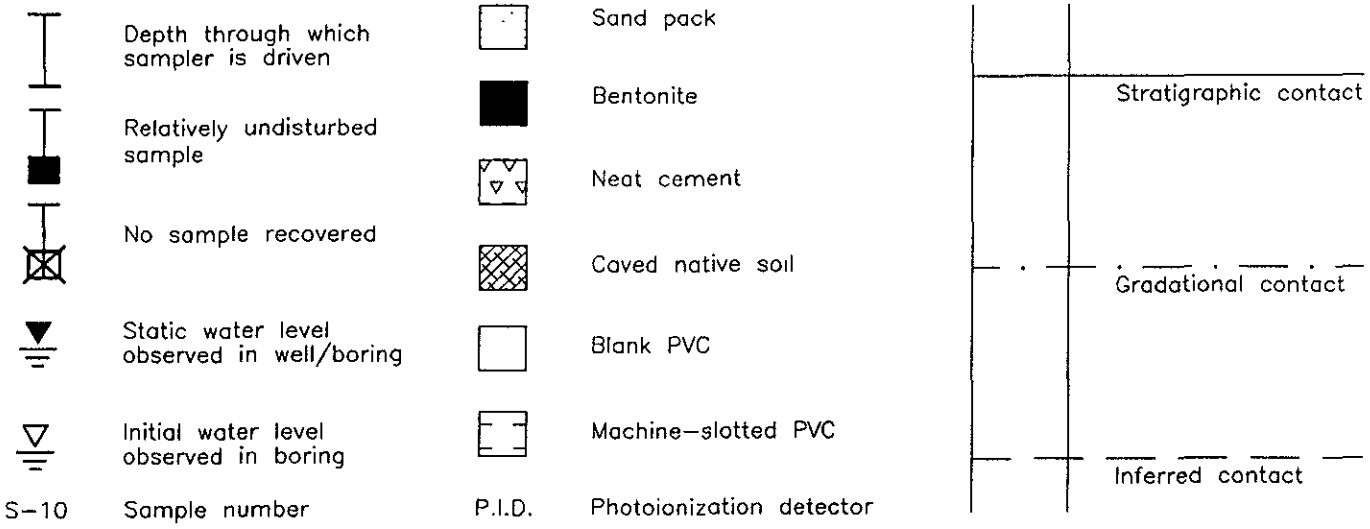
WELL LOCATION MAP
ARCO Station 6148
5131 Shattuck Avenue
Oakland, California

PLATE
3

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISION		LTR	DESCRIPTION	MAJOR DIVISION		LTR	DESCRIPTION
COARSE-GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	GW	Well-graded gravels or gravel-sand mixtures, little or no fines.	FINE-GRAINED SOILS	SILTS AND CLAYS LL<50	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands, or clayey silts with slight plasticity.
		GP	Poorly-graded gravels or gravel-sand mixtures, little or no fines.			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
		GM	Silty gravels, grave-sand-silt mixtures			OL	Organic silts and organic silt-clays of low plasticity
		GC	Clayey gravel, gravel-sand-clay mixtures.		SILTS AND CLAYS LL>50	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.
	SAND AND SANDY SOILS	SW	Well-graded sand or gravelly sands, little or no fines.			CH	Inorganic clays of high plasticity, fat clays.
		SP	Poorly-graded sands or gravelly sands, little or no fines.			OH	Organic clays of medium to high plasticity, organic silts.
		SM	Silty sands, sand-silt mixtures.				
		SC	Clayey sands, sand-clay mixtures.	HIGHLY ORGANIC SOILS		PT	Peat and other highly organic soils.



BLOWS REPRESENT THE NUMBER OF BLOWS OF A 140-POUND HAMMER FALLING 30 INCHES TO DRIVE THE SAMPLER THROUGH EACH 6 INCHES OF AN 18-INCH PENETRATION.

GRADATIONAL AND INFERRED CONTACT LINES SEPARATING UNITS ON THE LOG REPRESENT APPROXIMATE BOUNDARIES ONLY. ACTUAL BOUNDARIES MAY BE GRADUAL. LOGS REPRESENT SUBSURFACE CONDITIONS AT THE BORING LOCATION AT THE TIME OF DRILLING ONLY.

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UNIFIED SOIL CLASSIFICATION SYSTEM AND SYMBOL KEY
ARCO Station 6148
5131 Shattuck Avenue
Oakland, California

PLATE
4

Depth of boring: 32 feet Diameter of boring: 10.25 inches Date drilled: 10/27/92

Well depth: 26-1/2 feet Material type: Sch 40 PVC Casing diameter: 4 inches

Screen interval: 11-1/2 to 26-1/2 feet Filter pack: #3 Sand Slot size: 0.020-inch

Drilling Company: Exploration GeoServices Driller: Dave and Dennis

Method Used: Hollow-Stem Auger Field Geologist: Rob Campbell

Signature of Registered Professional:

Registration No.: CEG 1463 State: CA

Depth	Sample No.	Blows	P.I.D.	USCS Code	Description	Well Const.
					Asphalt-covered surface.	
0					Asphalt (4 inches).	
				SC	Clayey sand with silt, dark brown, damp, medium dense; brick fragments, glass: fill.	
2						
4		5		CL	Silty clay, dark brown, damp, low plasticity.	
	S-5	7	0			
		9		ML	Clayey silt, brown, damp, stiff, low plasticity.	
6						
8						
	S-9.5	6	0			
10		8				
		9	30		Product odor at 11 feet.	
12				GP-GM	Gravel with sand and silt, 1-2 inch gravel, olive-green, moist, medium dense; product odor.	
				SP-SM	Gravelly sand with silt, medium-grained sand and gravel, olive-green, moist, medium loose; product odor, root holes.	
14	S-14.5	10	210			
		14				
		12				
16			180			
			20 ▽			
				GP-GM	Sandy gravel with silt and clay, brown, wet, medium dense; no product odor.	
18						
		13				
20	S-20	15	0			
		14				

(Section continues downward)

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LOG OF BORING B-5/MW-4
ARCO Station 6148
5131 Shattuck Avenue
Oakland, California

PLATE 5

Depth	Sample No.	BLOWS	P.I.D.	USCS Code	Description	Well Const.
22				GP–GM	Sandy gravel with silt, brown, wet, dense; root holes.	
24	S–25	14 18 22	0			
26						
28				CL	Silty clay, brown, damp, low plasticity, hard.	
30	S–30	15 19 27	0			
		9				
32	S–31.5	13 15	0		Total depth = 32 feet.	
34						
36						
38						
40						
42						
44						
46						
48						
50						

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LOG OF BORING B–5/MW–4
ARCO Station 6148
5131 Shattuck Avenue
Oakland, California

PLATE
6

Depth of boring: 28 feet Diameter of boring: 10.25 inches Date drilled: 10/28/92

Well depth: 25 feet Material type: Sch 40 PVC Casing diameter: 4 inches

Screen interval: 10 to 25 feet Filter pack: #3 Sand Slot size: 0.020-inch

Drilling Company: Exploration GeoServices Driller: Dave and Dennis

Method Used: Hollow-Stem Auger Field Geologist: Rob Campbell

Signature of Registered Professional:

Registration No.: CEG 1463 State: CA

Depth	Sample No.	Blows	P.I.D.	USCS Code	Description	Well Const.
					Asphalt-covered surface.	
0					Asphalt (4 inches).	
				SC	Clayey sand with silt, dark brown, damp, medium dense; brick fragments, glass fragments: fill.	
2						
4	S-4 5	11 12 13	0			
6						
8				GM	Silty gravel with sand, brown, damp, medium dense.	
	S-9.5	10 12 14	50		Slight product odor at 10 feet.	
10						
12				GP	Sandy gravel, olive-green, moist, loose; product odor.	
				GP-GC	Sandy gravel with clay, olive-green, moist, dense; product odor.	
14	S-14.5	12 18 19	36			
16	S-16	8	407			
	S-16.5	14				
	S-17.5	16				
18	S-18	7 8	210		▽	
	S-18.5	9				
	S-19	12		SP	Gravelly sand, light brown, wet, dense; slight product odor.	
	S-19.5	18				
20	S-20	19	10			
	S-20.5	7				
	S-21	10 13	0	GP	Sandy gravel, gray, wet, medium dense; no product odor.	
				SM	Silty sand, gray with brown mottling, wet, medium dense.	

(Section continues downward)

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LOG OF BORING B-6/MW-5

ARCO Station 6148
5131 Shattuck Avenue
Oakland, California

PLATE 7

Depth	Sample No.	BLOWS	P.I.D.	USCS Code	Description	Well Const.
	S-20.5	7		SP	Gravelly sand, light brown, wet, dense; no product odor.	
	S-21	10	0	GP	Sandy gravel, gray, wet, medium dense.	
22	S-22	13	0	SM	Silty sand, gray with brown mottling, wet, medium dense.	
	S-22.5	4 7	0			
	S-23.5	9				
24	S-24	13 20	0	GW-GC	Gravelly sand with clay, brown with black mottling, wet, dense.	
	S-25	12 12	0			
26	S-26	15 19	0	CL	Silty clay, brown with gray mottling, wet, hard.	
		14				
	S-27.5	21 25	0			
28					Total depth = 28 feet.	
30						
32						
34						
36						
38						
40						
42						
44						
46						
48						
50						

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LOG OF BORING B-6/MW-5

ARCO Station 6148
5131 Shattuck Avenue
Oakland, California

PLATE 8

Depth of boring: 30 feet Diameter of boring: 10.25 inches Date drilled: 10/28/92

Well depth: 27 feet Material type: Sch 40 PVC Casing diameter: 4 inches

Screen interval: 12 to 27 feet Filter pack: #3 Sand Slot size: 0.020-inch

Drilling Company: Exploration GeoServices Driller: Dave and Dennis

Method Used: Hollow-Stem Auger Field Geologist: Rob Campbell

Signature of Registered Professional:

Registration No.: CEG 1463 State: CA

Depth	Sample No.	Blows	P.I.D.	USCS Code	Description	Well Const.
					Asphalt-covered surface.	
0					Asphalt (4 inches).	
				SC	Clayey sand, dark brown, damp, medium dense; no product odor, brick fragments: fill.	
2						
4	S-4.5	4 7 7	0			
6				SC	Clayey sand with gravel, brown with greenish-gray and black mottling, damp to moist, medium dense; root holes.	
8						
10	S-10	6 8 10	0			
12					Color change to olive-green at 12 feet, moist. Color change to brown at 13-1/2 feet.	
14	S-15	10 11 10	42	SP	Gravelly sand, brown with orange and gray mottling, moist, medium dense; product odor, root holes.	
16						
18	S-19	9 10 12	0	SM	Silty sand with gravel, gray with brown mottling, wet, medium dense; no product odor, cross-bedding lamination.	
20						

(Section continues downward)

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LOG OF BORING B-7/MW-6

ARCO Station 6148
5131 Shattuck Avenue
Oakland, California

PLATE 9

Depth	Sample No.	BLOWS	P.I.D.	USCS Code	Description	Well Const.
22				SM	Silty sand with gravel, gray with brown mottling, wet, medium dense; no product odor.	
24	S-25	13 18 22	0	GP	Sandy gravel, brown with orange mottling, wet, dense.	
26						
28	S-28	18 27 42	0	CL	Sandy clay, brown, damp, low plasticity, hard; root holes.	
	S-29.5	12 16 27	0			
30					Total depth = 30 feet.	
32						
34						
36						
38						
40						
42						
44						
46						
48						
50						

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LOG OF BORING B-7/MW-6
ARCO Station 6148
5131 Shattuck Avenue
Oakland, California

PLATE
10

Depth of boring: 34 feet Diameter of boring: 10.25 inches Date drilled: 10/27/92

Well depth: 27 feet Material type: Sch 40 PVC Casing diameter: 4 inches

Screen interval: 12 to 27 feet Filter pack: #3 Sand Slot size: 0.020-inch

Drilling Company: Exploration GeoServices Driller: Dave and Dennis

Method Used: Hollow-Stem Auger Field Geologist: Rob Campbell

Signature of Registered Professional:

Registration No.: CEG 1463 State: CA

Depth	Sample No.	Blows	P.I.D.	USCS Code	Description	Well Const.
					Asphalt-covered surface.	
0					Asphalt (4 inches).	
				SC	Clayey sand with silt, dark brown, damp, medium dense; no product odor, brick fragments, glass: fill.	
2						
4	S-4.5	5 8 13	0			
6				CL	Gravelly clay with sand, brown, damp, low plasticity, very stiff; root holes.	
8						
10	S-9.5	4 7 10	0			
12			40			
				GW-GM	Sandy gravel with silt, olive-green, moist, dense; product odor, green decreases with depth in sample taken.	
14	S-14.5	12 16 18	40		Grades to light brown at 14.9 feet.	
16						
18				SW	Sand with gravel, light brown, wet, medium dense; no product odor.	
20	S-19.5 S-20	5 8 13	0			
				GW-GM	Sandy gravel with silt, brown, wet, dense.	

(Section continues downward)

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LOG OF BORING B-8/MW-7
ARCO Station 6148
5131 Shattuck Avenue
Oakland, California

PLATE 11

Depth	Sample No.	BLOWS	P.I.D.	USCS Code	Description	Well Const.
				SW	Sand with gravel, light brown, wet, medium dense; no product odor.	
				GW-GM	Sandy gravel with silt, brown, wet, dense.	
22						
24		13				
	S-25	15	0			
26		18				
		12				
28	S-28	11	0			
		8				
		12				
30	S-30	11	0			
		22		CL	Silty clay, brown, damp, low plasticity, hard.	
32						
		12				
	S-33.5	16	0			
34		27			Total depth = 34 feet.	
36						
38						
40						
42						
44						
46						
48						
50						

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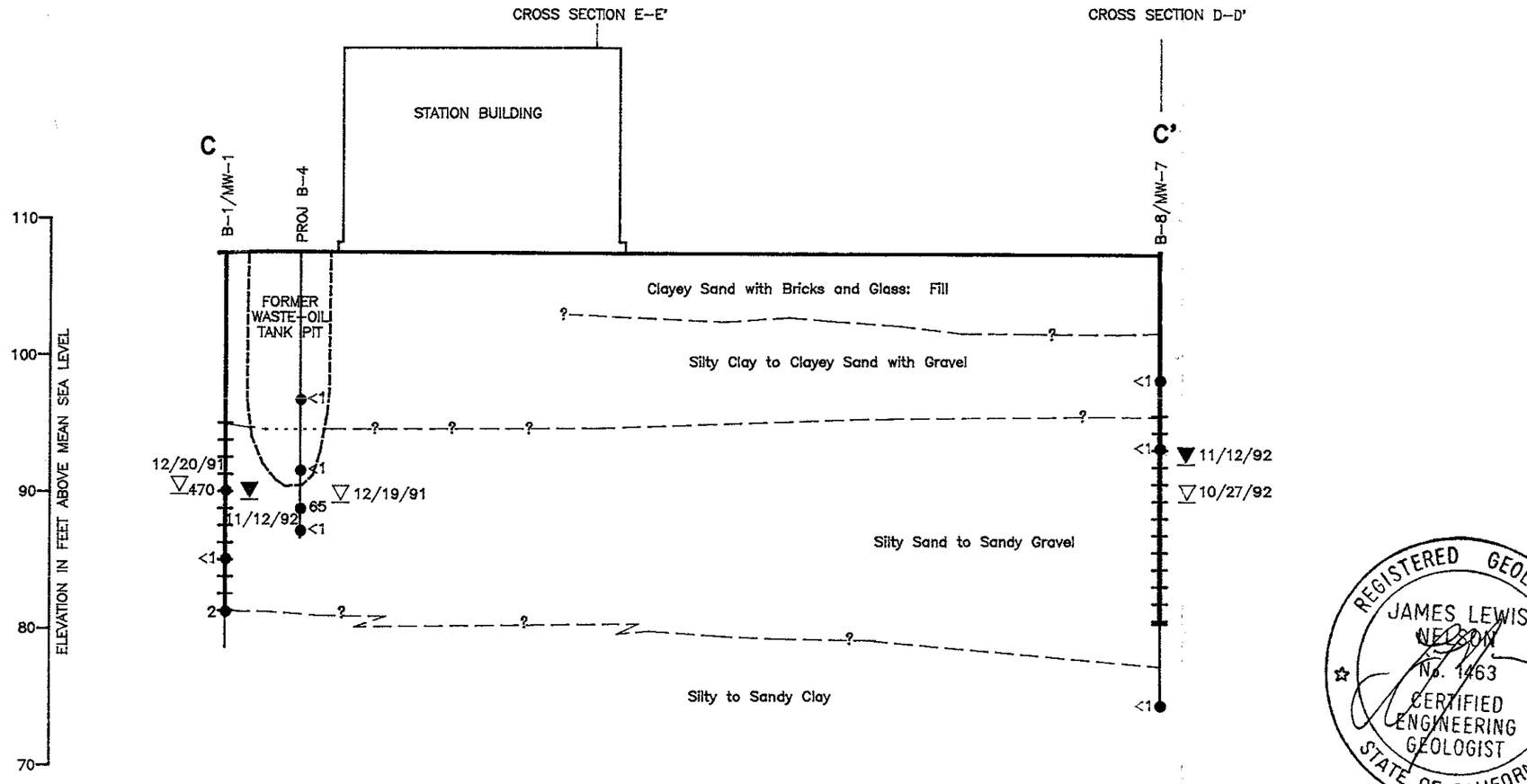
LOG OF BORING B-8/MW-7
ARCO Station 6148
5131 Shattuck Avenue
Oakland, California

PLATE
12



EXPLANATION

740 = Laboratory analyzed soil sample showing concentration of TPHg in parts per million

= Well casing

= Well screen

= Boring

▽ = Initial water level in boring

▼ = Static water level in well

Approximate Horizontal Scale

20 10 0 20 40

feet

Approximate Vertical Scale

10 5 0 10 20

feet

REGISTERED GEOLOGIST
JAMES LEWIS NELSON
No. 1463
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

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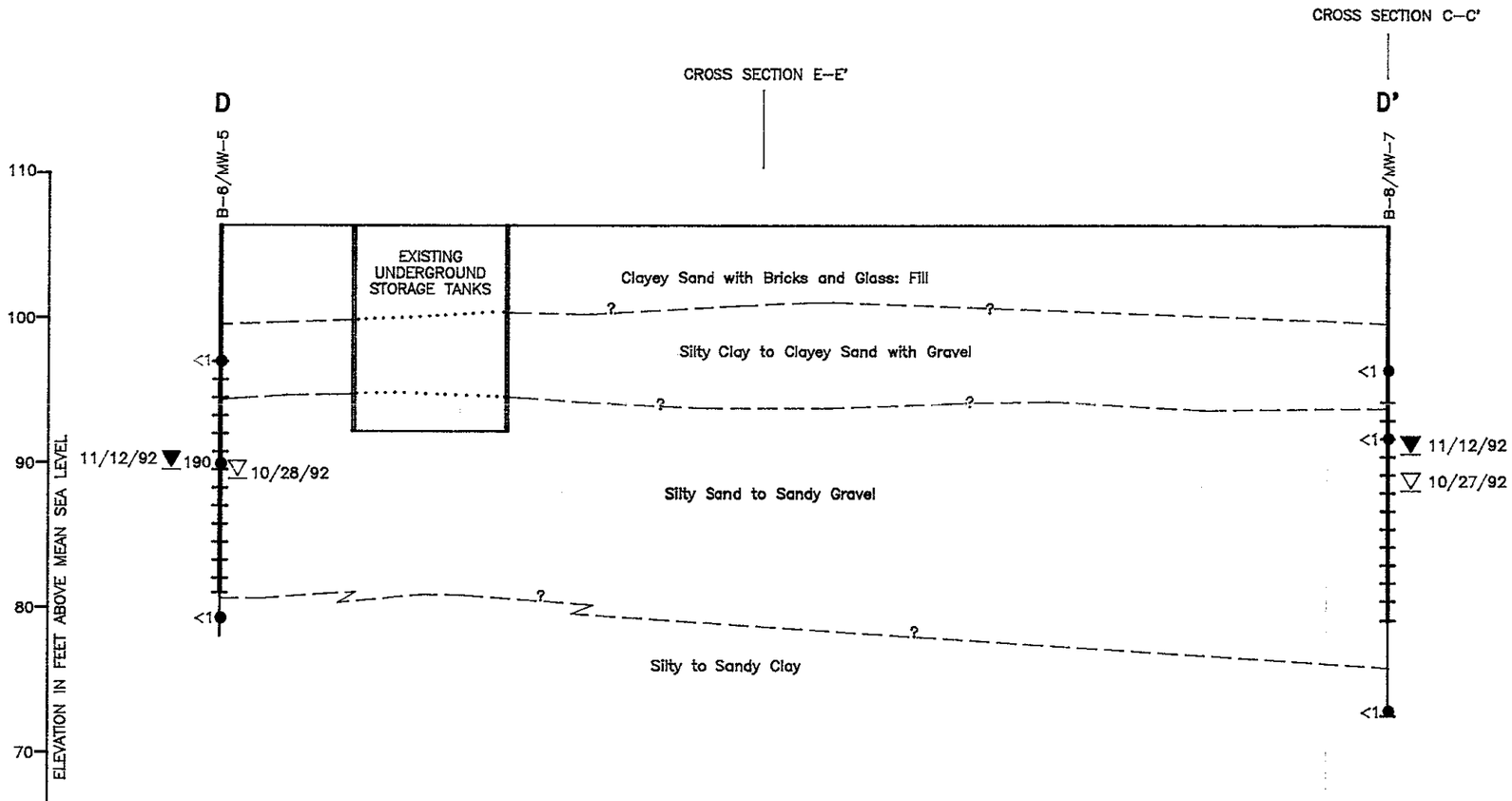
PROJECT 61035.05 610355A

GEOLOGIC CROSS SECTION C-C'
ARCO Station 6148
5131 Shattuck Avenue
Oakland, California

PLATE 13



EXPLANATION

190 = Laboratory analyzed soil sample showing concentration of TPHg in parts per million

= Well casing

= Well screen

= Boring

▽ = Initial water level in boring

▼ = Static water level in well

Approximate Horizontal Scale

20 10 0 20 40

feet

Approximate Vertical Scale

10 5 0 10 20

feet

REGISTERED GEOLOGIST
JAMES LEWIS NELSON
No. 1463
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

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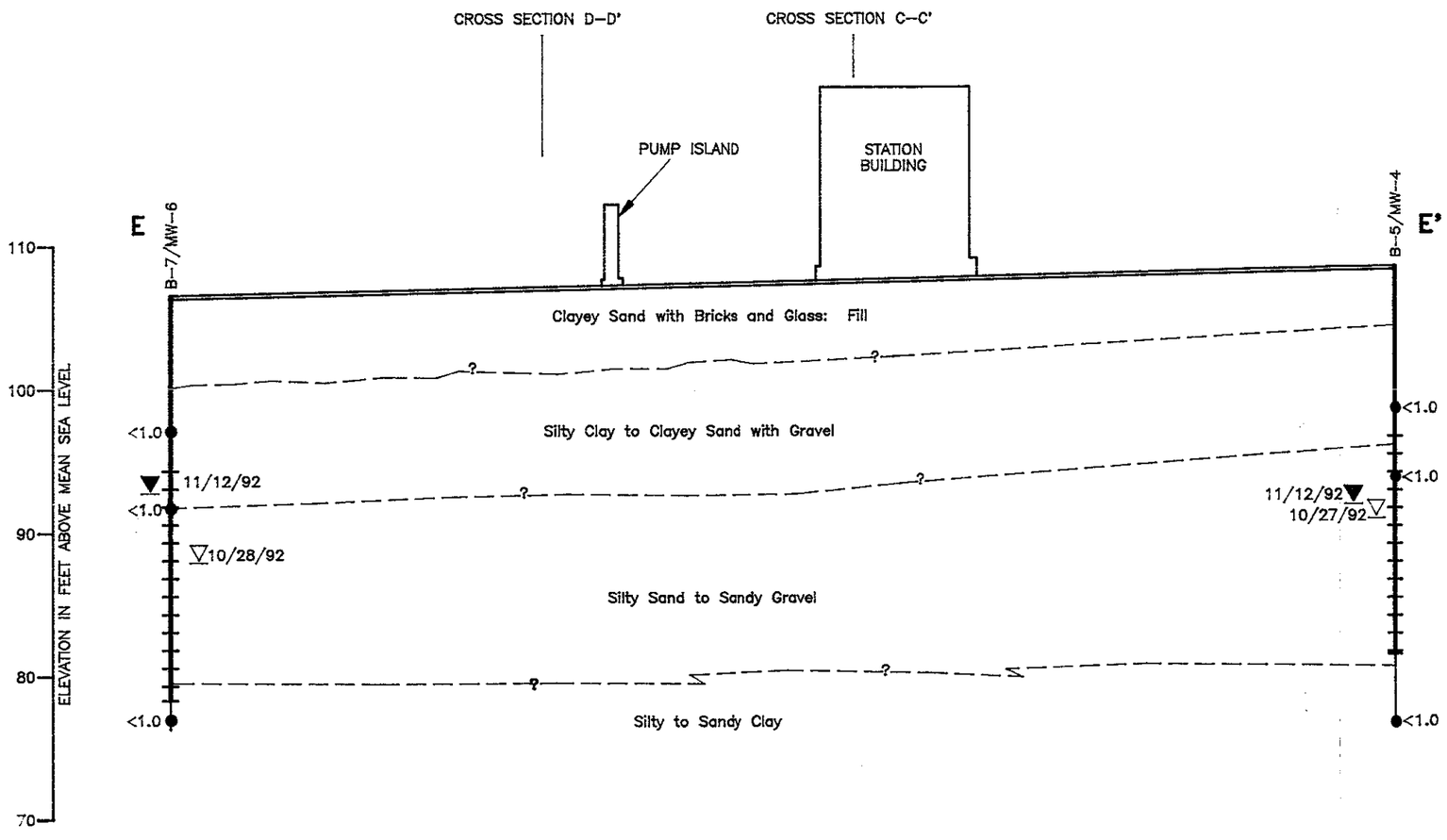
PROJECT 61035.05 610355D

GEOLOGIC CROSS SECTION D-D'
ARCO Station 6148
5131 Shattuck Avenue
Oakland, California

PLATE
14



EXPLANATION

<1.0 = Laboratory analyzed soil sample showing concentration of TPHg in parts per million

= Well casing

= Well screen

= Boring

▽ = Initial water level in boring

▼ = Static water level in well

Approximate Horizontal Scale

20 10 0 20 40

feet

Approximate Vertical Scale

10 5 0 10 20

feet

REGISTERED GEOLOGIST
JAMES LEWIS NELSON
No. 1463
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

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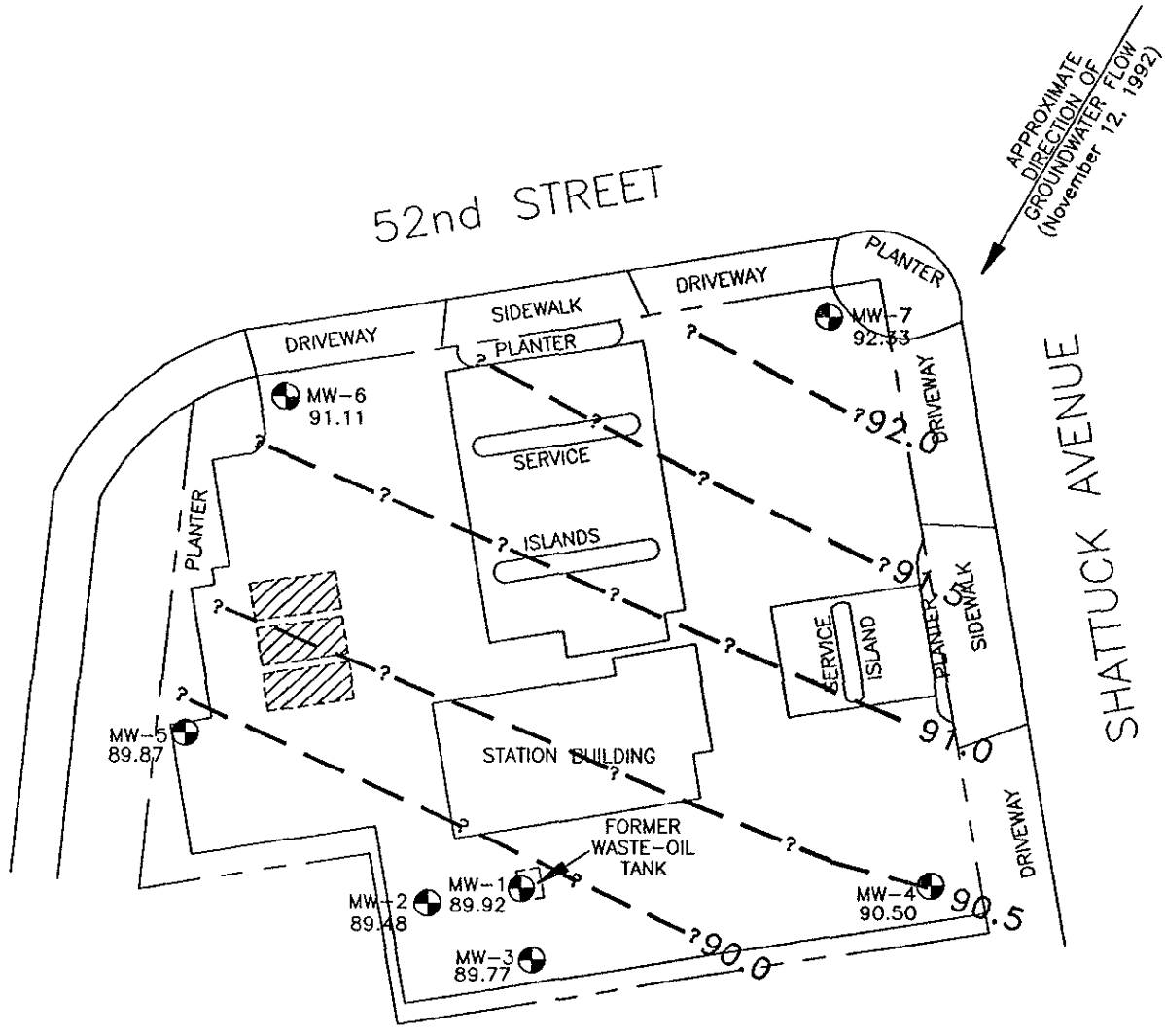
Working to Restore Nature

PROJECT 61035.05 610355E

GEOLOGIC CROSS SECTION E-E'
ARCO Station 6148
5131 Shattuck Avenue
Oakland, California

PLATE
15



EXPLANATION

92.0 = Line of equal elevation of groundwater in feet above mean sea level (MSL)

92.33 = Elevation of groundwater in feet above MSL, November 12, 1992

MW-7 = Monitoring well (RESNA, December 1991 and October 1992)

= Underground storage tanks

N

Approximate Scale

40 20 0 40 80

feet

Source: Based on data supplied by John Koch, Surveyor, 11/09/92.

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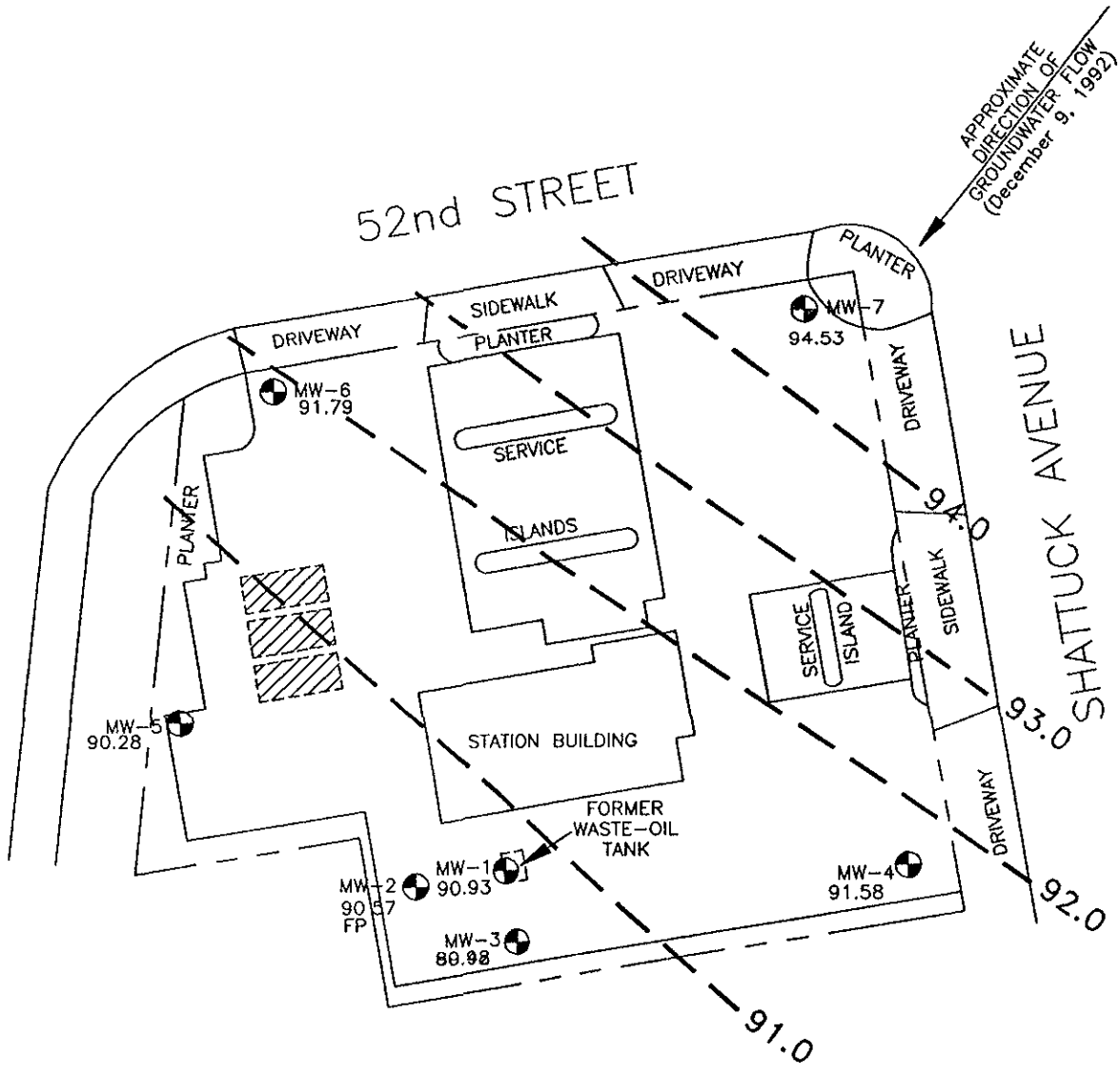
PROJECT 61035.05

GROUNDWATER GRADIENT MAP
ARCO Station 6148
5131 Shattuck Avenue
Oakland, California

PLATE
16



EXPLANATION

94.0 = Line of equal elevation of groundwater in feet above mean sea level (MSL)

94.53 = Elevation of groundwater in feet above MSL, December 9, 1992

FP = Floating Product

MW-7 = Monitoring well (RESNA, December 1991 and October 1992)

= Underground storage tanks

N

Approximate Scale

40 20 0 40 80

feet

Source: Based on data supplied by John Koch, Surveyor, 11/09/92.

RESNA
Working to Restore Nature

PROJECT 61035.05

GROUNDWATER GRADIENT MAP
ARCO Station 6148
5131 Shattuck Avenue
Oakland, California

PLATE 17

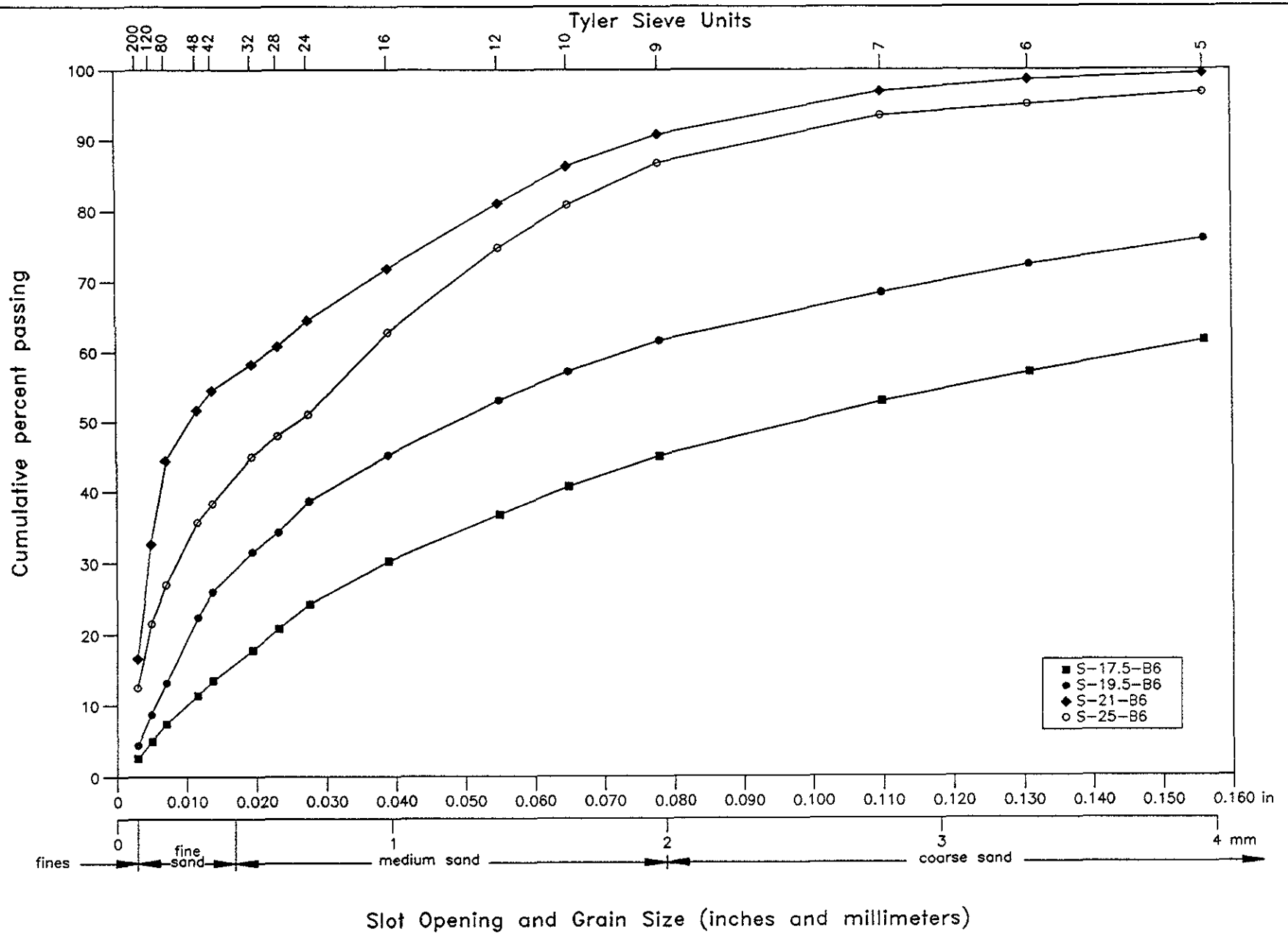
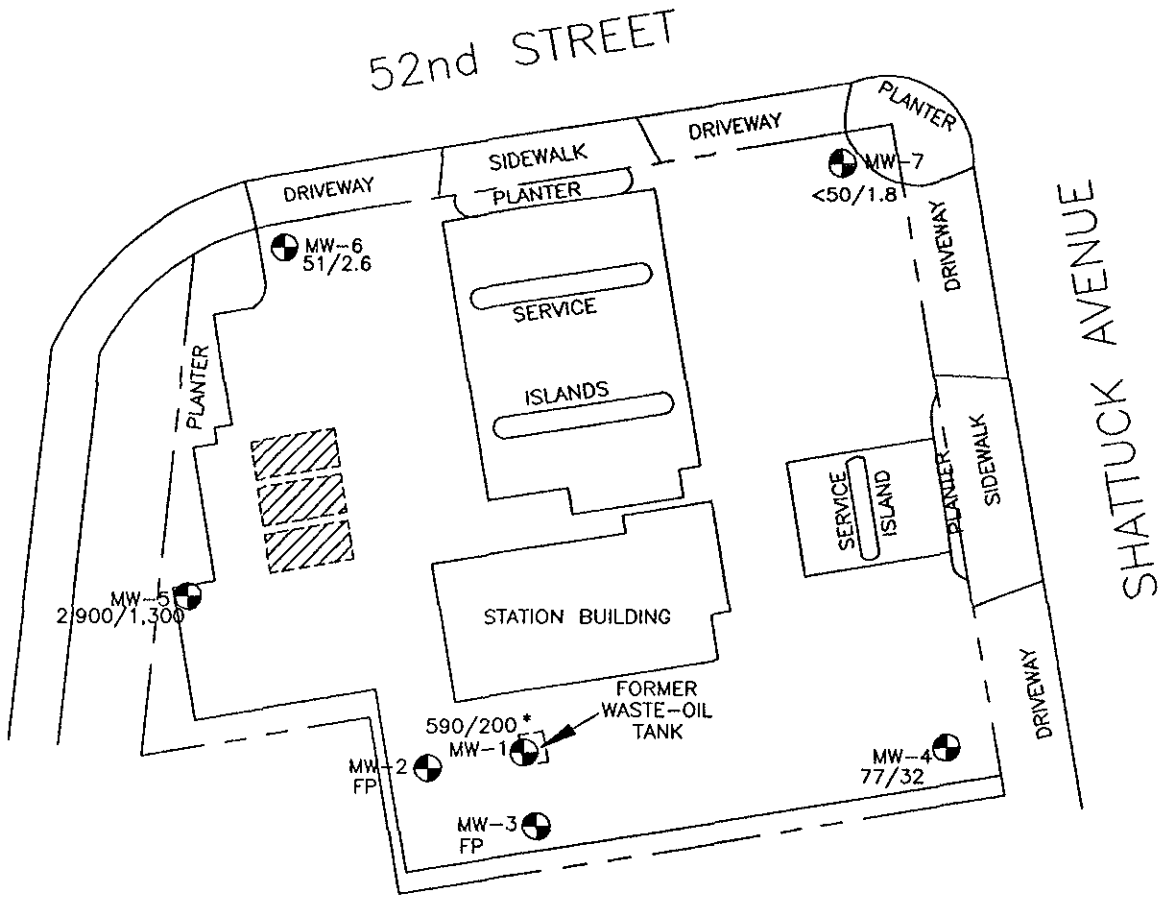


PLATE	PARTICLE SIZE DISTRIBUTION GRAPH ARCO Station 6148 5131 Shattuck Avenue Oakland, California	RESNA Working to Restore Nature
18		PROJECT 61035.05



EXPLANATION

* = Well was sampled on 10/07/92

2,900/1,300 = Concentration of TPHg/Benzene in groundwater December 12, 1992

FP = Floating Product

MW-7 = Monitoring well (RESNA, December 1991 and October 1992)

= Underground storage tanks

Approximate Scale

40 20 0 40 80

feet

Source: Based on data supplied by John Koch, Surveyor, 11/09/92.

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PROJECT 61035.05 61035Q4

CONCENTRATIONS OF TPHg/BENZENE IN GROUNDWATER
ARCO Station 6148
5131 Shattuck Avenue
Oakland, California

PLATE 19

TABLE 1
WELL SURVEY DATA
ARCO Station 6148
Oakland, California
(Page 1 of 1)

Map Section Number	Well Number	Well Type	Well Owner	Well Depth (feet)	Depth to Water (feet)
13	L2	Cathodic Protection	EBMUD	50	NA
13	M2	Cathodic Protection	PG&E	120	NA
13	N2	Cathodic Protection	EBMUD	50	NA
24	D1	Cathodic Protection	EBMUD	53	25
24	D2	Cathodic Protection	EBMUD	53	NA
24	D3	Cathodic Protection	PG&E	120	NA
13	G8	Monitoring	City of Oakland	33	18
13	M3	Monitoring	Chevron USA Inc	30	13
13	M4	Monitoring	Chevron USA Inc	29	13
13	M5	Monitoring	Chevron USA Inc	29	13
14	R2	Monitoring	Pacific Rim Development	31	17
14	R3	Monitoring	Pacific Rim Development	36	16
23	A1	Monitoring	Wayne Kelly Auto Parts	35	14
13	G6	Piezometric	City of Oakland	28	18
13	G7	Piezometric	City of Oakland	28	23
14	J1	Industrial	Marshall Steel Company	40	NA
13	N1	Abandoned	Mrs H. Gotelli	85	9
14	R1	Geotechnical	Children's Hospital	150	NA
13	M1	Domestic	Angela Delucchi	75	5

EBMUD: East Bay Municipal Utility District.
PG&E: Pacific Gas and Electric.
NA: Not available.

Source: Andreas Godfry, County of Alameda Public Works Department.

TABLE 2
CUMULATIVE GROUNDWATER MONITORING DATA
ARCO Station 6148
Oakland, California
(Page 1 of 2)

Date Well Measured	Well Elevation	Depth to Water	Water Elevation	Floating Product
MW-1				
12-23-91	108.03	18.26	89.77	Sheen
01-07-92		17.44	90.59	Sheen
01-19-92		17.17	90.86	None
02-19-92		16.52	91.51	None
03-18-92		16.81	91.22	None
04-20-92		17.56	90.47	None
05-15-92		17.96	90.07	None
06-12-92		18.16	89.87	None
07-15-92		18.32	89.71	None
08-07-92		18.34	89.69	None
09-14-92		18.46	89.57	None
10-07-92		18.52	89.51	None
11-12-92		18.11	89.92	None
12-09-92		17.10	90.93	None
MW-2				
12-23-91	107.43	17.98	89.45	Sheen
01-07-92		17.15	90.28	Sheen
01-19-92		17.47	89.96	None
02-19-92		16.28	91.15	None
03-18-92		16.52	90.91	None
04-20-92		17.27	90.16	None
05-15-92		17.62	89.81	None
06-12-92		17.63*	89.80*	0.05
07-15-92		17.65	89.78	None
08-07-92		17.80	89.63	None
09-14-92		18.09*	89.34*	0.55
10-07-92		18.55*	88.88*	0.31
11-12-92		17.95	89.48	Sheen
12-09-92		16.85*	90.58*	0.02
MW-3				
12-23-91	107 77	18.14	89.63	Sheen
01-07-92		17.26	90.51	Sheen
01-19-92		17.63	90.14	None
02-19-92		16.34	91.43	None
03-18-92		16.62	91.15	None
04-20-92		17.38	90.39	None
05-15-92		17.80	89.97	None
06-12-92		18.01	89.76	None
07-15-92		18.17	89.60	None
08-07-92		18.23	89.54	None

See notes on page 2 of 2.

TABLE 2
CUMULATIVE GROUNDWATER MONITORING DATA
ARCO Station 6148
Oakland, California
(Page 2 of 2)

Date Well Measured	Well Elevation	Depth to Water	Water Elevation	Floating Product
MW-3 Cont.				
09-14-92		18.36	89.41	None
10-07-92		18.90	88.87	Sheen
11-12-92		18.00	89.77	Sheen
12-09-92		16.85	90.92	Droplets
MW-4				
11-12-92	106.58	16.08	90.50	None
12-09-92		15.00	91.58	None
MW-5				
11-12-92	106.68	16.81	89.87	None
12-09-92		16.40	90.28	None
MW-6				
11-12-92	105.16	14.05	91.11	None
12-09-92		13.37	91.79	None
MW-7				
11-12-92	107.08	14.75	92.33	None
12-09-92		12.55	94.53	None

Measurements in feet.
Well elevation = Top of casing elevations.
Wells surveyed on November 9, 1992, by John Koch. Datum is City of Oakland = (USGS) + 3.00
Elevations in feet above mean sea level.
* indicates that the depth to water (DTW) and water elevation were corrected for the presence of floating product by the following method. Measured product thickness (PT) is multiplied by a correction factor of 0.8 and subtracted from DTW. (Adjusted DTW= DTW - [PT X 0.8]). The corrected DTW is then subtracted from the well elevation.

TABLE 3
RESULTS OF LABORATORY ANALYSES OF SOIL SAMPLES - TPHg, BTEX, Lead, and RCI
ARCO Station 6148
Oakland, California
October 27-28, 1992

Sample Identification	TPHg	B	T	E	X	Lead	RCI
S-9½-B5	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA
S-14½-B5	<1.0	0.13	<0.0050	<0.0050	0.0050	NA	NA
S-31½-B5	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA
S-9½-B6	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA
S-16½-B6*	190	0.24	0.55	1.0	1.3	NA	NA
S-27½-B6	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA
S-10-B7	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA
S-15-B7	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA
S-29½-B7	<1.0	<0.0050	<0.0050	<0.0050	0.025	NA	NA
S-9½-S8	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA
S-14½-B8	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA
S-33½-B8	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA
CSS-A-D	<1.0(<50)	<0.005(<0.50)	<0.005(<0.50)	<0.005(<0.50)	<0.005(<0.50)	0.079	Non-hazardous

All results shown in parts per million (ppm)
TPHg: Total petroleum hydrocarbons as gasoline by EPA method 5030/8015/8020.
B: Benzene, T: Toluene, E: Ethylbenzene, T: Total Xylene isomers;
BTEX: Measured by EPA method 8030/8015/8020.
Lead: Analyzed by STLC.
RCI: Reactivity, corrosivity, and ignitability.
NA: Not analyzed.
*: Laboratory reported this as a gas and non-gas mix.
<: Results reported as less than the detection limit.
(<50): Toxicity Characterization Leaching Procedure (TCLP) for TPHg reported in parts per billion (ppb).
(<0.50): TCLP for BTEX reported in ppb.

Sample Identification:

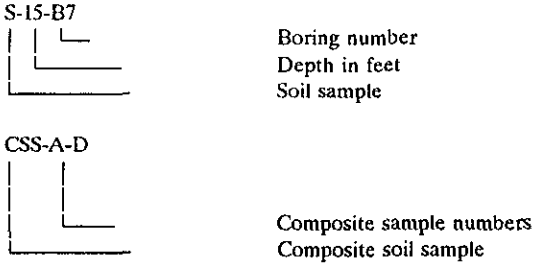


TABLE 4
RESULTS OF LABORATORY ANALYSES OF WATER SAMPLES
ARCO Station 6148
Oakland, California

WELL ID	TPHg	TPHd	B	T	E	X	TOG*	PCE	TCE	Cf
10/07/92										
MW-1	590	<50	200	19	6.7	19	<0.5	23	1.5	0.6
MW-2	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
MW-3	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
11/12/92										
MW-4	77	NA	32	<0.50	<0.50	<0.50	NA	NA	NA	NA
MW-5	2,900	NA	1,300	12	67	18	NA	NA	NA	NA
MW-6	51	NA	2.6	<0.50	<0.50	<0.50	NA	NA	NA	NA
MW-7	<50	NA	1.8	<0.50	<0.50	<0.50	NA	NA	NA	NA
MCL:	-	-	1	-	680	1,750	-	5	-	-
DWAL:	-	-	-	100	-	-	-	-	-	-

*Results in parts per billion (ppb) with the exception to TOG which is in parts per million (ppm).
TPHg: Total petroleum hydrocarbons as gasoline by EPA method 5030/8015/8020.
B: benzene, T: toluene, E: ethylbenzene, X: total xylenes isomers
BTEX: Analyzed by EPA method 5030/8015/8020.
TOG: Total oil and grease by Standard method 5520 C&F.
TCE: Trichloroethene analyzed by EPA Methods 5030/601.
PCE: Tetrachloroethene analyzed by EPA Methods 5030/601.
Cf: Chloroform analyzed by EPA Methods 5030/601.
NA: Not analyzed.
<: Results reported below the laboratory detection limit.
NS: Not sampled, due to floating product in the well.
MCL: Maximum contaminant level.
DWAL: Drinking water action level.

Sample Identification: W-MW3
- MW3: Monitoring well number
- W: Water Sample

APPENDIX A

VISTA DATABASE SEARCH RESULTS

VISTA ENVIRONMENTAL INFORMATION, INC.
3-RISJ0C-612010 RADIUS STATUS REPORT

Date of Report: 11/23/92

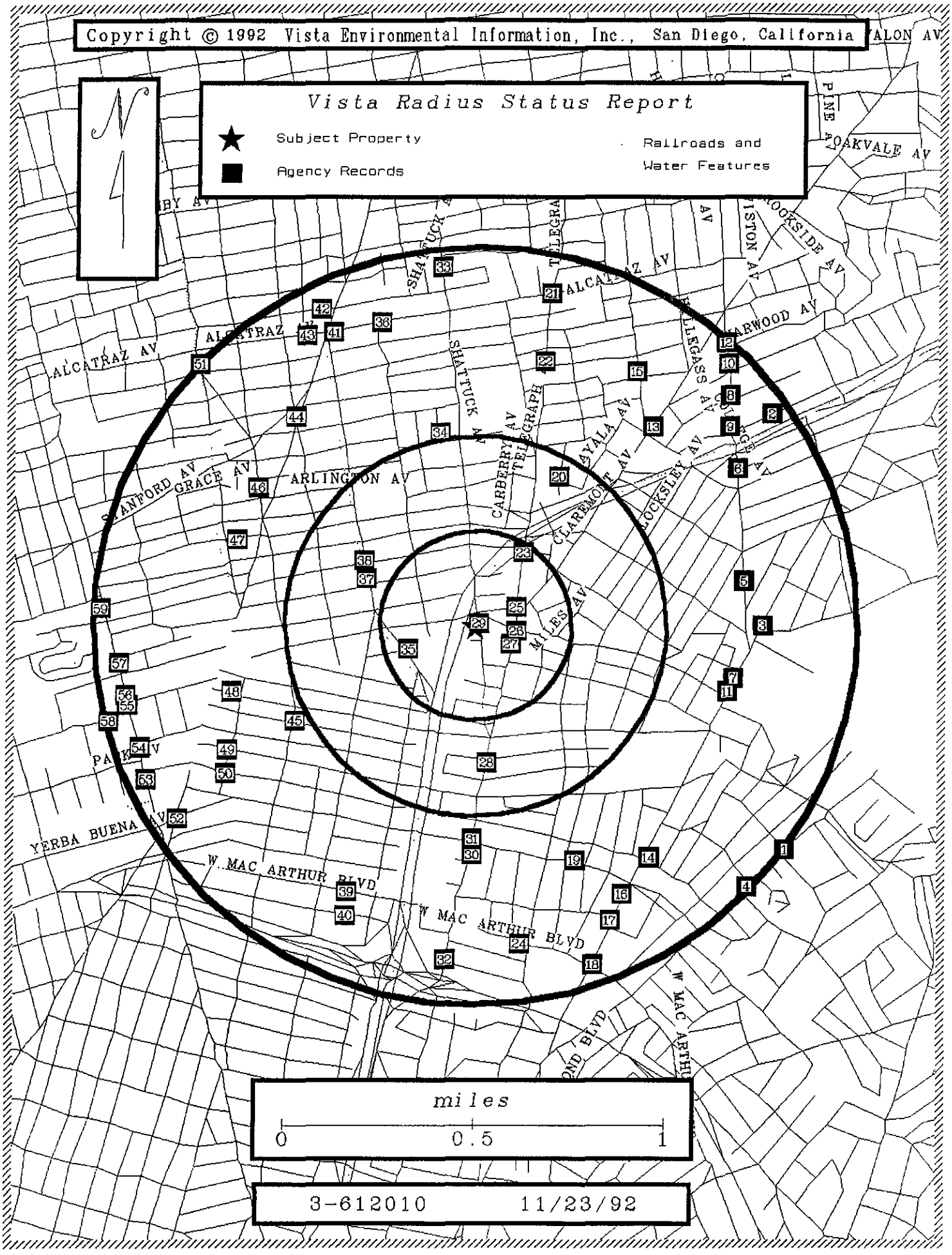
Loan #: ARCO STATION 6148
RESNA INDUSTRIES - SAN JOSE
3315 ALMADEN EXPRWY STE 34, SAN JOSE, CA 95118

Loan Property: 5131 SHATTUCK AVENUE
OAKLAND, CA 94609

VISTA DATABASE SEARCH RESULTS

Database & Date	Agency & Type of Records	Records Located Within: 0 to 1/4 mi.	1/4 to 1/2 mi.	1/2 to 1 mi.	TOTAL
NPL 1/92	US EPA Superfund Sites	0	0	0	0
CERCLIS 1/92	US EPA Potential Superfund Sites	0	0	1	1
AWP 10/91	CAL. EPA CASITES / Sites Authorized for Cleanup under the California Annual Work Plan	0	0	0	0
LUST various	CAL. REGIONAL WATER QUALITY CONTROL BOARD Leaking Underground Storage Tanks	4	6	39	49
SWIS 7/91	CAL. WASTE MGMT. BOARD Active/Inactive Sanitary Landfills/ Disposal Sites	0	0	0	0
ASPIS 10/91	CAL. EPA CASITES / Abandoned Site Program	2	1	26	29
	Total:	6	7	66	79

Note: Sites often have more than one environmental record.



LIST OF SITES AND RECORDS

3-RISJOC-612010

SITE #	AGENCY & ID#	ENVIRONMENTAL RISK SITE AND DIRECTION FROM SUBJECT PROPERTY	11/23/92

WITHIN 1/4 MILE:

23 LUST — CHEVRON — OAKLAND
5500 TELEGRAPH AVE — Direction: NE
Status Code: 3B: Preliminary site assessment underway.

25 LUST — AUTOPRO — OAKLAND
5200 TELEGRAPH AVE — Direction: NE
Status Code: 3A: Preliminary site assessment workplan submitted.

26 LUST — CHEVRON — OAKLAND
5101 TELEGRAPH AVE — Direction: E
Status Code: 3B: Preliminary site assessment underway.

29 LUST — ARCO — OAKLAND
5131 SHATTUCK AVE — Direction: --
Status Code: 0: No action.

27 ASPIS — MARKS PAINT SPOT — OAKLAND
01510011 — 5025 TELEGRAPH AV — 94609 — Direction: SE
Status Code: NFA: No Further Action.

35 ASPIS — CHILDREN'S HOSPITAL — OAKLAND
01800017 — GROVE AND 51ST ST. — 94609 — Direction: SW
Status Code: NFA: No Further Action.

WITHIN 1/4 TO 1/2 MILE:

28 LUST — KELLEY AUTO PARTS — OAKLAND
4400 TELEGRAPH AVE — Direction: S
Status Code: 3B: Preliminary site assessment underway.

37 LUST — BP OIL — OAKLAND
5425 MARTIN LUTHER KING — Direction: NW
Status Code: 0: No action.

37 LUST — MOBIL — OAKLAND
5425 GROVE ST — Direction: NW
Status Code: 3B: Preliminary site assessment underway.

37 LUST — BP OIL — OAKLAND
5425 MARTIN LUTHER KING — Direction: NW
Status Code: 0: No action.

SITE # | AGENCY & ID# | ENVIRONMENTAL RISK SITE AND DIRECTION FROM SUBJECT PROPERTY | 11/23/92

WITHIN 1/4 TO 1/2 MILE:

38 LUST — CHEVRON — OAKLAND
5509 MARTIN LUTHER KING — Direction: NW
Status Code: 5C: Pollution characterization underway.

38 LUST — CHEVRON — OAKLAND
5509 MARTIN LUTHER KING — Direction: NW
Status Code: 5C: Pollution characterization underway.

20 ASPIS — JAMES SLATON TRUCKING — OAKLAND
01420035 — 5707 VICENTE ST — 94618 — Direction: NE
Status Code: NFA: No Further Action.

WITHIN 1/2 TO 1 MILE:

44 CERCLIS — GRANT LABORATORIES — OAKLAND
CAD093982866 — 6020 ADELINE ST — 94608 — Direction: NW
Status Code: (None provided)

1 LUST — LA MANCHA DEVELOPMENT COMPANY — OAKLAND
4299 PIEDMONT AVE — Direction: SE
Status Code: 0: No action.

2 LUST — FIRE STATION #19 — OAKLAND
5776 MILES AVE — Direction: NE
Status Code: 3B: Preliminary site assessment underway.

3 LUST — UNOCAL — OAKLAND
5300 BROADWAY — Direction: E
Status Code: 3B: Preliminary site assessment underway.

3 LUST — UNOCAL — OAKLAND
5300 BROADWAY — Direction: E
Status Code: 3B: Preliminary site assessment underway.

4 LUST — YOUNG'S FOOD & LIQUOR — OAKLAND
4193 PIEDMONT AVE — Direction: SE
Status Code: 0: No action.

5 LUST — WILLIAM BROWN REALTY — OAKLAND
5353 COLLEGE AVE — Direction: NE
Status Code: 0: No action.

WITHIN 1/2 TO 1 MILE:

7	LUST	MEHDIZADEH PROPERTY 5175 BROADWAY	OAKLAND	Direction: SE
	Status Code: 3B: Preliminary site assessment underway.			
7	LUST	MEHDIZADEH PROPERTY 5175 BROADWAY	OAKLAND	Direction: SE
	Status Code: 3B: Preliminary site assessment underway.			
8	LUST	CHEVRON 5800 COLLEGE AVE	OAKLAND	Direction: NE
	Status Code: 5R: Remediation plan submitted.			
10	LUST	DRYER'S GRAND ICE CREAM 5929 COLLEGE AVE	OAKLAND	Direction: NE
	Status Code: 3A: Preliminary site assessment workplan submitted.			
12	LUST	SHELL 6039 COLLEGE AVE	OAKLAND	Direction: NE
	Status Code: 3B: Preliminary site assessment underway.			
14	LUST	7-ELEVEN 4100 BROADWAY	OAKLAND	Direction: SE
	Status Code: 3B: Preliminary site assessment underway.			
14	LUST	7-ELEVEN 4100 BROADWAY	OAKLAND	Direction: SE
	Status Code: 3B: Preliminary site assessment underway.			
16	LUST	UNOCAL 3943 BROADWAY	OAKLAND	Direction: SE
	Status Code: 5C: Pollution characterization underway.			
16	LUST	UNOCAL 3943 BROADWAY	OAKLAND	Direction: SE
	Status Code: 5C: Pollution characterization underway.			
17	LUST	FIRESTONE & RUBBER COMPANY 3785 BROADWAY	OAKLAND	Direction: SE
	Status Code: (None)			
17	LUST	FIRESTONE & RUBBER COMPANY 3785 BROADWAY	OAKLAND	Direction: SE
	Status Code: (None)			

WITHIN 1/2 TO 1 MILE:

18	LUST	CHEVRON	OAKLAND	
		3701 BROADWAY		Direction: SE
	Status Code: 5C: Pollution characterization underway.			
18	LUST	CHEVRON	OAKLAND	
		3701 BROADWAY		Direction: SE
	Status Code: 5C: Pollution characterization underway.			
21	LUST	ARCO	OAKLAND	
		6407 TELEGRAPH AVE		Direction: NE
	Status Code: 5C: Pollution characterization underway.			
21	LUST	GIVENS INVESTMENT COMPANY	OAKLAND	
		6398 TELEGRAPH AVE		Direction: NE
	Status Code: 0: No action.			
22	LUST	THRIFTY OIL	OAKLAND	
		6125 TELEGRAPH AVE		Direction: NE
	Status Code: 5R: Remediation plan submitted.			
24	LUST	UNOCAL	OAKLAND	
		411 MACARTHUR BLVD W		Direction: S
	Status Code: 3B: Preliminary site assessment underway.			
31	LUST	SIMAS BROS.	OAKLAND	
		4013 TELEGRAPH AVE		Direction: S
	Status Code: 0: No action.			
31	LUST	SHELL	OAKLAND	
		500 40TH ST		Direction: S
	Status Code: 5R: Remediation plan submitted.			
32	LUST	CALIFORNIA HIGHWAY PATROL OAKL	OAKLAND	
		3601 TELEGRAPH AVE		Direction: S
	Status Code: 0: No action.			
33	LUST	SHATTUCK IMPORTS	OAKLAND	
		6562 SHATTUCK AVE		Direction: N
	Status Code: 0: No action.			
39	LUST	ARCO	OAKLAND	
		731 MACARTHUR BLVD W		Direction: SW
	Status Code: 5C: Pollution characterization underway.			

SITE #	AGENCY & ID#	ENVIRONMENTAL RISK SITE AND DIRECTION FROM SUBJECT PROPERTY	11/23/92

WITHIN 1/2 TO 1 MILE:

40 LUST R.D. MINER CO. OAKLAND
750 37TH ST Direction: SW
Status Code: 0: No action.

45 LUST DAMELE PROPERTY OAKLAND
4401 MARKET ST Direction: SW
Status Code: 0: No action.

49 LUST OAKLAND NATIONAL ENGRAVING OAKLAND
1001 42ND ST Direction: SW
Status Code: 3B: Preliminary site assessment underway.

50 LUST CALIFORNIA LINEN RENTAL OAKLAND
989 41ST ST Direction: SW
Status Code: 3B: Preliminary site assessment underway.

50 LUST DUNNE QUALITY PAINTS OAKLAND
1007 41ST ST Direction: SW
Status Code: 3B: Preliminary site assessment underway.

51 LUST MOORE PROPERTY BERKELEY
3155 SACRAMENTO ST Direction: NW
Status Code: 0: No action.

53 LUST SAN FRANCISCO BREAD COMPANY EMERYVILLE
4070 SAN PABLO AVE Direction: SW
Status Code: 0: No action.

54 LUST CITY OF EMERYVILLE EMERYVILLE
4300 SAN PABLO AVE Direction: SW
Status Code: 3B: Preliminary site assessment underway.

56 LUST BERKELEY FARMS EMERYVILLE
4550 SAN PABLO AVE Direction: SW
Status Code: 0: No action.

58 LUST AC TRANSIT EMERYVILLE
1140 45TH ST Direction: SW
Status Code: 5C: Pollution characterization underway.

59 LUST PARINA ENTERPRISES OAKLAND
5433 SAN PABLO AVE Direction: W
Status Code: 0: No action.

SITE #	AGENCY & ID#	ENVIRONMENTAL RISK SITE AND DIRECTION FROM SUBJECT PROPERTY	11/23/92

WITHIN 1/2 TO 1 MILE:

6	ASPIS	IMPAC PHOTO	OAKLAND	
	01730007	5604 COLLEGE AV	94618	Direction: NE
	Status Code: NFA: No Further Action.			
9	ASPIS	RYAN'S CUSTOM UPHOLSTERY	OAKLAND	
	01760010	5711 COLLEGE AV	94618	Direction: NE
	Status Code: NFA: No Further Action.			
10	ASPIS	EXPOSURE	OAKLAND	
	01730083	5940 COLLEGE AV	94618	Direction: NE
	Status Code: NFA: No Further Action.			
11	ASPIS	SHIELDS, HARPER & CO.	OAKLAND	
	01730058	5107 BROADWAY	94611	Direction: SE
	Status Code: NFA: No Further Action.			
13	ASPIS	CLARKS REFINISHING	OAKLAND	
	01760018	5200 CLAREMONT	94618	Direction: NE
	Status Code: NFA: No Further Action.			
13	ASPIS	KAPS	OAKLAND	
	01760021	5301 CLAREMONT AV	94618	Direction: NE
	Status Code: NFA: No Further Action.			
13	ASPIS	WILD FLOWER & COMPANY	OAKLAND	
	01320018	5400 CLAREMONT	94618	Direction: NE
	Status Code: NFA: No Further Action.			
15	ASPIS	DAVANZO, LORNA	OAKLAND	
	01500084	6019 COLBY ST	94609	Direction: NE
	Status Code: NFA: No Further Action.			
19	ASPIS	CALIF. SURGERY CENTER AND HOSPITAL	OAKLAND	
	01800018	390 40TH ST	94609	Direction: SE
	Status Code: NFA: No Further Action.			
30	ASPIS	PAYLESS CLEANERS	OAKLAND	
	01720034	3936 TELEGRAPH	94609	Direction: S
	Status Code: NFA: No Further Action.			
34	ASPIS	WHERE ENDS MEET	OAKLAND	
	01330024	5926 WHITNEY ST	94609	Direction: NW
	Status Code: NFA: No Further Action.			

SITE #	AGENCY & ID#	ENVIRONMENTAL RISK SITE AND DIRECTION FROM SUBJECT PROPERTY	11/23/92

WITHIN 1/2 TO 1 MILE:

36 ASPIS PHOTO LAB BERKELEY
01730043 1908 ALCATRAZ AV 94703 Direction: NW
Status Code: NFA: No Further Action.

40 ASPIS R J S ENTERPRISES OAKLAND
01350004 675 37TH ST 94609 Direction: SW
Status Code: NFA: No Further Action.

41 ASPIS EUUELL BATES CLEANERS BERKELEY
01720023 1805 ALCATRAZ 94703 Direction: NW
Status Code: NFA: No Further Action.

42 ASPIS TALLEY COSMETICS BERKELEY
01280056 1831 HARMON 94703 Direction: NW
Status Code: NFA: No Further Action.

43 ASPIS SIERRA SOUND LABS BERKELEY
01360002 1741 ALCATRAZ AV 94703 Direction: NW
Status Code: NFA: No Further Action.

44 ASPIS GRANT LABORATORIES INC OAKLAND
01280062 6020 ADELINE ST 94607 Direction: NW
Status Code: NFA: No Further Action.

45 ASPIS OLIVIA RECORDS OAKLAND
01720073 4400 MARKET ST 94609 Direction: SW
Status Code: NFA: No Further Action.

46 ASPIS CORVIT PHARMACEUTICALS OAKLAND
01510014 5780 MARKET ST 94607 Direction: NW
Status Code: NFA: No Further Action.

47 ASPIS TOP LINE FIXTURES OAKLAND
01350083 941-945 AILEEN ST 94609 Direction: NW
Status Code: NFA: No Further Action.

48 ASPIS FLECTO INTERNATIONAL OAKLAND
01510002 1000-12 45TH ST 94609 Direction: SW
Status Code: NFA: No Further Action.

52 ASPIS PACIFIC TYPOGRAPHIC EMERYVILLE
01350017 1094 YERBA BUENA AV 94608 Direction: SW
Status Code: NFA: No Further Action.

SITE #	AGENCY & ID#	ENVIRONMENTAL RISK SITE AND DIRECTION FROM SUBJECT PROPERTY		11/23/92
======	==========	==========	==========	==========

WITHIN 1/2 TO 1 MILE:

55	ASPIS	A C TRANSIT - EMERYVILLE	EMERYVILLE	
	01410002	45TH STREET & SAN PABLO AVENUE	94608	Direction: SW
	Status Code: OAL: Other Agency Lead.			
57	ASPIS	ACCURATE MANUFACTURING	EMERYVILLE	
	01350016	4770 SAN PABLO AV	94608	Direction: W
	Status Code: NFA: No Further Action.			
59	ASPIS	J R WATSON ASSOCIATES	OAKLAND	
	01500055	1133 55TH ST	94609	Direction: W
	Status Code: NFA: No Further Action.			
59	ASPIS	GENERAL CLEANERS	OAKLAND	
	01720033	5426-28 SAN PABLO AV	94612	Direction: W
	Status Code: NFA: No Further Action.			

Agency	City	Zip	St #	Street Name	Site Name	NFA?
CERCLIS	EMERYVILLE	94608	1520	POWELL ST	AMERICAN BITUMALS & ASPHALT	NO
CERCLIS	OAKLAND	94621		727-66TH AVE.	ALLIED CRAIN, INC.	NO
CERCLIS	OAKLAND	94623		NAVAL SUPPLY CENTER OAKLAND	NAVY PUBLIC WORKS CENTER SAN FRANCIS	NO
CERCLIS	OAKLAND	94621		OAKLAND ARPT	PACIFIC AIRMOTIVE	NO
CERCLIS	OAKLAND	94621		OAKLAND ARPT	GOLDEN GATE AVIATION	NO
CERCLIS	OAKLAND	94621		OAKLAND ARPT	BUSINESS AIRCRAFT DISTR	NO
AWP	OAKLAND			CODE 6 BUILDING 322	OAKLAND NAVAL SUPPLY CENTER	-
ASPIS	OAKLAND	94625		CODE 6 BUILDING 322	OAKLAND NAVAL SUPPLY CENTER	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	OAKLAND	94626		TULAGI ST.	OAKLAND ARMY BASE, WAREHOUSE AREA	NO
ASPIS	BERKELEY	94703	523	COVENTRY RD	DISCO CORPORATION	Y
ASPIS	BERKELEY	94703	1925	GROVE ST	IMPAC PHOTO #2	Y
ASPIS	EMERYVILLE	94608	6901	CHRISTIE #405	INTERMODAL TRANSPORTATION SERVICE INC	Y
ASPIS	OAKLAND	94623	1819	10TH	IRVING SUBWAY - DIVISION OF HARSCO CORP	Y
ASPIS	OAKLAND	94607	2588	GROVE ST	PETER LEAF CABINET MAKER	Y
ASPIS	OAKLAND	94614		HANGER #5, OAKLAND INTERNATIONAL AIRPORT	POWER PAC ENGINEERING CORPORATION	Y
ASPIS	OAKLAND	94614		HANGER #6, OAKLAND INTERNATIONAL AIRPORT	AIR CALIFORNIA	Y
ASPIS	OAKLAND	94611	4139	JULIO	ALVAREZ & ORTIZ	Y
ASPIS	OAKLAND	94602	314	MAPLE ST	SHIELD TERMITE	Y
ASPIS	OAKLAND	94607		MARITIME STREET	GLOBAL INTERNATIONAL FORWARDERS	Y
ASPIS	OAKLAND	94621		OAKLAND INTERNATIONAL AIRPORT, BLDG 118	BUSINESS AIRCRAFT DISTRIBUTORS	Y
ASPIS	OAKLAND	94621		OAKLAND INTERNATIONAL AIRPORT, BLDG L230	PACIFIC AIRMOTIVE	Y
ASPIS	OAKLAND	94621		OAKLAND INTERNATIONAL AIRPORT, BLDG L310	GOLDEN GATE AVIATION	Y
ASPIS	OAKLAND	94662		PO BOX 8722	STAND COMPANY INDUSTRIES	Y
LUST 2	OAKLAND				OAKLAND ARMY BASE	NO
LUST 2	OAKLAND			11TH ST	UNKNOWN	NO
LUST 2	OAKLAND			11TH ST	UNKNOWN	NO
LUST 2	OAKLAND			11TH STREET	UNKNOWN	NO
LUST 2	OAKLAND		190	96TH AVE	MOUIS DRAZAGE CO.	NO
LUST 2	OAKLAND	94621		ASR #9 FACILITY	FAA AIRWAY FACILITY	NO
LUST 2	OAKLAND			EARHART RD	NATIONAL AIRMOTIVE	NO
LUST 2	OAKLAND			EARHART RD	NATIONAL AIROMOTIVE	NO
LUST 2	OAKLAND	94621		N/A L-827 TRACON	FAA AIRWAY FACILITIES	NO
LUST 2	OAKLAND			OAKLAND AIRPORT	AVIS RENT A CAR	NO
LUST 2	OAKLAND			OAKLAND AIRPORT	AVIS RENT A CAR	NO
LUST 2	OAKLAND			OAKLAND INTN'L AIR	CHEVRON	NO
LUST 2	OAKLAND			OAKLAND INTN'L AIR	CHEVRON	NO
LUST 2	OAKLAND			OAKPORT ST	EGMUD	NO

Mentions for report 3 - RISJOC - 612010

Agency	City	Zip	St #	Street Name	Site Name	NFA?
LUST 2	OAKLAND			OAKPORT ST	EBMUD	NO
LUST 2	OAKLAND			PETROLEUM ST	MOBIL	NO
LUST 2	OAKLAND			PETROLEUM ST	MOBIL	NO
LUST 2	OAKLAND			PINE ST	SOUTHERN PACIFIC	NO
LUST 2	OAKLAND			PINE ST	SOUTHERN PACIFIC	NO
LUST 2	OAKLAND			PORT OF OAKLAND	MOBIL BULK PLANT	NO
LUST 2	OAKLAND			PORT OF OAKLAND	MOBIL BULK PLANT	NO
LUST 2	OAKLAND			PRIVATE RD	SOUTHERN PACIFIC	NO
LUST 2	OAKLAND			TERMINAL FACILITY	SHELL	NO
LUST 2	OAKLAND			TERMINAL FACILITY	SHELL	NO
LUST 2	OAKLAND			TERMINAL FACILITY	SHELL	NO
LUST 2	OAKLAND			TIDEWATER AVE	TIDEWATER BUSINESS PARK	NO
LUST 2	OAKLAND			TIDEWATER AVE	TIDEWATER BUSINESS PARK	NO
LUST 2	OAKLAND			VALDEZ & 13TH	OLD OAKLAND TRIBUNE GARAGE	NO
LUST 2	OAKLAND			VALDEZ & 13TH	OLD OAKLAND TRIBUNE GARAGE	NO
LUST 2	OAKLAND			VALDEZ & 13TH	OLD OAKLAND TRIBUNE GARAGE	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."

KEY TO TERMS/ABBREVIATIONS USED IN THIS REPORT:

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

MAP ID NO: An entry having "--" in this field indicates a site, possibly in the radius, currently under investigation. The source agency was unable to provide sufficient locational information.

CERCLIS:

* *NFA FLAG* - An entry indicating "N" means "No Further Action" is currently contemplated by U.S. EPA at this site.

* *EVENT TYPE* - Evaluation and disposition information:

DS = Discovery
PA = Preliminary Assessment
SI = Site Inspection
ES = Expanded Site Inspection
SE = Site Access
HR = Final Hazard Ranking Determined
NP = Proposal to NPL
NR = Removed from Proposed NPL
NF = Final Listing on NPL
ND = NPL Deletion Process

Removal Activities (All Leads)
PR = Planned Removal
IR = Immediate Removal
RV = Removal Action
RC = Removal Community Relations
UR = Underground Storage Tank Removal

Remedial Activities (All Leads)
WP = RI/FS Workplan Approved by HQ
CO = Combined RI/SI
RI = Remedial Investigation
(Primarily for Historical Purposes only)
FS = Feasibility Study
(Primarily for Historical Purposes only)
ER = Expedited Response Action
CT = Community Relations Technical Assistance
TG = Community Relations Technical Assistance
LR = Long-Term Response

Grants
CR = Remedial Community Relations
RD = Remedial Design
FP = Forward Planning Activity
(for Historical Purposes only)
FM = Forward Planning/Management Assistance
RM = RAMP -- Remedial Action Master Plan
(for Historical Purposes only)
IM = Initial Remedial Measure
RA = Remedial Action
LA = Long-Term Response
PD = Public Comments on Deletion Package
EO = EDD
NA = NAA
RO = ROD

Other Events
EV = Evacuation State/local
TR = Temporary Relocation
TO = Topographical Mapping
TA = Technical Assistance
DA = Design Assistance
MA = Management Assistance
OM = Operations and Maintenance
OS = Oversight of State by Fund
ED = Endangerment Assessment
GS = Geophysical Support/Mapping
HA = Health Assessment
AS = Aerial Survey
OH = Other Event

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

NPL:

* *NPL/STATUS INDICATOR* -
"P" - Proposed for inclusion on the NPL.
"F" - Site qualified to receive CERCLA remedial funding.
"D" - Deleted from final NPL.
"R" - Removed from the proposed NPL and no longer considered for the final NPL.
"O" - Non-site indicator - not a valid site as defined in CERCLIS.
"S" - Has SCAP plan remedial activities.
"N" - Not currently nor formerly on proposed or final NPL.

NPL continued...

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

CORTESE:

* *SOURCE* - Identifies which agency reported the site for publication in the Hazardous Waste and Substances Sites List. Codes for each agency are identified on the original report page for the Hazardous Waste and Substances Sites List.

* *PROBLEM* - Identifies the cause/source of the contamination or the facility affected.

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.

ASPIS:

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

    * *SUPFD* - Site is listed on the California BEP or the Federal National Priorities List.

    * *UNR* - "Unresolved Sites" will be investigated by DHS to determine whether contamination exists on site.

    * *SSR* - Site screening required.

    * *PAL* - Preliminary assessment required - low priority.

    * *PAM* - Preliminary assessment required - medium priority.

    * *PAH* - Preliminary assessment required - high priority.

    * *SIRL* - Site inspection required - low priority.

    * *SIRM* - Site inspection required - medium priority.

    * *SIRH* - Site inspection required - high priority.

    * *RENF* - Site has been referred to a TSCP enforcement unit for follow-up.

    * *REF* - Are those sites which have been formerly referred to another agency.

ASPIS continued...

* *PDS* - "Pending Status" - site is currently undergoing investigation or mitigation activities by DHS, RWQCB, US EPA, or a local regulatory agency.

* *NFA* - "No Further Action" means that the preliminary assessment indicates that no hazardous substances/wastes were ever used/produced on site or that such materials were used/produced at low volumes that would have a minimal impact or that all contamination has been mitigated. These determinations were not made via sampling and were made as a result of file surveys and "windshield surveys".

* *RSM* - "Referred to Site Mitigation Sites" are those sites in which the site inspection shows on site contamination. Hazard Ranking Score is required and the site will be considered for the Bond Expenditure Plan.

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.

LUST continued...

* STATUS CODES

C Remedial action (cleanup) in progress.
F No funds available (no responsible party or responsible party has insufficient funds, and no public funds available).
I Site investigation in progress (defining extent of problem).
N No action taken by lead agency (i.e., new case or backlog).
P Post remedial action monitoring in progress.
R Remedial action alternative evaluation in progress.
S Signed off: remedial action completed or deemed unnecessary.
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.

* 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.

APPENDIX B

PREVIOUS WORK

PREVIOUS WORK

Waste-Oil Tank Removal

Previous work performed by Crosby and Oberton (C&O) and Erico Construction at the site included removal of a waste-oil tank and laboratory analyses of a soil sample from the bottom of the waste-oil tank pit on June 1, 1987, additional excavation and laboratory analyses of soil from the waste-oil tank pit on June 3, 1987, and June 10, 1987. Soil excavated from the waste-oil tank pit was transported to the Class I landfill in Casmalia, California on June 10, 1987, by Erico Construction and C&O.

Initial Subsurface Investigation

In December 1991, an initial subsurface investigation related to the former waste-oil tank was conducted (RESNA, December 1992). The investigation included drilling four onsite borings (B-1 through B-4) and installing three 4-inch diameter groundwater monitoring wells (MW-1 through MW-3) in borings B-1 through B-3 in the immediate vicinity of the former waste-oil tank.

Soil samples with the greatest concentrations of TPHg were taken from borings B-1 and B-2 and indicated concentrations of 470 and 740 ppm, respectively, at a depth of approximately 17 feet below ground surface within the sandy gravel unit. The greatest concentrations of TPH as diesel (TPHd) in soil were also detected in the same sample interval (17 feet below ground surface) in borings B-1 and B-2 at concentrations of 370 and 540 ppm, respectively; however, the laboratory reported that the samples' matrix contained high boiling point fuel mixtures which were calculated as diesel, but could also be weathered gasoline. See Table B-1, Cumulative Results of Soil Samples.

Analytical results of water samples indicated concentrations of 20,000 ppb TPHg and 3,200 ppb TPHd in well MW-3, 8,400 ppb TPHg and 230 ppb TPHd in well MW-2, and 790 ppb TPHg in well MW-1. The laboratory reported that the samples' matrix contained high boiling point fuel mixture which was calculated as diesel, but could also be weathered gasoline. See Table B-2, Cumulative Results of Water Samples.

During the Second Quarter 1992 Quarterly Groundwater Monitoring, 0.55 feet of floating product was detected in well MW-2.

The interpreted extent of hydrocarbon impacted soil detected during the subsurface investigation in the vicinity of the former waste-oil tank pit is graphically presented on the Geologic Cross Sections, Plate 2A. The locations of the geologic cross-sections are shown in horizonal view on Plate 1A, General Site Plan. Analytical results of soil and groundwater indicated concentrations of diesel. According to ARCO, diesel has never been stored at the site and the diesel detected in soil and groundwater may be whethered gasoline.

TABLE B-1
RESULTS OF LABORATORY ANALYSES OF SOIL SAMPLES
ARCO Station 6148
Oakland, California

Sample ID	TPHg	TPHd	B	T	E	X	TOG
S-17½-B1	470	370	2.3 [1.3]	5.1 [1.8]	5.1 [1.8]	24 [8.8]	<30
S-22½-B1	<1.0	<1.0	0.010	<0.0050	<0.0050	<0.0050	<30
S-26½-B1	2.0	<1.0	0.026	0.014	0.011	0.049	<30
S-12-B2	<1.0	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<30
S-17-B2	740	540	2.3 [4.3]	13 [92]	7.7 [57]	41 [360]	<30
S-25½-B2	<1.0	<1.0	0.015	0.016	<0.0050	0.019	<30
S-30½-B2	<1.0	<1.0	0.015	0.0080	<0.0050	<0.0050	<30
S-10½-B3	<1.0	<1.0	0.0070	<0.0050	<0.0050	<0.0050	<30
S-17½-B3	320	230	0.65	0.65	2.3	5.9	<30
S-26½-B3	<1.0	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<30
S-10½-B4	<1.0	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<30
S-15½-B4	<1.0	<1.0	0.010	<0.0050	<0.0050	<0.0050	<30
S-18½-B4	65	41	0.42 [0.46]	0.22 [0.24]	0.54 [1.7]	0.77 [3.2]	<30
S-20-B4	<1.0	<1.0	0.0070	<0.0050	<0.0050	<0.0050	<30
S-1220-SP-(A-D)	25	11	0.11	0.14	0.11	0.38	<30

All results shown in parts per million (ppm)
TPHg: Total petroleum hydrocarbons as gasoline by EPA method 5030/8015/8020.
TPHd: Total petroleum hydrocarbons as diesel by EPA method 3550/8015. Laboratory reported samples matrix contained high boiling point fuel mixture calculated as diesel, possibly weathered gasoline.
B: Benzene, T: Toluene, E: Ethylbenzene, T: Total Xylene isomers;
BTEX: Measured by EPA method 8030/8015/8020.
TOG: Total oil and grease by Standard Method 5520 E&F.
[ ]: BTEX detected using EPA Method 8240.
<: Results reported as less than the detection limit.

Sample Identification:

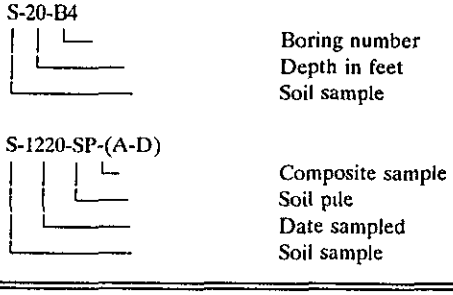
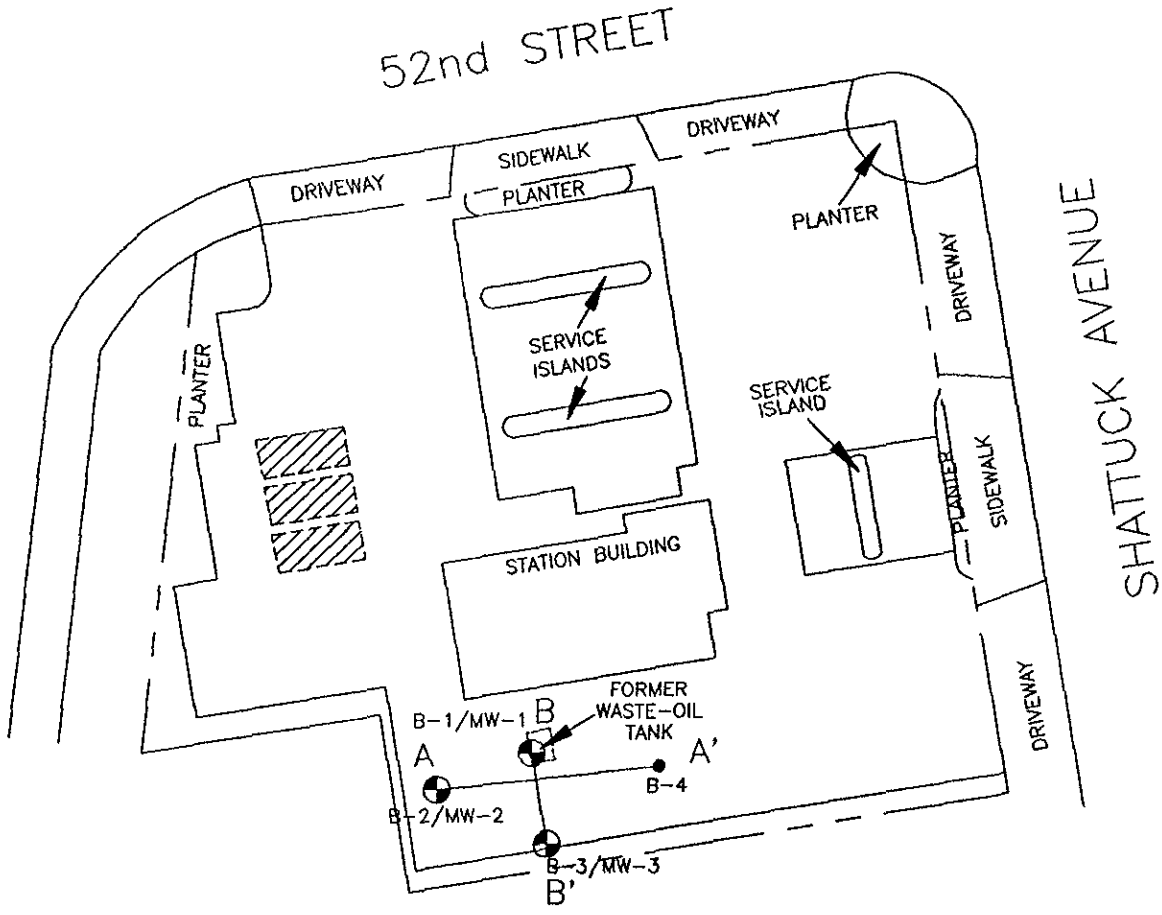


TABLE B-2
CUMULATIVE RESULTS OF LABORATORY ANALYSES OF WATER SAMPLES-
TPHg, TPHd, BTEX, TOG, and Metals
ARCO Station 6148
Oakland, California

WELL DATE	TPHg	TPHd	B	T	E	X	Cd	Cr	Pb	Ni	Zn	TOG
MW-1												
03/18/92	790	<50	310	26	12	44	<3	5	3	<20	31	<0.5 (1.4)
06-12-92	1,000	<50	290	15	10	30	NA	NA	NA	NA	NA	<0.5
09-14-92	1,000	<80*	370	6.5	6.5	17	NA	NA	NA	NA	NA	0.9
MW-2												
03/18/92	8,400	230**	1,400	1,000	220	870	<3	21	9	38	54	1.2 (3.0)
06/12/92	Not sampled--floating product											
09/14/92	Not Sampled--floating product											
MW-3												
03/18/92	20,000	2,800**	3,200	560	380	1,000	<3	67	27	113	156	7.8 (8.1)
06/12/92	46,000	1,600**	3,400	4,200	1,300	5,400	NA	NA	NA	NA	NA	16
09/14/92	53,000	40,000**	4,300	5,700	1,300	7,300	NA	NA	NA	NA	NA	5.5
MCL:	---	---	1	---	680	1,750	10	50	50	---	---	---
DWAL:	---	---	---	100	---	---	---	---	---	---	---	---

Results in parts per billion (ppb), except TOG which is in parts per million (ppm).
TPHg: Total petroleum hydrocarbons as gasoline by EPA method 5030/8015/8020.
TPHd: Total petroleum hydrocarbons as diesel by EPA method 3510/California DHS LUFT Method.
B: benzene, T: toluene, E: ethylbenzene, X: total xylenes isomers
BTEX: Analyzed by EPA method 5030/8020/DHS LUFT Method.
TOG: Total oil and grease by Standard method 5520C&F (on 09/14/92 by EPA Method 418.1)
( ): Concentrations in parentheses were results of Method 5520C.
*: Raised MRL due to insufficient sample quantity.
Metals: By EPA method 6010 and 7421.
<: Results reported below the laboratory detection limit.
**: Laboratory reported sample contains a lower boiling point hydrocarbon mixture quantified as diesel. The chromatogram does not match the typical diesel fingerprint, but appears to be weathered gasoline.
MCL: Adopted Maximum Contaminant Levels in Drinking Water (DHS, October 1990).
DWAL: Recommended Drinking Water Action Level (DHS, October 1990).



EXPLANATION

A —— A' = Geologic cross sections

B-3/MW-3 = Monitoring well (RESNA, December 1991)

B-4 = Soil boring (RESNA, December 1991)

= Underground storage tanks

N

Approximate Scale

40 20 0 40 80

feet

Source: Based on John Kock, Surveyor, 11/09/92.

RESNA
Working to Restore Nature

PROJECT 61035.05

GENERALIZED SITE PLAN
ARCO Station 6148
5131 Shattuck Avenue
Oakland, California

PLATE
1B

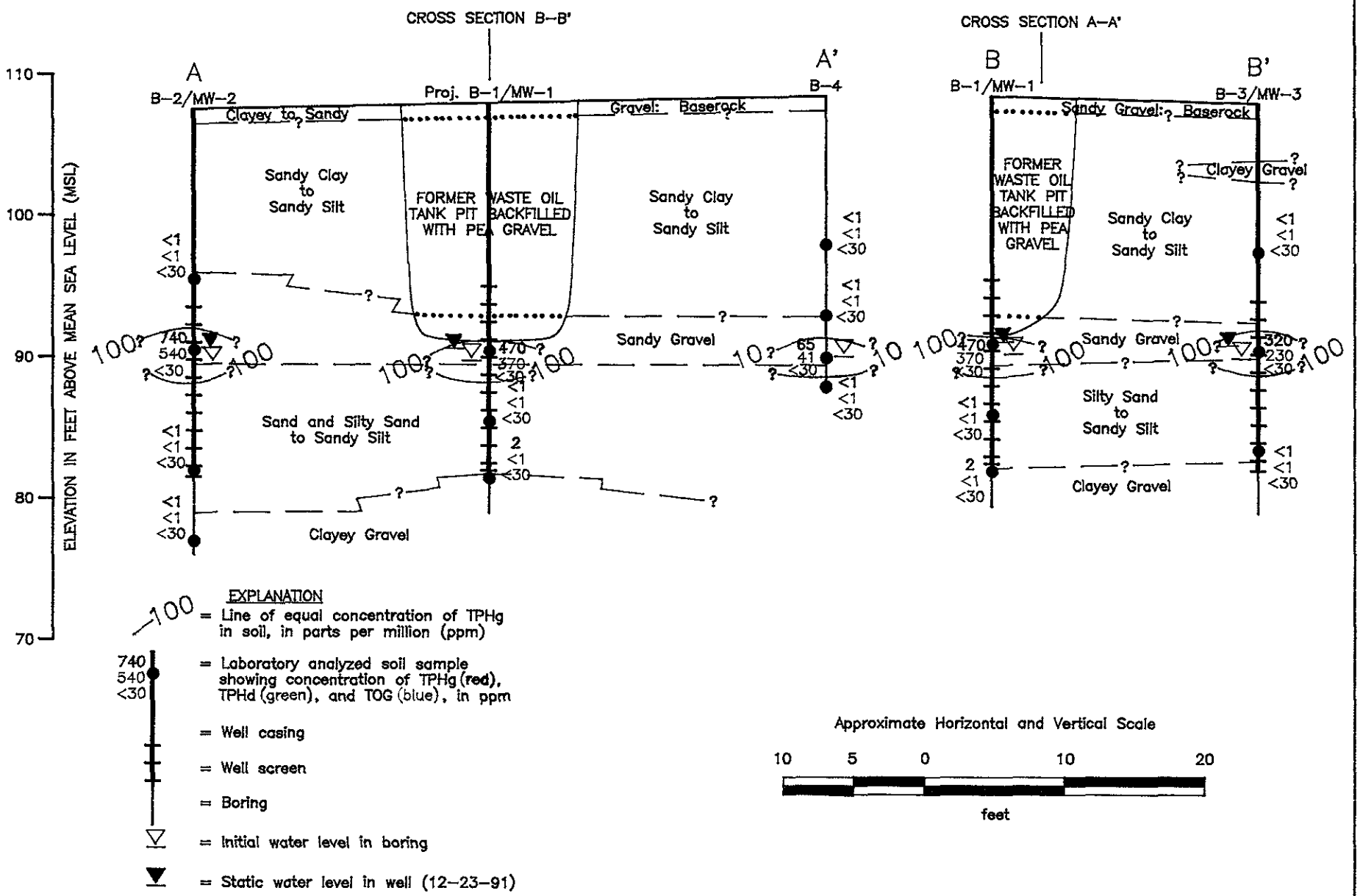


PLATE	GEOLOGIC CROSS SECTIONS A-A' AND B-B' ARCO Station 6148 5131 Shattuck Avenue Oakland, California	RESNA Working to Restore Nature
2B		PROJECT 61035.05

APPENDIX C

FIELD METHODS

FIELD METHODS

Site Safety Plan

The Site Safety Plan (RESNA, June 24, 1991) describes the safety requirements for the evaluation of gasoline hydrocarbons in soil and groundwater at the site. The site Safety Plan is applicable to personnel of RESNA and its subcontractors. RESNA personnel and subcontractors of RESNA scheduled to perform the work at the site were briefed on the contents of the Site Safety Plan before work began. A copy of the Site Safety Plan was available for reference by appropriate parties during the work. The Staff Geologist of RESNA was Site Safety Officer for the project.

Soil Borings

Prior to the drilling of borings and construction of monitoring wells, permits were acquired from the appropriate regulatory agency. Copies of the permits are included in Appendix A of this report. Prior to drilling, Underground Services Alert was notified of our intent to drill, and known underground utility lines and structures were marked. The borings were drilled by a truck-mounted drill rig equipped with 10 or 12-inch-diameter, hollow-stem augers. The augers were steam-cleaned prior to drilling each boring to minimize the possibility of cross-contamination. After the borings were drilled, monitoring wells were constructed in the borings, or the borings were backfilled to the ground surface with neat-cement grout and bentonite.

Borings for groundwater monitoring wells were drilled to a depth of no more than 20 feet below the depth at which a saturated zone was first encountered, or a short distance into a stratum beneath the saturated zone which was of moisture content and consistency to be judged as a perching layer by the field geologist, whichever was shallower.

Drill Cuttings

Drill cuttings subjectively evaluated for hydrocarbons at levels greater than 100 parts per million (ppm) were separated from those subjectively evaluated for hydrocarbons at levels less than 100 ppm. Evaluation was based either on subjective evidence of soil discoloration, or on measurements made using a field calibrated organic vapor meter (OVM). Readings were taken by placing a soil sample into a ziplock-type plastic bag and allowing volatilization to occur. The intake probe of the OVM was then inserted into the headspace created in the plastic bag immediately after opening it. The drill cuttings from the borings were placed

on plastic at the site, and covered with plastic. The cuttings were removed to a Sanitary Landfill by ARCO.

Soil Sampling in Borings

Soil samples were collected at no greater than 5-foot intervals from the ground surface to the total depth of the borings. The soil samples were collected by advancing the boring to a point immediately above the sampling depth, and then driving a California-modified, split-spoon sampler containing brass sleeves through the hollow center of the auger into the soil. The sampler and brass sleeves were laboratory-cleaned, steam-cleaned, or washed thoroughly with Alconox® and water, prior to each use. The sampler was driven with a standard 140-pound hammer repeatedly dropped 30 inches. The number of blows to drive the sampler each successive six inches was counted and recorded to evaluate the relative consistency of the soil.

The samples selected for laboratory analysis were removed from the sampler and quickly sealed in their brass sleeves with aluminum foil, plastic caps, and aluminized duct tape. The samples were then labeled, promptly placed in iced storage, and delivered to a laboratory certified by the State of California to perform the analyses requested.

One of the samples in brass sleeves not selected for laboratory analysis at each sampling interval was tested in the field using an OVM that was field calibrated at the beginning of each day it was used. This testing was performed by inserting the intake probe of the OVM into the headspace created in the plastic bag containing the soil sample as described in the Drill Cuttings section above. The OVM readings are presented in Logs of Borings included in the report.

Logging of Borings

A geologist was present to log the soil cuttings and samples using the Unified Soil Classification System. Samples not selected for chemical analysis, and the soil in the sampler shoe, were extruded in the field for inspection. Logs include texture, color, moisture, plasticity, consistency, blow counts, and any other characteristics noted. Logs also include subjective evidence for the presence of hydrocarbons, such as soil staining, noticeable or obvious product odor, and OVM readings.

Monitoring Well Construction

Monitoring wells were constructed in selected borings using clean 6- and 4-inch-diameter, thread-jointed, Schedule 40 PVC casing. No chemical cements, glues, or solvents were used in well construction. Each casing bottom was sealed with a threaded end-plug, and each casing top with a locking plug. The screened portions of the wells were constructed of machine-slotted PVC casing with 0.020-inch-wide slots for initial site wells. Slot size for subsequent wells will be based on sieve analysis and/or well development data. The screened sections in groundwater monitoring wells were placed to allow monitoring during seasonal fluctuations of groundwater levels.

The annular space of each well was backfilled with No. 2 by 12 sand, to approximately two feet above the top of the screened casing for initial site wells. The sand pack grain size for subsequent wells will be based on sieve analysis and/or well development data. A 1- to 2-foot-thick bentonite plug was placed above the sand as a seal against cement entering the filter pack. The remaining annulus was then backfilled with a slurry of water, neat cement, and bentonite to approximately one foot below the ground surface.

An aluminum utility box with a PVC apron was placed over each wellhead and set in concrete placed flush with the surrounding ground surface. Each wellhead cover has a seal to protect the monitoring well against surface-water infiltration and requires a special wrench to open. The design discourages vandalism and reduces the possibility of accidental disturbance of the well.

Groundwater Monitoring Well Development

The monitoring wells were developed by bailing or over-pumping and surge-block techniques. The wells were either bailed or pumped, allowed to recharge, and bailed or pumped again until the water removed from the wells was subjectively evaluated to be clear by the field geologist. The wells were allowed to equilibrate for at least 48 hours after development prior to sampling. Water generated by well development was stored in 17E Department of Transportation (DOT) 55-gallon drums on site and was removed in October 1991 by a state-licensed and ARCO contracted waste hauler under manifest. A copy of the manifest is included in Appendix F, Waste Manifest Forms.

Groundwater Sampling

The static water level in each well was measured to the nearest 0.01-foot using a Solinst® electric water-level sounder cleaned with Alconox® and water before use in each well. The

liquid in the onsite wells was examined for visual evidence of hydrocarbons by gently lowering approximately half the length of a Teflon® bailer (cleaned with Alconox® and water) past the air/water interface. The sample was then retrieved and inspected for floating product, sheen, emulsion, color, and clarity. The thickness of floating product detected was recorded to the nearest 0.1-inch.

Wells which did not contain floating product were purged using a submersible pump. The pump, cables, and hoses were cleaned with Alconox® and water prior to use in each well. The wells were purged until withdrawal was of sufficient volume to result in stabilized Ph, temperature, and electrical conductivity of the water, as measured using portable meters calibrated to standard water solutions. If a purged well became de-watered, the water level was allowed to recover to at least 80 percent of the initial water level. Prior to the collection of each groundwater sample, the Teflon® bailer was cleaned with Alconox® and rinsed with tap water and deionized water, and the latex gloves worn by the sampler changed. Hydrochloric acid was added to the sample vials as a preservative (as required for specific laboratory analysis). A sample-method blank was collected by pouring distilled water into the bailer and then into sample vials. A sample of the groundwater was then collected from the surface of the water in each of the wells using the Teflon® bailer. The water samples were then gently poured into laboratory-cleaned, 40-milliliter (ml) glass vials, 500 ml plastic bottles, or 1-liter glass bottles (as required for specific laboratory analysis) and sealed with Teflon®-lined caps, and inspected for air bubbles to check for headspace, which would allow volatilization to occur. The samples were then labeled and promptly placed in iced storage. A field log of well purging procedures and parameter monitoring was maintained. Water generated by the purging of wells was stored in 17E DOT 55-gallon drums onsite, and was removed and disposed by a state-certified and ARCO approved contractor.

Sample Labeling and Handling

Sample containers are labeled in the field with the job number, sample location and depth, and date, and promptly placed in iced storage for transport to the laboratory. A Chain of Custody Record is initiated by the field geologist and updated throughout handling of the samples, and accompanies the samples to a laboratory certified by the State of California for the analyses requested. Samples are transported to the laboratory promptly to help ensure that recommended sample holding times are not exceeded. Samples are properly disposed of after their useful life has expired.

APPENDIX D

WELL CONSTRUCTION PERMIT

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

(1) LOCATION OF PROJECT ARCO Station 6148
5131 Shattuck Avenue
Oakland, CA

(2) CLIENT
Name ARCO Products Company
Address P.O. Box 5811 Phone (415) 571-2435
City San Mateo Zip 94402

(3) APPLICANT
Name RESNA Industries INC.
Address 3315 Almaden Expy. Suite 34 Phone (408) 264-7723
City San Jose Zip 95118

(4) DESCRIPTION OF PROJECT
Water Well Construction X Geotechnical ___
Cathodic Protection ___ Well Destruction ___

(5) PROPOSED WATER WELL USE
Domestic ___ Industrial ___ Irrigation ___
Municipal ___ Monitoring X Other ___

(6) PROPOSED CONSTRUCTION
Drilling Method:
Mud Rotary ___ Air Rotary ___ Auger X (hollow-stem)
Cable ___ Other ___

WELL PROJECTS
Drill Hole Diameter 10 in. Depth(s) 30 ft.
Casing Diameter 4 in. Number
Surface Seal Depth 8 ft. of Wells 4
Driller's License No. C57-487288

GEOTECHNICAL PROJECTS
Number ___
Diameter ___ in. Maximum Depth ___ ft.

(7) ESTIMATED STARTING DATE 3 Nov 92
ESTIMATED COMPLETION DATE ___

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

APPLICANT'S SIGNATURE Robert D. Campbell for RESNA Date 10/1/92

FOR OFFICE USE

PERMIT NUMBER 92491
LOCATION NUMBER ___

Approved Wyman Hong Date 5 Oct 92
Wyman Hong

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. Notify this office (484-2600) at least one day prior to starting work on permitted work and before placing well seals.
3. 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 bore hole logs and location sketch for geotechnical projects. Permitted work is completed when the last surface seal is placed or the last boring is completed.
4. 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, or equivalent.
2. Minimum seal depth is 50 feet for municipal and industrial wells or 20 feet for domestic, irrigation, and monitoring wells unless a lesser depth is specially approved.

C. GEOTECHNICAL. Backfill bore hole with compacted cuttings or heavy bentonite and upper two feet with compacted material.

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

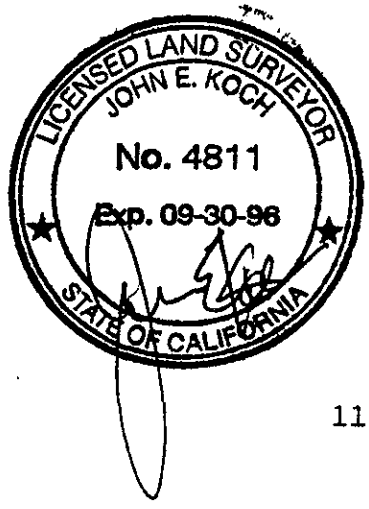
E. WELL DESTRUCTION. See attached.

91987

APPENDIX E

WELLHEAD SURVEY

JOHN E. KOCH
Land Surveyor
CA. State Lic. No. LS4811
5427 Telegraph Ave., Suite A
Oakland, CA 94609
(510)655-9956
FAX(510)655-9745



11/09/92

RESNA
3315 Almaden Expressway, Suite 34
San Jose CA 95118
(408) 264-7723
FAX(408) 264-2435

Tabulation of Elevations as of 11:00 a.m. 11/09/92

Job #92090
RESNA Project Job # 61035.05
Project Manager: Joel Coffman
Site: Arco Station 6148
5131 Shattuck Avenue
@ 52nd Street
Oakland, CA

BENCHMARK: #3172 Cut square in top of curb. Northeast end of island, triangle shaped,at east side of crosswalk at Telegraph Avenue and Claremont Avenue.
(Elev.116.271' City of Oakland Datum) *see note 1.

MONITOR WELL DATA TABLE

Well Designation	Elevation	Description
MW-1*	108.03	Top of P.V.C. Casing
	108.27	Top of Box
MW-2*	107.43	Top of P.V.C. Casing
	107.70	Top of Box
MW-3*	107.77	Top of P.V.C. Casing
	108.06	Top of Box
MW-4	106.58	Top of P.V.C. Casing
	107.18	Top of Box
MW-5	106.68	Top of P.V.C. Casing
	106.96	Top of Box

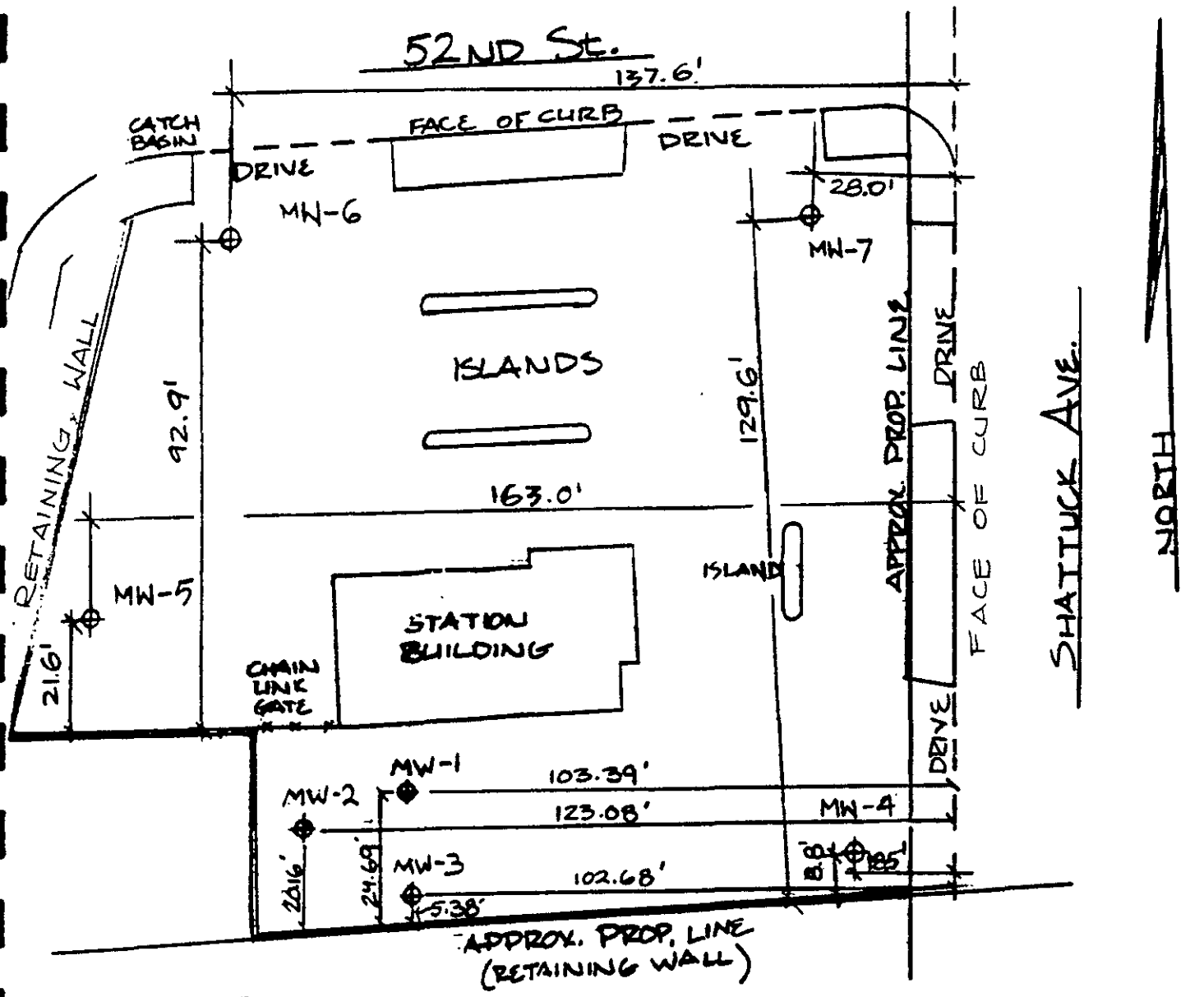
JOHN E. KOCH, P. L. S. RESNA PROJ.#61035.04 JEK JOB #92090

MW-6	105.16	Top of P.V.C. Casing
	105.77	Top of Box
MW-7	107.08	Top of P.V.C. Casing
	107.66	Top Box

* INDICATES WELLS SURVEYED ON 12/27/91 (JEK JOB #91084)

NOTES:

1. Datum is City of Oakland = (USGS) +3.00
2. Top of Casing Elevation (T.O.C.El.) is at set mark on rim of PVC.
3. Ground Elevation (Gd. El.) is at set mark on top of box.
4. MW-2 was checked and found to be within 0.01' of previous report of 12/27/91.



ELEVATIONS

WELL	T.O.C	T.O.B.
MW-1	108.03	108.27
MW-2	107.43	107.70
MW-3	107.77	108.06
MW-4	106.58	107.18
MW-5	106.68	106.96
MW-6	105.16	105.77
MW-7	107.08	107.66

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

MAP SHOWING LOCATION OF NEW WELLS MW-4 THROUGH MW-7

JEK JOB # 92090
CLIENT RESNA/SAN JOSE
SITE: ARCO STATION 6148
5131 SHATTUCK AVE.
@ 52ND ST.
OAKLAND, CA
RESNA PROJ# 61035.04

JOHN E. KOCH
Land Surveyor
CA State Lic. No. LS4811
5427 Telegraph Ave., Suite A
Oakland, CA 94609
(510) 655-9956
FAX (510) 655-9745

APPENDIX F

WASTE MANIFEST FORMS

Dillard Trucking, Inc.

ENVIRONMENTAL SERVICES
P.O. BOX 218 · BYRON, CALIFORNIA 94514
(510) 634-6850 FAX (510) 634-0569

December 10, 1992

RESNA
3315 Almaden Expressway #34
San Jose, CA 94118

Fax# (408)264-2435

Attn: Rob Campbell

Re: Arco Station #6148 - 5131 Shattuck Ave., Oakland - 4 yds drill cuttings

Dear Rob:

Please be advised that the drill cuttings from the above referenced site have been removed. They were taken to BFI Landfill, Livermore on December 1, 1992.

I trust that you will find everything in order. If you have any questions, please do not hesitate to call.

Sincerely,

DILLARD TRUCKING, INC.

Donna L. Pedersen
Estimator

DLP/st

cc: file

APPENDIX G

LABORATORY ANALYSES REPORTS
CHAIN OF CUSTODY RECORDS

SEQUOIA ANALYTICAL

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

RECEIVED
NOV 1 1992
RESNA
SAN JOSE

RESNA
3315 Almaden Expwy., Suite 34
San Jose, CA 95118
Attention: Joel Coffman

Project: ARCO 6148, Oakland

Enclosed are the results from 16 soil samples received at Sequoia Analytical on October 29,1992. The requested analyses are listed below:

SAMPLE #	SAMPLE DESCRIPTION	DATE OF COLLECTION	TEST METHOD
2104764	Soil, S-9.5-B5	10/27/92	EPA 5030/8015/8020
2104765	Soil, S-14.5-B5	10/27/92	EPA 5030/8015/8020
2104766	Soil, S-31.5-B5	10/27/92	EPA 5030/8015/8020
2104767	Soil, S-9.5-B8	10/27/92	EPA 5030/8015/8020
2104768	Soil, S-14.5-B8	10/27/92	EPA 5030/8015/8020
2104769	Soil, S-33.5-B8	10/27/92	EPA 5030/8015/8020
2104770	Soil, S-9.5-B6	10/28/92	EPA 5030/8015/8020
2104771	Soil, S-16.5-B6	10/28/92	EPA 5030/8015/8020
2104772	Soil, S-17.5-B6	10/28/92	Particle Size Distrubition by Weight
2104773	Soil, S-19.5-B6	10/28/92	Particle Size Distrubition by Weight
2104774	Soil, S-21-B6	10/28/92	Particle Size Distrubition by Weight
2104775	Soil, S-25-B6	10/28/92	Particle Size Distrubition by Weight
2104776	Soil, S-27.5-B6	10/28/92	EPA 5030/8015/8020
2104777	Soil, S-10-B7	10/28/92	EPA 5030/8015/8020
2104778	Soil, S-15-B7	10/28/92	EPA 5030/8015/8020
2104779	Soil, S-29.5-B7	10/28/92	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

Maria Lee

Maria Lee
Project Manager

SEQUOIA ANALYTICAL

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

RESNA	Client Project ID:	ARCO 6148, Oakland	Sampled:	Oct 27, 1992
3315 Almaden Expwy., Suite 34	Sample Matrix:	Soil	Received:	Oct 29, 1992
San Jose, CA 95118	Analysis Method:	EPA 5030/8015/8020	Reported:	Nov 11, 1992
Attention: Joel Coffman	First Sample #:	210-4764		

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit mg/kg	Sample I.D. 210-4764 S-9.5-B5	Sample I.D. 210-4765 S-14.5-B5	Sample I.D. 210-4766 S-31.5-B5	Sample I.D. 210-4767 S-9.5-B8	Sample I.D. 210-4768 S-14.5-B8	Sample I.D. 210-4769 S-33.5-B8
Purgeable Hydrocarbons	1.0	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Benzene	0.0050	N.D.	0.13	N.D.	N.D.	N.D.	N.D.
Toluene	0.0050	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Ethyl Benzene	0.0050	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Total Xylenes	0.0050	N.D.	0.0050	N.D.	N.D.	N.D.	N.D.
Chromatogram Pattern:		--	--	--	--	--	--

Quality Control Data

Report Limit Multiplication Factor:	1.0	1.0	1.0	1.0	1.0	1.0
Date Analyzed:	11/2/92	11/2/92	11/2/92	11/2/92	11/2/92	11/2/92
Instrument Identification:	GCHP-7	GCHP-7	GCHP-7	GCHP-7	GCHP-7	GCHP-6
Surrogate Recovery, %: (QC Limits = 70-130%)	99	100	98	90	90	100

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

SEQUOIA ANALYTICAL

Maria Lee
Project Manager

SEQUOIA ANALYTICAL

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

RESNA	Client Project ID:	ARCO 6148, Oakland	Sampled:	Oct 28, 1992
3315 Almaden Expwy., Suite 34	Sample Matrix:	Soil	Received:	Oct 29, 1992
San Jose, CA 95118	Analysis Method:	EPA 5030/8015/8020	Reported:	Nov 11, 1992
Attention: Joel Coffman	First Sample #:	210-4770		

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit mg/kg	Sample I.D. 210-4770 S-9.5-B6	Sample I.D. 210-4771 S-16.5-B6	Sample I.D. 210-4776 S-27.5-B6	Sample I.D. 210-4777 S-10-B7	Sample I.D. 210-4778 S-15-B7	Sample I.D. 210-4779 S-29.5-B7
Purgeable Hydrocarbons	1.0	N.D.	190	N.D.	N.D.	N.D.	N.D.
Benzene	0.0050	N.D.	0.24	N.D.	N.D.	N.D.	N.D.
Toluene	0.0050	N.D.	0.55	N.D.	N.D.	N.D.	N.D.
Ethyl Benzene	0.0050	N.D.	1.0	N.D.	N.D.	N.D.	N.D.
Total Xylenes	0.0050	N.D.	1.3	N.D.	N.D.	N.D.	0.025
Chromatogram Pattern:		--	Gas & Non-Gas Mix C4 - C12	--	--	--	--

Quality Control Data

Report Limit Multiplication Factor:	1.0	5.0	1.0	1.0	1.0	1.0
Date Analyzed:	11/2/92	11/2/92	11/2/92	11/2/92	11/2/92	11/2/92
Instrument Identification:	GCHP-7	GCHP-7	GCHP-7	GCHP-7	GCHP-1	GCHP-6
Surrogate Recovery, %: (QC Limits = 70-130%)	90	122	86	87	72	107

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

SEQUOIA ANALYTICAL

Maria Lee
Project Manager

SEQUOIA ANALYTICAL

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

RESNA	Client Project ID:	ARCO 6148, Oakland	Sampled:	Oct 28, 1992
3315 Almaden Expwy., Suite 34	Sample Descript:	Soil, S-17.5-B6	Received:	Oct 29, 1992
San Jose, CA 95118			Analyzed:	Nov 10, 1992
Attention: Joel Coffman	Lab Number:	210-4772	Reported:	Nov 11, 1992

PARTICLE SIZE DISTRIBUTION BY WEIGHT

Seive # Tyler Sieve Units	Weight grams	Percent Distribution
5	66.5	38.4
6	8.0	4.6
7	7.4	4.2
9	13.7	7.9
10	7.4	4.3
12	6.7	3.9
16	11.7	6.5
24	10.3	6.0
28	5.9	3.4
32	5.2	3.0
42	7.4	4.3
48	3.6	2.1
80	7.0	4.0
120	4.3	2.5
200	3.9	2.3
Pan	4.3	2.5

SEQUOIA ANALYTICAL

Maria Lee
Project Manager

2104764.RES <3>

SEQUOIA ANALYTICAL

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

RESNA	Client Project ID:	ARCO 6148, Oakland	Sampled:	Oct 28, 1992
3315 Almaden Expwy., Suite 34	Sample Descript:	Soil, S-19.5-B6	Received:	Oct 29, 1992
San Jose, CA 95118			Analyzed:	Nov 10, 1992
Attention: Joel Coffman	Lab Number:	210-4773	Reported:	Nov 11, 1992

PARTICLE SIZE DISTRIBUTION BY WEIGHT

Seive # Tyler Sieve Units	Weight grams	Percent Distribution
5	33.6	24
6	5.0	3.6
7	5.6	4.0
9	9.6	6.8
10	6.3	4.5
12	5.8	4.1
16	10.9	7.9
24	9.1	6.5
28	6.1	4.3
32	4.0	2.8
42	7.7	5.5
48	5.1	3.6
80	13.0	9.2
120	6.0	4.5
200	6.0	4.3
Pan	6.8	4.8

SEQUOIA ANALYTICAL

Maria Lee
Project Manager

SEQUOIA ANALYTICAL

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

RESNA	Client Project ID:	ARCO 6148, Oakland	Sampled:	Oct 28, 1992
3315 Almaden Expwy., Suite 34	Sample Descript:	Soil, S-21-B6	Received:	Oct 29, 1992
San Jose, CA 95118			Analyzed:	Nov 10, 1992
Attention: Joel Coffman	Lab Number:	210-4774	Reported:	Nov 11, 1992

PARTICLE SIZE DISTRIBUTION BY WEIGHT

Seive # Tyler Sieve Units	Weight grams	Percent Distribution
5	0.92	0.61
6	1.3	0.87
7	9.6	1.7
9	9.2	6.1
10	6.7	4.5
12	7.8	5.2
16	13.9	9.2
24	11.0	7.3
28	5.6	3.7
32	3.9	2.6
42	5.6	3.8
48	4.2	2.8
80	10.9	7.3
120	17.5	11.7
200	24.0	16.0
Pan	25.0	16.7

SEQUOIA ANALYTICAL

Maria Lee
Project Manager

SEQUOIA ANALYTICAL

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

RESNA	Client Project ID:	ARCO 6148, Oakland	Sampled:	Oct 28, 1992
3315 Almaden Expwy., Suite 34	Sample Descript:	Soil, S-25-B6	Received:	Oct 29, 1992
San Jose, CA 95118			Analyzed:	Nov 10, 1992
Attention: Joel Coffman	Lab Number:	210-4775	Reported:	Nov 11, 1992

PARTICLE SIZE DISTRIBUTION BY WEIGHT

Seive # Tyler Sieve Units	Weight grams	Percent Distribution
5	4.7	3.3
6	2.4	1.7
7	2.3	1.6
9	9.4	6.7
10	8.2	5.9
12	8.8	6.2
16	16.7	11.8
24	16.8	11.8
28	4.4	3.1
32	4.3	3.0
42	9.4	6.6
48	3.7	2.6
80	12.4	8.7
120	7.9	5.5
200	12.7	9.0
Pan	17.8	12.6

SEQUOIA ANALYTICAL

Maria Lee
Project Manager

SEQUOIA ANALYTICAL

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

RESNA
3315 Almaden Expwy., Suite 34
San Jose, CA 95118
Attention: Joel Coffman

Client Project ID: ARCO 6148, Oakland

QC Sample Group: 2104764-71, 76-9

Reported: Nov 11, 1992

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl-benzene	Xylenes
Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Analyst:	R. Lee	R. Lee	R. Lee	R. Lee
Reporting Units:	mg/kg	mg/kg	mg/kg	mg/kg
Date Analyzed:	Nov 2, 1992	Nov 2, 1992	Nov 2, 1992	Nov 2, 1992
QC Sample #:	GBLK110292	GBLK110292	GBLK110292	GBLK110292
Sample Conc.:	N.D.	N.D.	N.D.	N.D.
Spike Conc. Added:	0.20	0.20	0.20	0.60
Conc. Matrix Spike:	0.22	0.22	0.22	0.66
Matrix Spike % Recovery:	110	110	110	110
Conc. Matrix Spike Dup.:	0.23	0.23	0.22	0.67
Matrix Spike Duplicate % Recovery:	115	115	110	112
Relative % Difference:	4.4	4.4	0.0	1.5

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

SEQUOIA ANALYTICAL

Maria Lee
Project Manager

% Recovery:	Conc. of M.S. - Conc. of Sample / Spike Conc. Added	x 100
Relative % Difference:	Conc. of M.S. - Conc. of M.S.D. / (Conc. of M.S. + Conc. of M.S.D.) / 2	x 100

SEQUOIA ANALYTICAL

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

RESNA
3315 Almaden Expwy., Suite 34
San Jose, CA 95118
Attention: Joel Coffman

Client Project ID: ARCO 6148, Oakland

QC Sample Group: 2104764-71, 76-9

Reported: Nov 11, 1992

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl-benzene	Xylenes
Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Analyst:	B. Ali	B. Ali	B. Ali	B. Ali
Reporting Units:	mg/kg	mg/kg	mg/kg	mg/kg
Date Analyzed:	Nov 2, 1992	Nov 2, 1992	Nov 2, 1992	Nov 2, 1992
QC Sample #:	GBLK110292	GBLK110292	GBLK110292	GBLK110292
	MS/MSD	MS/MSD	MS/MSD	MS/MSD
Sample Conc.:	N.D.	N.D.	N.D.	N.D.
Spike Conc. Added:	0.20	0.20	0.20	0.60
Conc. Matrix Spike:	0.19	0.18	0.19	0.55
Matrix Spike % Recovery:	95	90	95	92
Conc. Matrix Spike Dup.:	0.20	0.19	0.20	0.58
Matrix Spike Duplicate % Recovery:	100	95	100	97
Relative % Difference:	5.1	5.4	5.1	5.3

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

SEQUOIA ANALYTICAL

Maria Lee
Project Manager

$$\%\ \text{Recovery:} = \frac{\text{Conc. of M.S.} - \text{Conc. of Sample}}{\text{Spike Conc. Added}} \times 100$$

$$\text{Relative \% Difference:} = \frac{\text{Conc. of M.S.} - \text{Conc. of M.S.D.}}{(\text{Conc. of M.S.} + \text{Conc. of M.S.D.}) / 2} \times 100$$

SEQUOIA ANALYTICAL

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

RESNA
3315 Almaden Expwy., Suite 34
San Jose, CA 95118
Attention: Joel Coffman

Client Project ID: ARCO 6148, Oakland

QC Sample Group: 2104764-71, 76-9

Reported: Nov 11, 1992

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
Reporting Units:	mg/kg	mg/kg	mg/kg	mg/kg
Date Analyzed:	Nov 2, 1992	Nov 2, 1992	Nov 2, 1992	Nov 2, 1992
QC Sample #:	GBLK110292	GBLK110292	GBLK110292	GBLK110292
	MS/MSD	MS/MSD	MS/MSD	MS/MSD
Sample Conc.:	N.D.	N.D.	N.D.	N.D.
Spike Conc. Added:	0.20	0.20	0.20	0.60
Conc. Matrix Spike:	0.17	0.17	0.17	0.50
Matrix Spike % Recovery:	85	85	85	83
Conc. Matrix Spike Dup.:	0.18	0.18	0.18	0.51
Matrix Spike Duplicate % Recovery:	90	90	90	85
Relative % Difference:	5.7	5.7	5.7	2.0

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

SEQUOIA ANALYTICAL

Maria Lee
Project Manager

% Recovery:	Conc. of M.S. - Conc. of Sample / Spike Conc. Added	x 100
Relative % Difference:	Conc. of M.S. - Conc. of M.S.D. / (Conc. of M.S. + Conc. of M.S.D.) / 2	x 100

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. 6148 - 92 - 25

Chain of Custody

ARCO Facility no. 6148	City (Facility) Oakland	Project manager (Consultant) Joel Coffman	Laboratory name Sequoia
ARCO engineer Michael Whelan	Telephone no. (ARCO) (415) 541-2435	Telephone no. (Consultant) (408) 264-7723	Fax no. (Consultant) (408) 264-2435
Consultant name RESNA Industries Inc.	Address (Consultant) 3315 Almaden Expressway Suite 34 San Jose, CA 95118		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 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 ☐	TPH
S-5-B5		1	X			X		10/27/92													X
S-9.5-B5		1	X			X					X			210476 4							
VOA B5		1	X			X															X
S-14.5-B5		1	X			X					X			210 4765							
S-20-B5		1	X			X															X
S-25-B5		1	X			X															X
S-30-B5		1	X			X															X
S-31.5-B5		1	X			X					X			210 4766							
S-4.5-B8		1	X			X															X
S-9.5-B8		1	X			X					X			210 4767							
S-14-B8		1	X			X															X
S-14.5-B8		1	X			X					X			210 4768							
S-19.5-B8		1	X			X															X
S-20-B8		1	X			X															X
S-25-B8		1	X			X															X
S-28-B8		1	X			X															X

Special detection Limit/reporting

Special QA/QC

Remarks

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: Kathryn Campbell	Date/Time 10/29/92 1435	Received by: Frank V Ellen	10-29-92 14:35
Relinquished by: Frank V Ellen	Date/Time 10-29-92 3:30	Received by:	
Relinquished by:	Date/Time	Received by laboratory: Jim Griffin	Date 10-29-92 Time 3:30pm

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

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. 6148-92-25

Chain of Custody

ARCO Facility no. 6148	City (Facility) Oakland	Project manager (Consultant) Joel Coffman	Laboratory name Sequoia
ARCO engineer Michael Whelan	Telephone no. (ARCO) (415) 571-2435	Telephone no. (Consultant) (408) 264-7723	Fax no. (Consultant) (408) 264-2435
Consultant name RESNA Industries Inc.	Address (Consultant) 3315 Almaden Expressway Suite 34 San Jose, CA 95118		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 EPA M602/8020 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 ☐	TPH	Seive
S-30-B8		1	X			X		10/27/92													X	
S-33.5-B8		1	X			X		10/27/92			X			2104769								
S-4.5-B6		1	X			X		10/28/92						-78							X	
S-9.5-B6		1	X			X					X				70							
S-14.5-B6		1	X			X								-70 1165							X	
S-16-B6		1	X			X															X	
S-16.5-B6		1	X			X					X											
S-17.5-B6		1	X			X									71							X
S-18-B6		1	X			X								-70 1768							X	
S-18.5-B6		1	X			X															X	
S-19-B6		1	X			X								2104767							X	
S-19.5-B6		1	X			X																X
S-20-B6		1	X			X								2104768							X	
S-20.5-B6		1	X			X															X	
S-21-B6		1	X			X									74							X
S-22-B6		1	X			X															X	

Condition of sample:

Temperature received:

Relinquished by sampler	Date 10/29/92	Time 14:35	Received by Mark McEllen
Relinquished by Mark McEllen	Date 10-29-92	Time 3:30	Received by
Relinquished by	Date	Time	Received by laboratory Jim Smith

Date 10-29-92 Time 3:39pm

Turnaround time

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

Special detection Limit/reporting

Special QA/QC

Remarks

Lab number

Method of shipment

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

APPC-3292 (2-91)

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. 6148-92-25

Chain of Custody

ARCO Facility no. 6148	City (Facility) Oakland	Project manager (Consultant) Joel Coffman	Laboratory name Sequoia
ARCO engineer Michael Whelan	Telephone no. (ARCO) (415) 571-2435	Telephone no. (Consultant) (408) 764-7773	Fax no. (Consultant) (408) 764-2435
Consultant name RESNA Industries Inc.	Address (Consultant) 3315 Almaden Expressway Suite 34 San Jose, CA 95118		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 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 ☐	Hold	Save
S-22.5-B6	1	X			X		10/28/92														X	
S-23.5-B6	1	X			X																X	
S-24-B6	1	X			X									2124169							X	
S-25-B6	1	X			X										21047		75					X
S-25.5-B6	1	X			X											70					X	
S-26-B6	1	X			X																X	
S-27.5-B6	1	X			X						X				210 47		76					
S-4.5-B7	1	X			X											11					X	
S-10-B7	1	X			X						X					12	7677					
S-15-B7	1	X			X						X						7778					
S-19-B7	1	X			X																X	
S-25-B7	1	X			X																X	
S-29.5-B7	1	X			X						X					13	79					
S-28-B7	1	X			X			10/29/92														hold
																14						

Special detection Limit/reporting

Special QA/QC

Remarks

Lab number

Turnaround time

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

Method of shipment

Condition of sample:		Temperature received:	
Relinquished by sampler	Date 10/28/92 Time 1435	Received by	10-29-92 14:35
Relinquished by	Date 10-29-92 Time 3:30	Received by	
Relinquished by	Date	Time	Received by laboratory: Date 10-29-92 Time 3:30pm

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

RESNA
3315 Almaden Expwy., Suite 34
San Jose, CA 95118
Attention: Joel Coffman

Project: ARCO 6148, Oakland

Enclosed are the results from 1 soil sample received at Sequoia Analytical on October 29,1992. The requested analyses are listed below:

SAMPLE #	SAMPLE DESCRIPTION	DATE OF COLLECTION	TEST METHOD
2104586	Soil, CSS-A-D	10/28/92	EPA 5030/8015/8020 EPA 5030/8015/8020-TCLP Extract STLC Lead Corrosivity, Ignitability and Reactivity

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

Maria Lee

Maria Lee
Project Manager

SEQUOIA ANALYTICAL

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

RESNA	Client Project ID:	ARCO 6148, Oakland	Sampled:	Oct 28, 1992
3315 Almaden Expwy., Suite 34	Sample Matrix:	Soil	Received:	Oct 29, 1992
San Jose, CA 95118	Analysis Method:	EPA 5030/8015/8020	Reported:	Nov 2, 1992
Attention: Joel Coffman	First Sample #:	210-4586		

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit mg/kg	Sample I.D. 210-4586 CSS-A-D
Purgeable Hydrocarbons	1.0	N.D.
Benzene	0.0050	N.D.
Toluene	0.0050	N.D.
Ethyl Benzene	0.0050	N.D.
Total Xylenes	0.0050	N.D.
Chromatogram Pattern:		--

Quality Control Data

Report Limit Multiplication Factor:	1.0
Date Analyzed:	10/29/92
Instrument Identification:	GCHP-7
Surrogate Recovery, %: (QC Limits = 70-130%)	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

Maria Lee
Project Manager

SEQUOIA ANALYTICAL

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

RESNA	Client Project ID:	ARCO 6148, Oakland	Sampled:	Oct 28, 1992
3315 Almaden Expwy., Suite 34	Sample Matrix:	TCLP Extract of Soil	Received:	Oct 29, 1992
San Jose, CA 95118	Analysis Method:	EPA 5030/8015/8020	Reported:	Nov 2, 1992
Attention: Joel Coffman	First Sample #:	210-4586		

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit µg/L	Sample I.D. 210-4586 CSS-A-D
Purgeable Hydrocarbons	50	N.D.
Benzene	0.50	N.D.
Toluene	0.50	N.D.
Ethyl Benzene	0.50	N.D.
Total Xylenes	0.50	N.D.
Chromatogram Pattern:		--

Quality Control Data

Report Limit Multiplication Factor:	20
Date Analyzed:	11/2/92
Instrument Identification:	GCHP-2
Surrogate Recovery, %: (QC Limits = 70-130%)	109

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

SEQUOIA ANALYTICAL

Maria Lee
Project Manager

SEQUOIA ANALYTICAL

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

RESNA	Client Project ID:	ARCO 6148, Oakland	Sampled:	Oct 28, 1992
3315 Almaden Expwy., Suite 34	Sample Descript:	Soil, CSS-A-D	Received:	Oct 29, 1992
San Jose, CA 95118			Analyzed:	see below
Attention: Joel Coffman	Lab Number:	210-4586	Reported:	Nov 2, 1992

LABORATORY ANALYSIS by STLC

Analyte	Date Analyzed	Detection Limit mg/L	Sample Result mg/L
Lead	11/2/92	0.0050	0.079

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

SEQUOIA ANALYTICAL

Maria Lee
Project Manager

SEQUOIA ANALYTICAL

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

RESNA	Client Project ID:	ARCO 6148, Oakland	Sampled:	Oct 28, 1992
3315 Almaden Expwy., Suite 34	Sample Descript:	Soil, CSS-A-D	Received:	Oct 29, 1992
San Jose, CA 95118			Analyzed:	Oct 30, 1992
Attention: Joel Coffman	Lab Number:	210-4586	Reported:	Nov 2, 1992

CORROSIVITY, IGNITABILITY, AND REACTIVITY

Analyte	Detection Limit	Sample Results
Corrosivity:		
pH	N.A.	7.3
Ignitability:		
Flashpoint (Pensky-Martens), °C	N.A.	> 100 °C
Reactivity:		
Sulfide, mg/kg	10	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

Maria Lee
Project Manager

SEQUOIA ANALYTICAL

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

RESNA
3315 Almaden Expwy., Suite 34
San Jose, CA 95118
Attention: Joel Coffman

Client Project ID: ARCO 6148, Oakland

QC Sample Group: 210-4586

Reported: Nov 2, 1992

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl-benzene	Xylenes
Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Analyst:	B. Ali	B. Ali	B. Ali	B. Ali
Reporting Units:	mg/kg	mg/kg	mg/kg	mg/kg
Date Analyzed:	Oct 29, 1992	Oct 29, 1992	Oct 29, 1992	Oct 29, 1992
QC Sample #:	GBLK102992	GBLK102992	GBLK102992	GBLK102992
Sample Conc.:	N.D.	N.D.	N.D.	N.D.
Spike Conc. Added:	0.20	0.20	0.20	0.60
Conc. Matrix Spike:	0.21	0.21	0.21	0.62
Matrix Spike % Recovery:	105	105	105	103
Conc. Matrix Spike Dup.:	0.21	0.21	0.22	0.63
Matrix Spike Duplicate % Recovery:	105	105	110	105
Relative % Difference:	0.0	0.0	4.7	1.6

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

SEQUOIA ANALYTICAL

Maria Lee
Project Manager

% Recovery:	Conc. of M.S. - Conc. of Sample / Spike Conc. Added	x 100
Relative % Difference:	Conc. of M.S. - Conc. of M.S.D. / (Conc. of M.S. + Conc. of M.S.D.) / 2	x 100

SEQUOIA ANALYTICAL

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

RESNA
3315 Almaden Expwy., Suite 34
San Jose, CA 95118
Attention: Joel Coffman

Client Project ID: ARCO 6148, Oakland

QC Sample Group: 210-4586

Reported: Nov 2, 1992

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
Reporting Units:	µg/L	µg/L	µg/L	µg/L
Date Analyzed:	Oct 2, 1992	Oct 2, 1992	Oct 2, 1992	Oct 2, 1992
QC Sample #:	GBLk110292 MS/MSD	GBLk110292 MS/MSD	GBLk110292 MS/MSD	GBLk110292 MS/MSD
Sample Conc.:	N.D.	N.D.	N.D.	N.D.
Spike Conc. Added:	10	10	10	30
Conc. Matrix Spike:	9.7	9.7	9.7	29
Matrix Spike % Recovery:	97	97	97	97
Conc. Matrix Spike Dup.:	9.5	9.5	9.4	29
Matrix Spike Duplicate % Recovery:	95	95	94	97
Relative % Difference:	2.1	2.1	3.1	0.0

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

SEQUOIA ANALYTICAL

Maria Lee
Project Manager

% Recovery:	Conc. of M.S. - Conc. of Sample / Spike Conc. Added	x 100
Relative % Difference:	Conc. of M.S. - Conc. of M.S.D. / (Conc. of M.S. + Conc. of M.S.D.) / 2	x 100

SEQUOIA ANALYTICAL

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

RESNA
3315 Almaden Expwy., Suite 34
San Jose, CA 95118
Attention: Joel Coffman

Client Project ID: ARCO 6148, Oakland

QC Sample Group: 210-4586

Reported: Nov 2, 1992

QUALITY CONTROL DATA REPORT

ANALYTE	Lead STLC	pH	Flashpoint	Reactive Sulfide	Cyanide
Method:	EPA 7421	EPA 9045	EPA 1010	EPA 9030	EPA 9010
Analyst:	S. Chin	Y. Arteaga	K. Follett	K. Follett	N. Zahedi
Reporting Units:	mg/L	N.A.	°C	mg/kg	mg/kg
Date Analyzed:	Nov 2, 1992	Oct 30, 1992	Oct 28, 1992	Oct 26, 1992	Oct 27, 1992
QC Sample #:	210-4390	210-4334	210-3713	209-4408	210-3565
Sample Conc.:	0.12	8.5	>100	N.D.	1.1
Spike Conc. Added:	0.50	N.A.	N.A.	1300	2.9
Conc. Matrix Spike:	0.56	N.A.	N.A.	1500	3.9
Matrix Spike % Recovery:	88	N.A.	N.A.	115	97
Conc. Matrix Spike Dup.:	0.54	8.5	>100	1300	4.2
Matrix Spike Duplicate % Recovery:	84	N.A.	N.A.	106	107
Relative % Difference:	3.6	0.0	0.0	14	7.4

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

SEQUOIA ANALYTICAL

Maria Lee
Project Manager

% Recovery:	Conc. of M.S. - Conc. of Sample / Spike Conc. Added	x 100
Relative % Difference:	Conc. of M.S. - Conc. of M.S.D. / (Conc. of M.S. + Conc. of M.S.D.) / 2	x 100

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. 6148-92-25

Chain of Custody

ARCO Facility no. 6148	City (Facility) Oakland	Project manager (Consultant) Joel Coffman	Laboratory name Sequoia
ARCO engineer Michael Whelan	Telephone no. (ARCO) (415) 571-2435	Telephone no. (Consultant) (408) 264-7723	Fax no. (Consultant) (408) 264-2435
Consultant name TRESNA Industries Inc	Address (Consultant) 3315 Almaden Exp. Suite 34 San Jose, CA 95118		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 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 Metals ☐ VOA ☐ VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐	RCI
CSS-A-D	1	1	X			X		10/23/92				X						X	X		X

BTEX

Special detection Limit/reporting

Special QA/QC

Remarks

Lab number 2104586

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		Date	Time
Relinquished by sampler	10/24/92	1455	Received by	10-29-92	14:35
Relinquished by	10-29-92	3:30	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)

EMCON
ASSOCIATES
Consultants in Wastes Management and Environmental Control

RECEIVED
NOV 9 - 1992
RESNA
SAN JOSE

Date October 29, 1992
Project 0G70-039.01

To:
Mr. Joel Coffman
RESNA/ Applied Geosystems
3315 Almaden Expressway, Suite 34
San Jose, California 95050

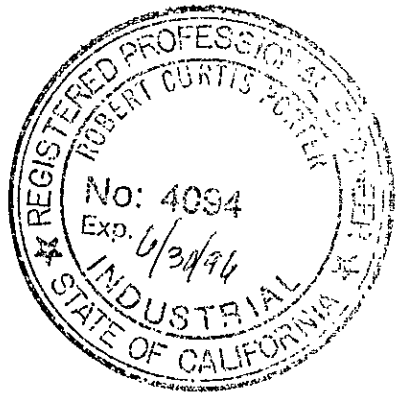
We are enclosing:

Copies	Description
1	Depth To Water / Floating Product Survey Results
1	Summary of Groundwater Monitoring Data
1	Certified Analytical Reports with Chain-of-Custody
3	Water Sample Field Data Sheets

For your: X Information Sent by: X Mail

Comments:
Enclosed are the data from the fourth quarter 1992 monitoring event at ARCO service station 6148, located at 5131 Shattuck Avenue, Oakland CA. Groundwater monitoring is conducted consistent with applicable regulatory guidelines. Please call if you have any questions. (408) 453-2266.

Reviewed by:



Jim Butera JB

Robert Porter, Senior Project Engineer.

1938 Junction Avenue, San Jose, California 95131-2102, (408) 453-0719, Fax (408) 453-0452

FIELD REPORT
DEPTH TO WATER / FLOATING PRODUCT SURVEY

PROJECT # : 0G70-039.01 STATION ADDRESS : 5131 Shattuck Ave., Oakland, CA DATE : 10-07-92

ARCO STATION # : 6148 FIELD TECHNICIAN : S Williams DAY : WED

DTW Order	WELL ID	Well Box Seal	Well Lid Secure	Lock Gasket	GASKET ~~Lock~~	Locking Well Cap	FIRST DEPTH TO WATER (feet)	SECOND DEPTH TO WATER (feet)	DEPTH TO FLOATING PRODUCT (feet)	FLOATING PRODUCT THICKNESS (feet)	WELL TOTAL DEPTH (feet)	COMMENTS
1	MW-1	OK	YES	3259	NA	OK	18.52	18.52	ND	ND	25.7	—
2	MW-2	OK	YES	3259	NA	OK	18.80	18.80	19.11	.31	25.8	.31 Teflon Bailer
3	MW-3	OK	YES	3259	NA	OK	18.90	18.90	ND	ND*	25.80	* .02 After purge

SURVEY POINTS ARE TOP OF WELL CASINGS

Summary of Groundwater Monitoring Data
Fourth Quarter 1992
ARCO Service Station 6148
5131 Shattuck Avenue, Oakland, California
micrograms per liter (µg/l) and milligrams per liter (mg/l)

Well ID and Sample Depth	Sampling Date	Depth To Water (feet)	Floating Product Thickness (feet)	TPH[1] as Gasoline (µg/l)	Benzene (µg/l)	Toluene (µg/l)	Ethyl-benzene (µg/l)	Total Xylenes (µg/l)	TPH as Diesel (µg/l)	Total Oil and Grease, 5520F (mg/l)
MW-1(25)	10/07/92	18.52	ND.[2]	590.	200.	19.	6.7	19.	<50.	<0.5
MW-2	10/07/92	18.80	0.31	FP.[3]	FP.	FP.	FP.	FP.	FP.	FP.
MW-3	10/07/92	18.90	0.02*	FP.	FP.	FP.	FP.	FP.	FP.	FP.
FB-1.[4]	10/07/92	NA.[5]	NA.	<50	<0.5	<0.5	<0.5	<0.5	NR.[6]	NR.

1. TPH. = Total petroleum hydrocarbons
2. ND. = Not detected
3. FP.= Floating product detected in well, no sample was taken
4. FB. = Field Blank
5. NA. = Not applicable
6. NR. = Not reported; sample was not scheduled for analysis of the selected parameter

* = Floating product came into the well after the purge was completed

Summary of Analytical Results
Halogenated Volatile Organic Compounds by EPA[1] Methods 5030/601
Fourth Quarter 1992
ARCO Service Station 6148
5131 Shattuck Avenue, Oakland, California
micrograms per liter (µg/l) or parts per billion (ppb)

Well ID and Sample Depth	Sampling Date	Chloroform (ppb)	TCE[2] (ppb)	PCE[3] (ppb)
MW-1(25)	06/12/92	0.6	1.5	23.
MW-2	FP.[4]	FP.	FP.	FP.
MW-3	FP.	FP.	FP.	FP.

1. EPA = United States Environmental Protection Agency.
2. TCE = Trichloroethene
3. PCE = Tetrachloroethene
4. FP.= Floating product detected, well not sampled

Columbia Analytical Services inc.

October 20, 1992

Jim Butera
EMCON Associates
1921 Ringwood Avenue
San Jose, CA 95131

Re: **EMCON Project No. 0G70-039.01**
Arco Facility No. 6148

Dear Mr. Butera:

Enclosed are the results of the water samples submitted to our lab on October 7, 1992. For your reference, our service request number for this work is SJ92-1244.

All analyses were performed in accordance with the laboratory's quality assurance program.

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/ajb

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

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	EMCON Associates	**Date Received:**	10/07/92
Project:	EMCON Project No. 0G70-039.01	**Work Order #:**	SJ92-1244
	Arco Facility No. 6148	**Sample Matrix:**	Water

Inorganic Parameters
mg/L (ppm)

Sample Name:		MW-1 (25)	Method Blank
Date Sampled:		10/07/92	
Analyte	**Method**	**MRL**	
Hydrocarbons by IR	SM 5520F	0.5	ND ND

MRL Method Reporting Limit
ND None Detected at or above the method reporting limit
SM *Standard Methods for the Examination of Water and Wastewater*, 17th Ed., 1989

Approved by Kevin A Murphy Date October 20, 1992

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	EMCON Associates	**Date Received:**	10/07/92
Project:	EMCON Project No. 0G70-039.01	**Date Extracted:**	10/12/92
	Arco Facility No. 6148	**Date Analyzed:**	10/15/92
Sample Matrix:	Water	**Work Order #:**	SJ92-1244

TPH as Diesel
EPA Method 3510/California DHS LUFT Method
µg/L (ppb)

Sample Name	MRL	TPH as Diesel
MW-1 (25)	50.	ND
Method Blank	50.	ND

MRL Method Reporting Limit
TPH Total Petroleum Hydrocarbons
ND None Detected at or above the method reporting limit

Approved by Kevin Murphy Date October 20, 1992

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: EMCON Associates
Project: EMCON Project No. 0G70-039.01
Arco Facility No. 6148

Date Received: 10/07/92
Work Order #: SJ92-1244
Sample Matrix: Water

Halogenated Volatile Organic Compounds
EPA Methods 5030/601
µg/L (ppb)

Sample Name:	MW-1 (25)	Method Blank
Date Analyzed:	10/09/92	10/09/92

Analyte	MRL		
Dichlorodifluoromethane (Freon 12)	1	ND	ND
Chloromethane	1	ND	ND
Vinyl Chloride	0.5	ND	ND
Bromomethane	0.5	ND	ND
Chloroethane	0.5	ND	ND
Trichlorofluoromethane (Freon 11)	0.5	ND	ND
1,1-Dichloroethene	0.5	ND	ND
Trichlorotrifluoroethane (Freon 113)	0.5	ND	ND
Methylene Chloride	0.5	ND	ND
trans-1,2-Dichloroethene	0.5	ND	ND
cis-1,2-Dichloroethene	0.5	ND	ND
1,1-Dichloroethane	0.5	ND	ND
Chloroform	0.5	0.6	ND
1,1,1-Trichloroethane (TCA)	0.5	ND	ND
Carbon Tetrachloride	0.5	ND	ND
Benzene	0.5	ND	ND
1,2-Dichloroethane	0.5	ND	ND
Trichloroethene (TCE)	0.5	1.5	ND
1,2-Dichloropropane	0.5	ND	ND
Bromodichloromethane	0.5	ND	ND
2-Chloroethyl Vinyl Ether	5	ND	ND
trans-1,3-Dichloropropene	0.5	ND	ND
Toluene	1	ND	ND
cis-1,3-Dichloropropene	0.5	ND	ND
1,1,2-Trichloroethane	0.5	ND	ND
Tetrachloroethene (PCE)	0.5	23.	ND
Dibromochloromethane	0.5	ND	ND
Chlorobenzene	0.5	ND	ND
Ethylbenzene	1	ND	ND
Bromoform	0.5	ND	ND
1,1,2,2-Tetrachloroethane	0.5	ND	ND
1,3-Dichlorobenzene	1	ND	ND
1,4-Dichlorobenzene	1	ND	ND
1,2-Dichlorobenzene	1	ND	ND
Total Xylenes	1	ND	ND

MRL Method Reporting Limit
ND None Detected at or above the method reporting limit

Approved by Kevin Murphy Date October 20, 1992

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: EMCON Associates
Project: EMCON Project No. 0G70-039.01
Arco Facility No. 6148

Date Received: 10/07/92
Work Order #: SJ92-1244
Sample Matrix: Water

BTEX and TPH as Gasoline
EPA Methods 5030/8020/DHS LUFT Method
µg/L (ppb)

Sample Name:		MW-1 (25)	FB-1	Method Blank
Date Analyzed:		10/12/92	10/12/92	10/12/92
Analyte	**MRL**			
Benzene	0.5	200.	ND	ND
Toluene	0.5	19.	ND	ND
Ethylbenzene	0.5	6.7	ND	ND
Total Xylenes	0.5	19.	ND	ND
TPH as Gasoline	50	590.	ND	ND

TPH Total Petroleum Hydrocarbons
MRL Method Reporting Limit
ND None Detected at or above the method reporting limit

Approved by Kathy Murphy Date October 20, 1992

APPENDIX A

LABORATORY QC RESULTS

Client: EMCON Associates
Project: EMCON Project No. 0G70-039.01
Arco Facility No. 6148

Date Received: 10/07/92
Work Order #: SJ92-1244
Sample Matrix: Water

QA/QC Report
Continuing Calibration Summary
Inorganics
SM 5520F
mg/L

Analyte	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Criteria
Hydrocarbons by IR	100.	106.	106.	90-110

Approved by Kevin Murphy Date October 20, 1992

COLUMBIA ANALYTICAL SERVICES, INC.

Client:	EMCON Associates	**Date Received:**	10/07/92
Project:	EMCON Project No. 0G70-039.01	**Work Order #:**	SJ92-1244
	Arco Facility No. 6148	**Sample Matrix:**	Water

QA/QC Report
Matrix Spike Summary
Inorganic Parameters
mg/L (ppm)

Sample Name: MW-1 (25)
Date Sampled: 10/07/92

Parameter	Spike Level	Sample Result	Spike Result MS	Spike Result DMS	Percent Recovery MS	Percent Recovery DMS	Recovery Acceptance Criteria
Hydrocarbons by IR	5.71	ND	5.72	5.72	100.	100.	56-106

ND None Detected at or above the method reporting limit

Approved by Kevin Murphy Date October 20, 1992

COLUMBIA ANALYTICAL SERVICES, INC.

Client: EMCON Associates
Project: EMCON Project No. 0G70-039.01
Arco Facility No. 6148

Date Received: 10/07/92
Work Order #: SJ92-1244
Sample Matrix: Water

QA/QC Report
Initial Calibration Verification
TPH as Diesel
EPA Methods 3510/DHS LUFT Method
mg/L (ppm)

Date Analyzed: 10/15/92

Analyte	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Criteria
TPH as Diesel	1,000.	1,100.	110.	90-110

TPH Total Petroleum Hydrocarbons

Approved by Kevin Murphy Date October 20, 1992

COLUMBIA ANALYTICAL SERVICES, INC.

Client: EMCON Associates
Project: EMCON Project No. 0G70-039.01
Arco Facility No. 6148

Date Received: 10/07/92
Work Order #: SJ92-1244
Sample Matrix: Water

QA/QC Report
Surrogate Recovery Summary
TPH as Diesel
EPA Method 3510/DHS LUFT Method

Sample Name	Date Analyzed	Percent Recovery P-Terphenyl
MW-1 (25)	10/15/92	94.
MS	10/15/92	81.
DMS	10/15/92	77.
Method Blank	10/15/92	106.
	CAS Acceptance Criteria	61-121

TPH Total Petroleum Hydrocarbons

Approved by Kevin Murphy Date October 20, 1992

COLUMBIA ANALYTICAL SERVICES, INC.

Client: EMCON Associates
Project: EMCON Project No. 0G70-039.01
Arco Facility No. 6148

Date Received: 10/07/92
Work Order #: SJ92-1244
Sample Matrix: Water

QA/QC Report
Matrix Spike/Duplicate Matrix Spike Summary
Total Petroleum Hydrocarbons as Diesel
DHS LUFT Method
µg/L (ppb)

Date Analyzed: 10/15/92

Parameter	Spike Level	Sample Result	Spike Result MS	Spike Result DMS	Percent Recovery MS	Percent Recovery DMS	Acceptance Criteria
Diesel	4,000.	ND	3,770.	3,340.	93.	84.	46-133

ND None Detected at or above the method reporting limit

Approved by Kevin Murphy Date October 20, 1992

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON Associates
Project: EMCON Project No. 0G70-039.01
Arco Facility No. 6148

Date Received: 10/07/92
Work Order #: SJ92-1244

Initial Calibration Verification
Halogenated Volatile Organic Compounds
EPA Methods 5030/601
Nanograms

Analyte	True Value	Result	Percent Recovery	EPA Percent Recovery Acceptance Criteria
Chloromethane	50	43.5	87.	D-193
Vinyl Chloride	50	48.4	97.	28-163
Bromomethane	50	48.0	96.	D-144
Chloroethane	50	50.1	100.	46-137
Trichlorofluoromethane (Freon 11)	50	47.8	96.	21-156
1,1-Dichloroethene	50	44.8	90.	28-167
Methylene Chloride	50	48.5	97.	25-162
trans-1,2-Dichloroethene	50	51.3	103.	38-155
1,1-Dichloroethane	50	52.1	104.	47-132
Chloroform	50	50.6	101.	49-133
1,1,1-Trichloroethane (TCA)	50	53.0	106.	41-138
Carbon Tetrachloride	50	54.4	109.	43-143
1,2-Dichloroethane	50	58.4	117.	51-147
Trichloroethene (TCE)	50	53.3	107.	35-146
1,2-Dichloropropane	50	56.0	112.	44-156
Bromodichloromethane	50	54.8	110.	42-172
trans-1,3-Dichloropropene	50	74.3	149.	22-178
cis-1,3-Dichloropropene	50	59.2	118.	22-178
1,1,2-Trichloroethane	50	55.6	111.	39-136
Tetrachloroethene (PCE)	50	54.6	109.	26-162
Dibromochloromethane	50	54.6	109.	24-191
Chlorobenzene	50	54.4	109.	38-150
Bromoform	50	55.6	111.	13-159
1,1,2,2-Tetrachloroethane	50	54.9	110.	8-184
1,3-Dichlorobenzene	50	53.6	107.	7-187
1,4-Dichlorobenzene	50	57.9	116.	42-143
1,2-Dichlorobenzene	50	57.3	115.	D-208

D Detected

Approved by Kevin Murphy Date October 20, 1992

COLUMBIA ANALYTICAL SERVICES, INC.

Client: EMCON Associates
Project: EMCON Project No. 0G70-039.01
Arco Facility No. 6148

Date Received: 10/07/92
Work Order #: SJ92-1244
Sample Matrix: Water

QA/QC Report
Surrogate Recovery Summary
Halogenated Volatile Organic Compounds
EPA Methods 5030/601

Sample Name	Date Analyzed	Percent Recovery 4-Bromofluorobenzene
MW-1 (25)	10/09/92	89.
MS	10/09/92	105.
DMS	10/09/92	106.
Method Blank	10/09/92	76.
	CAS Acceptance Criteria	70-130

Approved by Kevin Murphy Date October 20, 1992

Client: EMCON Associates
Project: EMCON Project No. 0G70-039.01
Arco Facility No. 6148

Date Received: 10/07/92
Work Order #: SJ92-1244
Sample Matrix: Water

QA/QC Report
Matrix Spike/Duplicate Matrix Spike Summary
Halogenated Volatile Organic Compounds
EPA Methods 5030/601
µg/L (ppb)

Date Analyzed: 10/09/92

Analyte	Spike Level	Sample Result	Spike Result MS	Spike Result DMS	Percent Recovery MS	Percent Recovery DMS	EPA Acceptance Criteria
1,1-Dichloroethene	10.	ND	10.4	10.8	104.	108.	28-167
Trichloroethene	10.	ND	10.4	11.0	104.	110.	35-146
Tetrachloroethene	10.	ND	10.7	11.3	107.	113.	26-162

ND None Detected at or above the method reporting limit

Approved by Kevin Murphy Date October 20, 1992

COLUMBIA ANALYTICAL SERVICES, INC.

Client: EMCON Associates
Project: EMCON Project No. 0G70-039.01
Arco Facility No. 6148

Date Received: 10/07/92
Work Order #: SJ92-1244

QA/QC Report
Initial Calibration Verification
BTEX and TPH as Gasoline
EPA Methods 5030/8020/DHS LUFT Method
Nanograms

Date Analyzed: 10/12/92

Analyte	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Criteria
Benzene	250.	261.	104.	85-115
Toluene	250.	266.	107.	85-115
Ethylbenzene	250.	253.	101.	85-115
Total Xylenes	750.	709.	95.	85-115
TPH as Gasoline	2,500.	2,431.	97.	90-110

TPH Total Petroleum Hydrocarbons

Approved by Kevin Murphy Date October 20, 1992

COLUMBIA ANALYTICAL SERVICES, INC.

Client: EMCON Associates
Project: EMCON Project No. 0G70-039.01
Arco Facility No. 6148

Date Received: 10/07/92
Work Order #: SJ92-1244
Sample Matrix: Water

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

Sample Name	Date Analyzed	Percent Recovery α,α,α-Trifluorotoluene
MW-1 (25)	10/12/92	109.
FB-1	10/12/92	107.
MS	10/12/92	110. *
DMS	10/12/92	106. *
Method Blank	10/12/92	108.

CAS Acceptance Criteria 70-130

TPH Total Petroleum Hydrocarbons
* The surrogate used on this sample was 4-Bromofluorobenzene.

Approved by Keenia Murphy Date October 20, 1992

COLUMBIA ANALYTICAL SERVICES, INC.

Client: EMCON Associates
Project: EMCON Project No. 0G70-039.01
Arco Facility No. 6148

Date Received: 10/07/92
Work Order #: SJ92-1244
Sample Matrix: Water

QA/QC Report
Matrix Spike/Duplicate Matrix Spike Summary
BTE
EPA Methods 5030/8020
µg/L (ppb)

Date Analyzed: 10/12/92

			Spike Result		Percent Recovery		
Analytes	Spike Level	Sample Result	MS	DMS	MS	DMS	Acceptance Criteria
Benzene	25.	5.8	28.2	28.6	90.	91.	39-150
Toluene	25.	ND	23.6	24.0	94.	96.	46-148
Ethylbenzene	25.	ND	23.5	24.1	94.	96.	32-160

ND None Detected at or above the method reporting limit

Approved by Kevin Murphy Date October 20, 1992

APPENDIX B

CHAIN OF CUSTODY

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. EMCGC-92-01

Chain of Custody

ARCO Facility no. 6148	City (Facility) OAKLAND	Project manager (Consultant) JIM BUTERA	Laboratory name CAS
ARCO engineer Kyle Christie	Telephone no. (ARCO) 415 5717434	Telephone no. (Consultant) 408 453-0719	Fax no. (Consultant) 408 453-0452	Contract number 07077
Consultant name EMCON ASSOCIATES	Address (Consultant) 1938 Junction Ave San Jose		Method of shipment Sampler will deliver

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 CAS	TPH Modified 8015 Gas ☐ Diesel ☑	Oil and Grease 413.1 ☐ 413.2 ☐ SSFOG	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 ☐		
MW-1(25)	1-6	6		X		X	HCl	10-7-92	1146		X		X		X							
MW-2( )		6		X		X	HCl	NO Sample			X		X		X							
MW-3( )		6		X		X	HCl	NO Sample			X		X		X							
MW-1(25)	7-8	2		X		X	NP	10-7-92	1146			X										
MW-2( )		2		X		X	NP	NO Sample				X										
MW-3( )		2		X		X	NP	NO Sample				X										
FB-1	9-10	2		X		X	HCl	10-7-92	1222		X											

Special detection Limit/reporting: Lowest possible

Special QA/QC: AS Normal

Remarks: 3-40ml HCl, 2-Liter HCl, 2-Liter NP

0670-039.01

Lab number: 5592-1244

Condition of sample: OK		Temperature received: Room	
Relinquished by sampler: Joe Williams	Date: 10-7-92	Time: 1410	Received by
Relinquished by	Date	Time	Received by
Relinquished by	Date	Time	Received by laboratory: Date: 10-7-92 Time: 14:10

Turnaround time

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

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

APPC-3292 (2-91)

WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

EMCON ASSOCIATES

PROJECT NO: 0479-039-01 SAMPLE ID: MW-1

PURGED BY: J. Williams CLIENT NAME: ARCO 6148

SAMPLED BY: J. Williams LOCATION: 5131 Shattuck Ave Oakland Ca

TYPE: Ground Water ✓ Surface Water ___ Treatment Effluent ___ Other ___

CASING DIAMETER (inches): 2 ___ 3 ___ 4 ✓ 4.5 ___ 6 ___ Other ___

CASING ELEVATION (feet/MSL): NA VOLUME IN CASING (gal.): 4.71

DEPTH TO WATER (feet): 18.52 CALCULATED PURGE (gal.): 23.55

DEPTH OF WELL (feet): 25.7 (3.75) ACTUAL PURGE VOL. (gal.): 24

DATE PURGED: 10-07-92 Start (2400 Hr) 1103 End (2400 Hr) 1139

DATE SAMPLED: 10-07-92 Start (2400 Hr) 1141 End (2400 Hr) 1146

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1104	5	6.09	470	78.6	CLEAR	CLEAR
1118	10	6.33	471	72.9	"	"
1124	15	6.27	498	73.1	"	"
1134	20	6.35	466	72.2	"	"
1139	24	6.32	466	73.3	"	"

D. O. (ppm): NP ODOR: Slight

NR (COBALT 0 - 100) NR (NTU 0 - 200)

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

PURGING EQUIPMENT		SAMPLING EQUIPMENT	
___ 2" Bladder Pump	___ Bailer (Teflon®)	___ 2" Bladder Pump	✓ Bailer (Teflon®)
___ Centrifugal Pump	___ Bailer (PVC)	___ DDL Sampler	___ Bailer (Stainless Steel)
✓ Submersible Pump	___ Bailer (Stainless Steel)	___ Dipper	___ Submersible Pump
___ Well Wizard™	___ Dedicated	___ Well Wizard™	___ Dedicated
Other: ___		Other: ___	

WELL INTEGRITY: OK LOCK #: 3259

REMARKS: ___

Meter Calibration: Date: 10-07-92 Time: 1055 Meter Serial #: 9111 Temperature °F: 79.0

(EC 1000 1073 / 1000) (DI ___) (pH 7 7.00 / 7.00) (pH 10 10.00 / 10.01) (pH 4 3.95 / ___)

Location of previous calibration: MW-1

Signature: ___ Reviewed By: JB Page 1 of 3

WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

EMCON ASSOCIATES

PROJECT NO: 0670-039-01 SAMPLE ID: MW-2

PURGED BY: J. Williams CLIENT NAME: ARCO 6148

SAMPLED BY: J. Williams LOCATION: 5131 Shattuck Ave Oakland CA

TYPE: Ground Water ✓ Surface Water ___ Treatment Effluent ___ Other ___

CASING DIAMETER (inches): 2 ___ 3 ___ 4 ✓ 4.5 ___ 6 ___ Other ___

CASING ELEVATION (feet/MSL): NR VOLUME IN CASING (gal.): NR

DEPTH TO WATER (feet): ___ CALCULATED PURGE (gal.): ___

DEPTH OF WELL (feet): ___ ACTUAL PURGE VOL. (gal.): ___

DATE PURGED: NR Start (2400 Hr) ___ End (2400 Hr) ___

DATE SAMPLED: NR Start (2400 Hr) ___ End (2400 Hr) ___

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)

D. O. (ppm): NR ODOR: Strong COLOR (COBALT 0 - 100): NR TURBIDITY (NTU 0 - 200): NR

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

PURGING EQUIPMENT		SAMPLING EQUIPMENT	
___ 2" Bladder Pump	___ Bailer (Teflon®)	___ 2" Bladder Pump	✓ Bailer (Teflon®)
___ Centrifugal Pump	___ Bailer (PVC)	___ DDL Sampler	___ Bailer (Stainless Steel)
___ Submersible Pump	___ Bailer (Stainless Steel)	___ Dipper	___ Submersible Pump
___ Well Wizard™	___ Dedicated	___ Well Wizard™	___ Dedicated
Other: ___		Other: ___	

WELL INTEGRITY: OK LOCK #: 3259

REMARKS: Product Thickness .31

Meter Calibration: Date: 10-07-91 Time: 1155 Meter Serial #: 9111 Temperature °F: ___

(EC 1000 ___ / ___) (DI ___) (pH 7 ___ / ___) (pH 10 ___ / ___) (pH 4 ___ / ___)

Location of previous calibration: MW-1

Signature: [signature] Reviewed By: JB Page 2 of 3

WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

EMCON ASSOCIATES

PROJECT NO: 0670-039-01 SAMPLE ID: MW-3

PURGED BY: J Williams CLIENT NAME: ARCO 6148

SAMPLED BY: J Williams LOCATION: 5131 Shattuck Ave Oakland CA

TYPE: Ground Water ✓ Surface Water ___ Treatment Effluent ___ Other ___

CASING DIAMETER (inches): 2 ___ 3 ___ 4 ✓ 4.5 ___ 6 ___ Other ___

CASING ELEVATION (feet/MSL): NR VOLUME IN CASING (gal.): 41.52

DEPTH TO WATER (feet): 18.90 CALCULATED PURGE (gal.): 22.

DEPTH OF WELL (feet): 25.80 ACTUAL PURGE VOL. (gal.): ___

DATE PURGED: 10-07-92 Start (2400 Hr) 1220 End (2400 Hr) 1247

DATE SAMPLED: 10-07-92 Start (2400 Hr) 1250 End (2400 Hr) ___

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1228	5	6.33	473	75.8	GREY	HEAVY
1233	10	6.41	523	73.7	GREY	HEAVY
1239	15	6.41	560	72.2	CLEAR	CLEAR
1244	20	6.45	567	71.4	CLEAR	CLEAR
1247	24	6.41	568	72.1	CLEAR	CLEAR

D. O. (ppm): NR ODOR: STRONG

COLOR (COBALT 0 - 100): NR

TURBIDITY (NTU 0 - 200): NR

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): FB-1 (12:22)

PURGING EQUIPMENT		SAMPLING EQUIPMENT	
___ 2" Bladder Pump	___ Bailer (Teflon®)	___ 2" Bladder Pump	✓ Bailer (Teflon®)
___ Centrifugal Pump	___ Bailer (PVC)	___ DDL Sampler	___ Bailer (Stainless Steel)
✓ Submersible Pump	___ Bailer (Stainless Steel)	___ Dipper	___ Submersible Pump
___ Well Wizard™	___ Dedicated	___ Well Wizard™	___ Dedicated
Other: ___		Other: ___	

WELL INTEGRITY: OK LOCK #: 3259

REMARKS: NO SAMPLE TAKE AFTER PURGING after purging Product came in .02 Teflon bailer

Meter Calibration: Date: 10-07-92 Time: 1055 Meter Serial #: 9171 Temperature °F: ___

(EC 1000 ___ / ___) (DI ___) (pH 7 ___ / ___) (pH 10 ___ / ___) (pH 4 ___ / ___)

Location of previous calibration: MW-1

Signature: Joe Williams Reviewed By: JB Page 3 of 3

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. 6148-92-25

Chain of Custody

ARCO Facility no. 6148	City (Facility) Oakland	Project manager (Consultant) Joel Coffman	Laboratory name Sequoia
ARCO engineer Michael Whelan	Telephone no. (ARCO) (415) 574-2435	Telephone no. (Consultant) (408) 264-7723	Fax no. (Consultant) (408) 264-2735
Consultant name TRESNA Industries Inc.	Address (Consultant) 3315 Almaden Expressway, Suite 34, San Jose, CA 95118		Contract number 07-073

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 ☐ Semi VOA ☐ VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐
16-MW4		3		X		X	X	11/12/92	1510		X								/	
16-MW5		3		X		X	X		1200		X								/	
14-MW6		3		X		X	X		1330		X								/	
14-MW7		3		X		X	X	↓	1420		X							↓	/	

Special detection Limit/reporting

Special QA/QC

Remarks

Lab number

Turnaround time

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

Method of shipment

Condition of sample: good		Temperature received: cool	
Relinquished by sampler	Date 11/13/92 Time 1000	Received by	
Relinquished by	Date 11/13/92 Time 1135	Received by	
Relinquished by	Date 11/13/92 Time 1220	Received by laboratory	Date 11-13-92 Time 1220pm

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

RESNA
3315 Almaden Expwy., Suite 34
San Jose, CA 95118
Attention: Joel Coffman

Project: ARCO 6148, Oakland

Enclosed are the results from 4 water samples received at Sequoia Analytical on November 13,1992. The requested analyses are listed below:

SAMPLE #	SAMPLE DESCRIPTION	DATE OF COLLECTION	TEST METHOD
2112545	Water, W-16-MW4	11/12/92	EPA 5030/8015/8020
2112546	Water, W-16-MW5	11/12/92	EPA 5030/8015/8020
2112547	Water, W-14-MW6	11/12/92	EPA 5030/8015/8020
2112548	Water, W-14-MW7	11/12/92	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

Maria Lee
Project Manager

SEQUOIA ANALYTICAL

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

RESNA	Client Project ID:	ARCO 6148, Oakland	Sampled:	Nov 12, 1992
3315 Almaden Expwy., Suite 34	Sample Matrix:	Water	Received:	Nov 13, 1992
San Jose, CA 95118	Analysis Method:	EPA 5030/8015/8020	Reported:	Nov 25, 1992
Attention: Joel Coffman	First Sample #:	211-2545		

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit µg/L	Sample I.D. 211-2545 W-16-MW4	Sample I.D. 211-2546 W-16-MW5	Sample I.D. 211-2547 W-14-MW6	Sample I.D. 211-2548 W-14-MW7
Purgeable Hydrocarbons	50	77	2,900	51	N.D.
Benzene	0.50	32	1,300	2.6	1.8
Toluene	0.50	N.D.	12	N.D.	N.D.
Ethyl Benzene	0.50	N.D.	67	N.D.	N.D.
Total Xylenes	0.50	N.D.	18	N.D.	N.D.
Chromatogram Pattern:		Gas & Discrete Peaks	Gas & Discrete Peaks	Gas & Discrete Peaks	--

Quality Control Data

Report Limit Multiplication Factor:	1.0	20	1.0	1.0
Date Analyzed:	11/20/92	11/20/92	11/20/92	q
Instrument Identification:	GCHP-2	GCHP-2	GCHP-2	GCHP-2
Surrogate Recovery, %: (QC Limits = 70-130%)	97	92	93	97

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

SEQUOIA ANALYTICAL

Maria Lee
Project Manager

SEQUOIA ANALYTICAL

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

RESNA
3315 Almaden Expwy., Suite 34
San Jose, CA 95118
Attention: Joel Coffman

Client Project ID: ARCO 6148, Oakland

QC Sample Group: 2112545-8

Reported: Nov 25, 1992

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
Reporting Units:	µg/L	µg/L	µg/L	µg/L
Date Analyzed:	Nov 20, 1992	Nov 20, 1992	Nov 20, 1992	Nov 20, 1992
QC Sample #:	GBLK112092 MS/MSD	GBLK112092 MS/MSD	GBLK112092 MS/MSD	GBLK112092 MS/MSD
Sample Conc.:	N.D.	N.D.	N.D.	N.D.
Spike Conc. Added:	10	10	10	30
Conc. Matrix Spike:	11	11	11	32
Matrix Spike % Recovery:	110	110	110	107
Conc. Matrix Spike Dup.:	11	11	10	32
Matrix Spike Duplicate % Recovery:	110	110	100	107
Relative % Difference:	0.0	0.0	9.5	0.0

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

SEQUOIA ANALYTICAL

Maria Lee
Project Manager

% Recovery:	Conc. of M.S. - Conc. of Sample / Spike Conc. Added	x 100
Relative % Difference:	Conc. of M.S. - Conc. of M.S.D. / (Conc. of M.S. + Conc. of M.S.D.) / 2	x 100