OFF-SITE WELL INSTALLATION REPORT

ARCO SERVICE STATION 2185

OAKLAND, CALIFORNIA

Prepared for
ARCO Products Company
January 8, 1996

Prepared by
EMCON
1921 Ringwood Avenue
San Jose, California 95131

Project 20805-130.002

January 8, 1996
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Mr. Michael Whelan
ARCO Products Company
2155 South Bascom, Suite 202
Campbell, California 95008

Re: Off-site well installation report, ARCO service station 2185, Oakland, California

Dear Mr. Whelan:

This report documents EMCON's installation of two off-site groundwater monitoring wells at ARCO Products Company (ARCO) service station 2185, 9800 E. 14th Street, Oakland, California (Figure 1). These wells were installed to further characterize off-site groundwater, as originally proposed in RESNA's workplan dated January 20, 1994.

BACKGROUND

The project site is at the southeastern corner of the intersection of East 14th Street and 98th Avenue in Oakland, California (Figure 1). An ARCO AM/PM minimarket and retail gasoline station are currently in operation at the site.

In May 1991, ROUX conducted a preliminary tank replacement assessment which included drilling four borings and installing two vadose zone wells (VW-1 and VW-2) in the area of the existing underground storage tanks(USTs). Soil samples were collected at 5 and 10 feet below ground surface (BGS) in each of the borings. Laboratory analyses of the samples showed that soil near the existing USTs contained TPHG and benzene at concentrations up to 350 and 19 ppm, respectively. In June 1991, ROUX conducted a one day vapor extraction test on vadose wells VW-1 and VW-2. Based on the results of the test, ROUX concluded that vapor extraction would not be a suitable remedial alternative at the site. Results of the assessment are detailed in *Preliminary Tank Replacement Assessment, ARCO Facility No. 2185, 9800 E. 14th Street, Oakland, California.* (ROUX, August 8, 1991).

In September 1991, ROUX performed a limited subsurface investigation at the site which included drilling four additional soil borings in the proposed location of the new UST complex, northeast of the original UST complex. Laboratory analysis of soil samples indicated that samples collected from the borings on the eastern edge of the proposed UST complex had not been impacted by petroleum hydrocarbons. Hydrocarbons were detected in samples collected from the borings on the western edge of the proposed UST complex. Results of the investigation were documented in *Limited Subsurface Soil*

Investigation, ARCO Facility No. 2185, 9800 E. 14th Street, Oakland, California. (ROUX, November 22, 1991).

Between October and November 1991, ROUX observed the excavation and removal of three gasoline USTs and associated product piping from the site. Laboratory analyses of soil samples collected from the UST and product line excavations indicated that hydrocarbons were present in the vicinity of the former product dispensers and the former tank excavation. Approximately 1,050 cubic yards of soil were excavated and disposed of during tank and product line removal. Additionally, 5,000 gallons of water were pumped out of the former UST excavation and disposed of during tank removal activities. Details of the tank removal and sampling are documented in Underground Storage Tank Removal and Soil Sampling, ARCO Facility No. 2185, East 14th Street, Oakland, California (ROUX, June 17, 1992).

In July 1992, RESNA conducted an initial subsurface investigation at the site which included drilling and installing four groundwater monitoring wells (MW-1 through MW-4. Laboratory analysis of soil and groundwater samples from the wells indicated that soil and groundwater immediately downgradient from the former UST complex and pump islands were impacted by petroleum hydrocarbons. Results of the investigation were summarized in *Initial Subsurface Investigation at ARCO Station 2185, 9800 East 14th Street, Oakland, California* (RESNA, September 28, 1992).

Between January and May 1993, RESNA conducted an initial off-site and additional on-site subsurface investigation which included the drilling and installation of two additional on-site wells (MW-5 and MW-6) and one off-site well (MW-7). Soil samples collected from well MW-7 off-site and well MW-5 near the pump islands did not contain detectable concentrations of petroleum hydrocarbons. Soil samples from well MW-6, located downgradient of the former UST complex and crossgradient of the pump islands, contained petroleum hydrocarbons. A groundwater sample collected from well MW-7 contained discrete components eluting in the gasoline range which were lab reported as TPHG. Subsequent monitoring at the site has shown that several chlorinated solvents in the groundwater at MW-7 appear to be responsible for the chromatogram pattern originally quantified as TPHG. In addition to the characterization, a limited off-site record search and on-site aquifer pumping test were conducted for the site. A review of historical aerial photographs conducted as part of the off-site records search identified two properties on the northwest and southwest corners of the intersection of 98th Avenue and E. 14th Street as former gasoline service stations. Off-site well MW-7 was installed within 15 feet of a pump island at the former service station immediately across E. 14th Street (southeast) from the ARCO facility. Results of the investigation were documented in *Initial Offsite and Additional Onsite Subsurface Investigation and Pumping Test at ARCO Station 2185, 9800 East 14th Street, Oakland, California* (RESNA, October 12, 1993).

In April 1994, RESNA installed one groundwater monitoring well at the site (MW-8) at the request of the Alameda County Health Care Services Agency. This well was installed so that the site could be considered for Alternative Points of Compliance, under the Tentative Resolution of the California Regional Water Quality Control Board's (CRWQCB) Basin and Amendment Plan (CRWQCB, November 20, 1992). Details of the well installation were summarized in the letter report *Installation of Compliance Well MW-10, ARCO Service station 2185, 9800 East 14th Street, Oakland, California* (RESNA, June 6, 1994). Well MW-8 was originally referred to as MW-10 by RESNA, but its identification was changed by EMCON to MW-8, to maintain chronological consistency with other wells at the site.

Groundwater monitoring and sampling at the site were initiated in July 1992. Wells MW-1 through MW-8 are measured quarterly for depth to water and wells MW-2, MW-3, and MW-5 through MW-8 are sampled quarterly for petroleum hydrocarbons in groundwater. Wells MW-1, MW-4, MW-6 and MW-7 are sampled annually for petroleum hydrocarbons in groundwater.

Previous investigations conducted at the site have delineated the extent of petroleum-hydrocarbons in soils to the area around the former UST excavation and product lines. Impacted groundwater at the site has been delineated vertically, and laterally to the east, south, and southwest of the site. The extent of hydrocarbon-impacted groundwater has not been delineated to the north and west of the site. The purpose of this investigation was to delineate the extent of impacted groundwater north and west of the site by installing two off-site groundwater monitoring wells (MW-9 and MW-10).

CURRENT FIELD ACTIVITIES

Wells MW-9 and MW-10 were installed at the site on August 16 and 17, 1995, at the locations shown in Figure 2. The exploratory borings for the wells were drilled and sampled under the supervision of an EMCON geologist, working under the direct supervision of a California-registered geologist. Well construction details are summarized in Table 1. Alameda County Flood Control and Water Conservation District, Zone 7 (ACFCWCD) well permits, and City of Oakland minor encroachment and excavation permits are presented in Appendix A. Procedures employed in drilling the exploratory borings, installing the wells, and sampling and storing drill cuttings and groundwater are described in Appendix B.

Soil Sampling

Soil samples were collected from both borings at intervals of 5 feet, in a 2-inch-diameter modified California split-spoon sampler. The sampler was fitted with brass liners before

being driven into the undisturbed soil beyond the tip of the augers. Borings MW-9 and MW-10 were sampled from 5 to 25-feet BGS.

Soil samples were screened for volatiles in the field by sealing a discrete amount of soil in a plastic bag, and allowing it to stand for at least 15 minutes. A photoionization detector reading was then taken on the headspace of the bag, and recorded in the exploratory boring log. Selected soil samples within the capillary fringe and well screen intervals of the borings were collected, preserved on ice, and transported with chain-of-custody documentation to a state-certified laboratory for analysis. Drilling and sampling equipment were steam-cleaned before use at each boring location.

The drill cuttings were stockpiled on site and covered with Visqueen®. A composite sample of the drill cuttings was collected, preserved and transported as described above, and analyzed for petroleum-hydrocarbon content. After the analyses were completed, the drill cuttings were disposed of at the BFI Vasco Road Sanitary Landfill in Livermore, California. Procedures used in sampling and storing drill cuttings are described in Appendix B. Waste manifests are presented in Appendix C.

Well Installation

Monitoring wells MW-9 and MW-10 were each installed in 8-inch-diameter borings drilled to depths of 23.5 and 25.0 feet BGS using limited-access, hollow-stem auger drilling equipment. The wells were constructed of flush-threaded, 2-inch-diameter, Schedule 40 polyvinyl chloride (PVC) casing, with approximately 14 feet of 0.020-inch slotted screen placed at the bottom.

Well construction details are summarized in Table 1; the exploratory boring logs and well construction details are presented in Appendix D. Steam-cleaning water used in decontaminating the drilling equipment was temporarily stored on site in 55-gallon drums. The steam-cleaning water generated during the field activities was disposed of at Seaport Environmental in Redwood City, California.

Well Development

Groundwater monitoring wells MW-9 and MW-10 were developed on September 13, 1995 using a surge block and bailer. During development, the wells were checked for floating product and monitored for turbidity, conductivity, color, temperature, odor, and pH. Field data sheets documenting well development activities are presented in Appendix E.

Steam-cleaning water used in decontaminating the well development equipment and water generated during well development was transported by a licensed hauler and disposed of at Seaport in Redwood City, California.

Groundwater Sampling

On September 20 and 21, 1995, groundwater samples were collected from wells MW-9 and MW-10 in conjunction with the quarterly sampling of wells MW-2, MW-3, MW-5, MW-6, and MW-8. The samples were collected with a Teflon® bailer and submitted to a state-certified laboratory with chain-of-custody documentation. Groundwater sampling field data sheets are presented in Appendix E.

Topographic Well Survey

EMCON contracted a licensed land surveyor to survey the elevations and locations of the new wells and well MW-8, which had not yet been surveyed. The survey was conducted by a California-licensed surveyor. The well positions were surveyed to an accuracy of 0.02 foot. The well casing, rim, and ground elevations were surveyed to an accuracy of 0.01 foot. The well elevations were surveyed relative to mean sea level (MSL) using a City of Oakland benchmark. Figure 2 presents the current surveyed well locations.

LOCAL SUBSURFACE CONDITIONS

The site is located in the East Bay Plain, a relatively flat alluvial plain lying between San Francisco Bay to the west and the Diablo Range to the east. The subsurface consists of unconsolidated alluvial sediments, predominantly composed of clayey silts to silty clays interbedded with discontinuous interfingering clayey to silty sands. The typical stratigraphic relationships of the sediments are depicted on geologic cross sections A-A' and B-B' (Figures 3 and 4). Average historical groundwater levels in site wells have ranged from approximately 7.7 feet BGS to 14.5 feet BGS (Table 2). During the third quarter groundwater monitoring event, the groundwater levels were within historical ranges, and the groundwater flow direction and gradient were consistent with previous events, as shown on the groundwater contour map (Figure 5).

LABORATORY PROCEDURES

Selected soil samples from borings MW-9 and MW-10, soil samples collected from the soil stockpile, and groundwater samples from wells MW-9 and MW-10, were submitted to a state-certified laboratory and analyzed for total petroleum hydrocarbons as gasoline (TPHG), and benzene, toluene, ethylbenzene, and total xylenes (BTEX). Soil and

groundwater samples were prepared for analysis by U.S. Environmental Protection Agency (USEPA) method 5030 (purge and trap). Soil was analyzed for TPHG by the methods accepted by the Department of Toxic Substances Control (DTSC) and referenced in *Leaking Underground Fuel Tank* (LUFT) *Field Manual* (State Water Resources Control Board, October 1989). Samples were analyzed for BTEX by USEPA method 8020, described in *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods* (EPA SW-846, November 1986, third edition). These methods are recommended for use at petroleum-hydrocarbon-impacted sites in the *Tri-Regional Board Staff Recommendations for Preliminary Evaluation and Investigation of Underground Tank Sites* (August 10, 1990). Laboratory procedures are detailed in Appendix B.

LABORATORY RESULTS

TPHG and benzene were not detected in the soil and groundwater samples from wells MW-9 and MW-10. Soil analytical data, groundwater analytical data, and historical groundwater analytical data are presented in Tables 3 and 4. Certified analytical reports and chain-of-custody documentation for the soil and groundwater samples are presented in Appendix F.

CONCLUSIONS

Based on this and previous investigations, EMCON concludes the following:

- Source removal was performed during tank replacement activities between October and November 1991. Approximately 1,050 yds^3 of soil were removed from the site during the excavation and removal of former USTs and product lines.

- The extent of petroleum-hydrocarbon-impacted soil at the site has been delineated. Impacted soil was limited to the immediate vicinity of the former UST excavation and pump islands.

- The extent of petroleum-hydrocarbons in groundwater has been delineated to the north, south, east, and west of the site. Impacted groundwater appears to be limited to the boundaries of the ARCO facility.

- A review of historical groundwater analytical data at the site reveals an overall downward trend in petroleum-hydrocarbon concentrations. Concentrations of TPHG and benzene observed in site wells have fallen since monitoring was initiated. Benzene concentrations in site wells have fallen an average of 96 percent from historical highs to the levels detected during the third quarter

1995 monitoring event. The drop in concentrations can be attributed to the removal of source material during the overexcavation of the former UST complex, natural attenuation, and biodegradation of the hydrocarbons by microorganisms present in soils and groundwater at the site. Please refer to *Third Quarter 1995 Groundwater Monitoring Program Results and Intrinsic Bioremediation Study, ARCO Service Station 2185, Oakland, California* (EMCON, December 22, 1995) for additional information on biodegradation at the site.

- Laboratory analyses of groundwater samples collected during previous and current groundwater monitoring at the site indicate that the petroleum-hydrocarbon-impacted groundwater observed in off-site well MW-7 may not be related to impacted soil and groundwater at the ARCO facility. The impacted groundwater observed in MW-7 differs from impacted groundwater observed at the ARCO facility in that it contains several chlorinated solvents eluting in the gasoline range (the chromatogram does not match the typical gasoline fingerprint).

Please call if you have questions.

Sincerely,

EMCON

Robert K. Davis

Rob Davis
Staff Geologist

REGISTERED GEOLOGIST
LYNN A. GALLAGHER
RG6090
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Lynn A. Gallagher, R.G. 6090
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Project Manager

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Attachments: Limitations
Table 1 - Summary of Well Details
Table 2 - Historical Groundwater Elevation Data
Table 3 - Soil and Groundwater Analytical Data
Table 4 - Historical Groundwater Analytical Data
Figure 1 - Site Location Map
Figure 2 - Site Plan
Figure 3 - Geologic Cross Section A-A´
Figure 4 - Geologic Cross Section B-B´
Figure 5 - Groundwater Elevation Contours
Appendix A - Well Permits
Appendix B - Field and Laboratory Procedures
Appendix C - Waste Manifests
Appendix D - Exploratory Boring Logs and Well Construction Details
Appendix E - Field Data Sheets
Appendix F - Certified Analytical Reports and Chain-of-Custody Documentation

cc: Barney Chan - ACHCSA
Kevin Graves - RWQCB

Table 1

Well Details
ARCO Service Station 2185

Well ID	Installation Date	Total Depth of Well (feet)	Casing Diameter (inches)	Screened Interval (feet)
MW-1	7/8/92	24.0	4.0	9.0 - 24.0
MW-2	7/7/92	24.0	4.0	8.0 - 24.0
MW-3	7/7/92	24.0	4.0	9.0 - 24.0
MW-4	7/8/92	24.0	4.0	9.0 - 24.0
MW-5	1/20/93	29.0	4.0	9.0 - 29.0
MW-6	1/21/93	28.5	4.0	8.5 - 28.5
MW-7	5/4/93	26.0	2.0	11.0 - 26.0
MW-8	4/6/94	23.0	4.0	8.0 - 23.0
MW-9	8/17/95	22.5	2.0	7.5 - 21.5
MW-10	8/16/95	23.5	2.0	8.5 - 22.5

Table 2
Historical Groundwater Elevation Data

ARCO Service Station 2185
9800 East 14th Street, Oakland, California

Date: 11-08-95

Well Desig-nation	Water Level Field Date	TOC Elevation ft-MSL	Depth to Water feet	Ground-Water Elevation ft-MSL	Floating Product Thickness feet	Ground-Water Flow Direction MWN	Hydraulic Gradient foot/foot
MW-1	07-24-92	29.15	13.38	15.77	ND	NR	NR
MW-1	08-26-92	29.15	13.92	15.23	ND	NR	NR
MW-1	09-22-92	29.15	14.18	14.97	ND	NR	NR
MW-1	10-19-92	29.15	14.52	14.63	ND	NR	NR
MW-1	11-23-92	29.15	14.54	14.61	ND	NR	NR
MW-1	12-16-92	29.15	12.20	16.95	ND	NR	NR
MW-1	01-14-93	29.15	9.32	19.83	ND	NR	NR
MW-1	02-26-93	29.15	9.38	19.77	ND	NR	NR
MW-1	03-26-93	29.15	10.04	19.11	ND	NR	NR
MW-1	04-09-93	29.15	10.50	18.65	ND	NR	NR
MW-1	05-19-93	29.15	11.26	17.89	ND	NR	NR
MW-1	06-17-93	29.15	11.53	17.62	ND	NR	NR
MW-1	07-28-93	29.15	12.00	17.15	ND	NR	NR
MW-1	08-23-93	29.15	12.31	16.84	ND	NR	NR
MW-1	09-28-93	29.15	12.60	16.55	ND	NR	NR
MW-1	10-11-93	29.15	12.74	16.41	ND	NR	NR
MW-1	11-16-93	29.15	12.96	16.19	ND	NR	NR
MW-1	12-16-93	29.15	11.68	17.47	ND	NR	NR
MW-1	02-08-94	29.15	11.29	17.86	ND	NR	NR
MW-1	03-04-94	29.15	10.61	18.54	ND	NR	NR
MW-1	05-10-94	29.15	11.12	18.03	ND	NR	NR
MW-1	08-12-94	29.15	12.55	16.60	ND	SW	0.004
MW-1	09-23-94	29.15	11.27	17.88	ND	NR	NR
MW-1	11-22-94	29.15	11.12	18.03	ND	SW	0.003
MW-1	03-15-95	29.15	8.50	20.65	ND	NW	0.01
MW-1	05-30-95	29.15	10.28	18.87	ND	SW	0.005
MW-1	09-20-95	29.15	11.70	17.45	ND	WSW	0.005

Table 2
Historical Groundwater Elevation Data

ARCO Service Station 2185
9800 East 14th Street, Oakland, California

Date: 11-08-95

Well Designation	Water Level Field Date	TOC Elevation ft-MSL	Depth to Water feet	Ground-Water Elevation ft-MSL	Floating Product Thickness feet	Ground-Water Flow Direction MWN	Hydraulic Gradient foot/foot
MW-2	07-24-92	28.47	12.95	15.52	ND	NR	NR
MW-2	08-26-92	28.47	13.55	14.92	ND	NR	NR
MW-2	09-22-92	28.47	13.78	14.69	ND	NR	NR
MW-2	10-19-92	28.47	14.09	14.38	ND	NR	NR
MW-2	11-23-92	28.47	14.06	14.41	ND	NR	NR
MW-2	12-16-92	28.47	11.70	16.77	ND	NR	NR
MW-2	01-14-93	28.47	8.87	19.60	ND	NR	NR
MW-2	02-26-93	28.47	8.98	19.49	ND	NR	NR
MW-2	03-26-93	28.47	9.57	18.90	ND	NR	NR
MW-2	04-09-93	28.47	10.02	18.45	ND	NR	NR
MW-2	05-19-93	28.47	10.81	17.66	ND	NR	NR
MW-2	06-17-93	28.47	11.08	17.39	ND	NR	NR
MW-2	07-28-93	28.47	11.60	16.87	ND	NR	NR
MW-2	08-23-93	28.47	11.90	16.57	ND	NR	NR
MW-2	09-28-93	28.47	12.17	16.30	ND	NR	NR
MW-2	10-11-93	28.47	12.31	16.16	ND	NR	NR
MW-2	11-16-93	28.47	12.54	15.93	Sheen	NR	NR
MW-2	12-16-93	28.47	11.29	17.18	ND	NR	NR
MW-2	02-08-94	28.47	10.85	17.62	ND	NR	NR
MW-2	03-04-94	28.47	10.16	18.31	ND	NR	NR
MW-2	05-10-94	28.47	10.70	17.77	ND	NR	NR
MW-2	08-12-94	28.47	12.12	16.35	ND	SW	0.004
MW-2	09-23-94	28.47	10.87	17.60	ND	NR	NR
MW-2	11-22-94	28.47	10.65	17.82	ND	SW	0.003
MW-2	03-15-95	28.47	8.37	20.10	ND	NW	0.01
MW-2	05-30-95	28.47	9.95	18.52	ND	SW	0.005
MW-2	09-20-95	28.47	11.37	17.10	ND	WSW	0.005

Table 2
Historical Groundwater Elevation Data

ARCO Service Station 2185
9800 East 14th Street, Oakland, California

Date: 11-08-95

Well Designation	Water Level Field Date	TOC Elevation ft-MSL	Depth to Water feet	Ground-Water Elevation ft-MSL	Floating Product Thickness feet	Ground-Water Flow Direction MWN	Hydraulic Gradient foot/foot
MW-3	07-24-92	28.57	12.90	15.67	Sheen	NR	NR
MW-3	08-26-92	28.57	13.51	15.06	ND	NR	NR
MW-3	09-22-92	28.57	13.73	14.84	ND	NR	NR
MW-3	10-19-92	28.57	14.04	14.53	ND	NR	NR
MW-3	11-23-92	28.57	14.02	14.55	ND	NR	NR
MW-3	12-16-92	28.57	11.73	16.84	ND	NR	NR
MW-3	01-14-93	28.57	9.17	19.40	ND	NR	NR
MW-3	02-26-93	28.57	9.30	19.27	ND	NR	NR
MW-3	03-26-93	28.57	9.83	18.74	ND	NR	NR
MW-3	04-09-93	28.57	10.22	18.35	ND	NR	NR
MW-3	05-19-93	28.57	10.91	17.66	ND	NR	NR
MW-3	06-17-93	28.57	10.74	17.83	ND	NR	NR
MW-3	07-28-93	28.57	11.60	16.97	ND	NR	NR
MW-3	08-23-93	28.57	11.93	16.64	ND	NR	NR
MW-3	09-28-93	28.57	12.13	16.44	ND	NR	NR
MW-3	10-11-93	28.57	12.26	16.31	ND	NR	NR
MW-3	11-16-93	28.57	12.48	16.09	ND	NR	NR
MW-3	12-16-93	28.57	11.26	17.31	ND	NR	NR
MW-3	02-08-94	28.57	10.93	17.64	ND	NR	NR
MW-3	03-04-94	28.57	10.33	18.24	ND	NR	NR
MW-3	05-10-94	28.57	10.77	17.80	ND	NR	NR
MW-3	08-12-94	28.57	12.07	16.50	ND	SW	0.004
MW-3	09-23-94	28.57	10.94	17.63	ND	NR	NR
MW-3	11-22-94	28.57	10.76	17.81	ND	SW	0.003
MW-3	03-15-95	28.57	8.47	20.10	ND	NW	0.01
MW-3	05-30-95	28.57	10.03	18.54	ND	SW	0.005
MW-3	09-20-95	28.57	11.30	17.27	ND	WSW	0.005

Table 2
Historical Groundwater Elevation Data

ARCO Service Station 2185
9800 East 14th Street, Oakland, California

Date: 11-08-95

Well Designation	Water Level Field Date	TOC Elevation ft-MSL	Depth to Water feet	Ground-Water Elevation ft-MSL	Floating Product Thickness feet	Ground-Water Flow Direction MWN	Hydraulic Gradient foot/foot
MW-4	07-24-92	29.21	13.68	15.53	ND	NR	NR
MW-4	08-26-92	29.21	14.12	15.09	ND	NR	NR
MW-4	09-22-92	29.21	14.46	14.75	ND	NR	NR
MW-4	10-19-92	29.21	14.74	14.47	ND	NR	NR
MW-4	11-23-92	29.21	14.75	14.46	ND	NR	NR
MW-4	12-16-92	29.21	12.45	16.76	ND	NR	NR
MW-4	01-14-93	29.21	9.46	19.75	ND	NR	NR
MW-4	02-26-93	29.21	9.54	19.67	ND	NR	NR
MW-4	03-26-93	29.21	10.19	19.02	ND	NR	NR
MW-4	04-09-93	29.21	10.67	18.54	ND	NR	NR
MW-4	05-19-93	29.21	11.52	17.69	ND	NR	NR
MW-4	06-17-93	29.21	11.79	17.42	ND	NR	NR
MW-4	07-28-93	29.21	12.30	16.91	ND	NR	NR
MW-4	08-23-93	29.21	12.60	16.61	ND	NR	NR
MW-4	09-28-93	29.21	12.88	16.33	ND	NR	NR
MW-4	10-11-93	29.21	13.03	16.18	ND	NR	NR
MW-4	11-16-93	29.21	13.24	15.97	ND	NR	NR
MW-4	12-16-93	29.21	11.96	17.25	ND	NR	NR
MW-4	02-08-94	29.21	11.54	17.67	ND	NR	NR
MW-4	03-04-94	29.21	10.84	18.37	ND	NR	NR
MW-4	05-10-94	29.21	11.38	17.83	ND	NR	NR
MW-4	08-12-94	29.21	12.82	16.39	ND	SW	0.004
MW-4	09-23-94	29.21	11.54	17.67	ND	NR	NR
MW-4	11-22-94	29.21	11.35	17.86	ND	SW	0.003
MW-4	03-15-95	29.21	8.69	20.52	ND	NW	0.01
MW-4	05-30-95	29.21	10.57	18.64	ND	SW	0.005
MW-4	09-20-95	29.21	12.02	17.19	ND	WSW	0.005

Table 2
Historical Groundwater Elevation Data

ARCO Service Station 2185
9800 East 14th Street, Oakland, California

Date: 11-08-95

Well Designation	Water Level Field Date	TOC Elevation ft-MSL	Depth to Water feet	Ground-Water Elevation ft-MSL	Floating Product Thickness feet	Ground-Water Flow Direction MWN	Hydraulic Gradient foot/foot
MW-5	02-26-93	28.12	9.00	19.12	ND	NR	NR
MW-5	03-26-93	28.12	9.41	18.71	ND	NR	NR
MW-5	04-09-93	28.12	9.80	18.32	ND	NR	NR
MW-5	05-19-93	28.12	10.50	17.62	ND	NR	NR
MW-5	06-17-93	28.12	10.73	17.39	ND	NR	NR
MW-5	07-28-93	28.12	11.15	16.97	ND	NR	NR
MW-5	08-23-93	28.12	11.43	16.69	ND	NR	NR
MW-5	09-28-93	28.12	11.66	16.46	ND	NR	NR
MW-5	10-11-93	28.12	11.80	16.32	ND	NR	NR
MW-5	11-16-93	28.12	12.00	16.12	ND	NR	NR
MW-5	12-16-93	28.12	10.81	17.31	ND	NR	NR
MW-5	02-08-94	28.12	10.53	17.59	ND	NR	NR
MW-5	03-04-94	28.12	9.89	18.23	ND	NR	NR
MW-5	05-10-94	28.12	10.37	17.75	ND	NR	NR
MW-5	08-12-94	28.12	11.60	16.52	ND	SW	0.004
MW-5	09-23-94	28.12	10.52	17.60	ND	NR	NR
MW-5	11-22-94	28.12	10.29	17.83	ND	SW	0.003
MW-5	03-15-95	28.12	8.47	19.65	ND	NW	0.01
MW-5	05-30-95	28.12	9.69	18.43	ND	SW	0.005
MW-5	09-20-95	28.12	10.90	17.22	ND	WSW	0.005
MW-6	02-26-93	27.79	8.47	19.32	ND	NR	NR
MW-6	03-26-93	27.79	9.07	18.72	ND	NR	NR
MW-6	04-09-93	27.79	9.53	18.26	ND	NR	NR
MW-6	05-19-93	27.79	10.23	17.56	ND	NR	NR
MW-6	06-17-93	27.79	10.51	17.28	ND	NR	NR
MW-6	07-28-93	27.79	10.98	16.81	ND	NR	NR
MW-6	08-23-93	27.79	11.28	16.51	ND	NR	NR
MW-6	09-28-93	27.79	11.50	16.29	ND	NR	NR
MW-6	10-11-93	27.79	11.65	16.14	ND	NR	NR
MW-6	11-16-93	27.79	11.87	15.92	ND	NR	NR
MW-6	12-16-93	27.79	10.63	17.16	ND	NR	NR
MW-6	02-08-94	27.79	10.28	17.51	ND	NR	NR
MW-6	03-04-94	27.79	9.67	18.12	ND	NR	NR
MW-6	05-10-94	27.79	10.13	17.66	ND	NR	NR
MW-6	08-12-94	27.79	11.44	16.35	ND	SW	0.004
MW-6	09-23-94	27.79	10.27	17.52	ND	NR	NR
MW-6	11-22-94	27.79	10.10	17.69	ND	SW	0.003
MW-6	03-15-95	27.79	7.75	20.04	ND	NW	0.01
MW-6	05-30-95	27.79	9.48	18.31	ND	SW	0.005
MW-6	09-20-95	27.79	10.75	17.04	ND	WSW	0.005

Table 2
Historical Groundwater Elevation Data

ARCO Service Station 2185
9800 East 14th Street, Oakland, California

Date: 11-08-95

Well Designation	Water Level Field Date	TOC Elevation ft-MSL	Depth to Water feet	Ground-Water Elevation ft-MSL	Floating Product Thickness feet	Ground-Water Flow Direction MWN	Hydraulic Gradient foot/foot
MW-7	07-28-93	27.88	11.67	16.21	ND	NR	NR
MW-7	08-23-93	27.88	12.00	15.88	ND	NR	NR
MW-7	09-28-93	27.88	12.17	15.71	ND	NR	NR
MW-7	10-11-93	27.88	12.33	15.55	ND	NR	NR
MW-7	11-16-93	27.88	12.46	15.42	ND	NR	NR
MW-7	12-16-93	27.88	11.23	16.65	ND	NR	NR
MW-7	02-08-94	27.88	10.83	17.05	ND	NR	NR
MW-7	03-04-94	27.88	10.13	17.75	ND	NR	NR
MW-7	05-10-94	27.88	10.68	17.20	ND	NR	NR
MW-7	08-12-94	27.88	12.05	15.83	ND	SW	0.004
MW-7	09-23-94	27.88	10.85	17.03	ND	NR	NR
MW-7	11-22-94	27.88	10.60	17.28	ND	SW	0.003
MW-7	03-15-95	27.88	8.13	19.75	ND	NW	0.01
MW-7	05-30-95	27.88	10.14	17.74	ND	SW	0.005
MW-7	09-20-95	27.88	11.52	16.36	ND	WSW	0.005
MW-8	08-12-94	NR	11.43	NR	ND	NR	NR
MW-8	09-23-94	NR	10.99	NR	ND	NR	NR
MW-8	11-22-94	NR	10.42	NR	ND	NR	NR
MW-8	03-15-95	NR	8.43	NR	ND	NR	NR
MW-8	05-30-95	NR	9.86	NR	ND	NR	NR
MW-8	09-20-95	28.08	11.07	17.01	ND	WSW	0.005
MW-9	09-20-95	27.73	11.67	16.06	ND	WSW	0.005
MW-10	09-20-95	27.55	10.65	16.90	ND	WSW	0.005

TOC: top of casing
ft-MSL: elevation in feet, relative to mean sea level
MWN: ground-water flow direction and gradient apply to the entire monitoring well network
ND: none detected
NR: not reported; data not available or not measurable
SW: southwest
NW: northwest
WSW: west-southwest

Table 3

Soil and Groundwater Analytical Data
ARCO Service Station 2185

Sample Identification	Date Sampled	Depth (feet)	TPHG[2]	Benzene	Toluene	Ethylbenzene	Xylenes
Soil Data (in mg/kg[1])							
MW-9	8/17/95	6.5	<1	<0.005	<0.005	<0.005	<0.005
MW-9	8/17/95	11	<1	<0.005	<0.005	<0.005	<0.005
MW-9	8/17/95	25	<1	<0.005	<0.005	<0.005	<0.005
MW-10	8/16/95	6.5	<1	<0.005	<0.005	<0.005	<0.005
MW-10	8/16/95	11.5	<1	<0.005	<0.005	<0.005	<0.005
MW-10	8/16/95	21.5	<1	<0.005	<0.005	<0.005	<0.005
Groundwater Data (in µg/L[3])							
MW-9	9/20/95	--	<50	<0.5	<0.5	<0.5	<0.5
MW-10	9/21/95	--	<50	<0.5	<0.5	<0.5	<0.5

1 mg/kg = milligrams per kilogram
2 TPHG = total petroleum hydrocarbons as gasoline
3 µg/L = micrograms per liter
< indicates laboratory minimum reporting limit

Table 4
Historical Groundwater Analytical Data

ARCO Service Station 2185
9800 East 14th Street, Oakland, California

Date: 11-08-95

Well Designation	Water Sample Field Date	TPHG µg/L	Benzene µg/L	Toluene µg/L	Ethyl-benzene µg/L	Total Xylenes µg/L
MW-1	07-24-92	<50	<0.5	<0.5	<0.5	<0.5
MW-1	10-19-92	<50	<0.5	<0.5	<0.5	<0.5
MW-1	01-14-93	<50	<0.5	<0.5	<0.5	<0.5
MW-1	04-09-93	<50	<0.5	<0.5	<0.5	<0.5
MW-1	08-23-93	<50	<0.5	<0.5	<0.5	<0.5
MW-1	10-11-93	<50	<0.5	<0.5	<0.5	<0.5
MW-1	03-04-94	<50	<0.5	<0.5	<0.5	<0.5
MW-1	05-10-94	<50	<0.5	<0.5	<0.5	<0.5
MW-1	08-12-94	<50	<0.5	<0.5	<0.5	<0.5
MW-1	11-22-94	<50	<0.5	<0.5	<0.5	<0.5
MW-1	03-15-95	<50	<0.5	<0.5	<0.5	<0.5
MW-1	05-30-95	Not sampled: not scheduled for chemical analysis				
MW-1	09-20-95	Not sampled: not scheduled for chemical analysis				
MW-2	07-24-92	5900	510	<10	370	430
MW-2	10-19-92	4100	110	<10	100	62
MW-2	01-14-93	12000	700	10	720	680
MW-2	04-09-93	8400	220	<10	480	320
MW-2	08-23-93	3700	89	<5	230	150
MW-2	10-11-93	2700	50	<2.5	<140	68
MW-2	03-04-94	3100	49	<2.5	180	98
MW-2	05-10-94	3100	39	<2.5	220	99
MW-2	08-12-94	1800	13	<2.5	120	35
MW-2	11-22-94	2300	45	<0.5	190	93
MW-2	03-15-95	2100	7.4	<2.5	130	39
MW-2	05-30-95	1700	3.3	<2.5	120	31
MW-2	09-21-95	1200	1	<1	68	16
MW-3	07-24-92	Not sampled: well contained floating product				
MW-3	10-19-92	42000	740	1100	1500	5700
MW-3	01-14-93	44000	1100	840	2200	9600
MW-3	04-09-93	21000	33	69	350	1600
MW-3	08-23-93	13000	63	21	530	1300
MW-3	10-11-93	11000	56	13	530	1200
MW-3	03-04-94	17000	50	<10	790	1600
MW-3	05-10-94	14000	32	<10	710	1200
MW-3	08-12-94	13000	37	<10	640	970
MW-3	11-22-94	15000	150	<10	1300	2000
MW-3	03-15-95	2000	<2.5	<2.5	88	82
MW-3	05-30-95	2000	3.2	<2.5	70	46
MW-3	09-21-95	2100	12	<3	77	38

Table 4
Historical Groundwater Analytical Data

ARCO Service Station 2185
9800 East 14th Street, Oakland, California

Date: 11-08-95

Well Designation	Water Sample Field Date	TPHG µg/L	Benzene µg/L	Toluene µg/L	Ethyl-benzene µg/L	Total Xylenes µg/L
MW-4	07-24-92	<50	<0.5	<0.5	<0.5	<0.5
MW-4	10-19-92	<50	<0.5	<0.5	<0.5	<0.5
MW-4	01-14-93	<50	<0.5	<0.5	<0.5	<0.5
MW-4	04-09-93	<50	<0.5	<0.5	<0.5	<0.5
MW-4	08-23-93	<50	<0.5	<0.5	<0.5	<0.5
MW-4	10-11-93	<50	<0.5	<0.5	<0.5	<0.5
MW-4	03-04-94	<50	<0.5	<0.5	<0.5	<0.5
MW-4	05-10-94	<50	<0.5	<0.5	<0.5	<0.5
MW-4	08-12-94	<50	<0.5	<0.5	<0.5	<0.5
MW-4	11-22-94	<50	<0.5	<0.5	<0.5	<0.5
MW-4	03-15-95	<50	<0.5	<0.5	<0.5	<0.5
MW-4	05-30-95	Not sampled: not scheduled for chemical analysis				
MW-4	09-20-95	Not sampled: not scheduled for chemical analysis				
MW-5	02-11-93	9300	620	<50	890	2200
MW-5	04-09-93	960	29	<1	100	96
MW-5	08-23-93	2700	50	<2.5	260	250
MW-5	10-11-93	840	9	<1	87	41
MW-5	03-04-94	540	0.9	0.6	16	6.3
MW-5	05-10-94	1300	11	<2.5	110	68
MW-5	08-12-94	1500	10	<2.5	110	30
MW-5	11-22-94	84	1	<0.5	5	2
MW-5	03-15-95	170	5.6	<0.5	17	11
MW-5	05-30-95	53	0.6	<0.5	4.8	2.8
MW-5	09-21-95	1500	47	2	120	86
MW-6	02-11-93	4800	630	<10	490	460
MW-6	04-09-93	13000	880	<10	1000	1000
MW-6	08-23-93	6300	390	<20	450	390
MW-6	10-11-93	2900	150	3.4	190	140
MW-6	03-04-94	5800	320	<5	510	360
MW-6	05-10-94	11000	470	<10	880	650
MW-6	08-12-94	4400	170	<10	390	210
MW-6	11-22-94	7300	390	<5	940	640
MW-6	03-15-95	3600	77	<5	420	180
MW-6	05-30-95	5000	68	<5	530	250
MW-6	09-21-95	3300	36	<5	360	120

Table 4
Historical Groundwater Analytical Data

ARCO Service Station 2185
9800 East 14th Street, Oakland, California

Date: 11-08-95

Well Designation	Water Sample Field Date	TPHG µg/L	Benzene µg/L	Toluene µg/L	Ethyl-benzene µg/L	Total Xylenes µg/L
MW-7	05-14-93	350	0.83	<0.5	<0.5	<0.5
MW-7	08-23-93	630*	7.3	<1	<1	<1
MW-7	10-11-93	620*	3.5	<0.5	<0.5	<0.5
MW-7	03-04-94	320*	<0.5	<0.5	<0.5	<0.5
MW-7	05-10-94	330*	0.6	<0.5	<0.5	<0.5
MW-7	08-12-94	360*	<0.5	<0.5	<0.5	<0.5
MW-7	11-22-94	<50	<0.5	<0.5	<0.5	<0.5
MW-7	03-15-95	150*	<0.5	<0.5	<0.5	<0.5
MW-7	05-30-95	110*	<0.5	<0.5	<0.5	<0.5
MW-7	09-20-95	<400*	<0.8	<0.5	<0.5	<0.5
MW-8	08-12-94	5100	12	<5	470	53
MW-8	11-22-94	2300	16	<0.5	140	4
MW-8	03-15-95	280	<0.5	<0.5	0.7	0.7
MW-8	05-30-95	390	<0.5	<0.5	<2	1.6
MW-8	09-21-95	470	<0.5	<0.5	3	1.2
MW-9	09-20-95	<50	<0.5	<0.5	<0.5	<0.5
MW-10	09-21-95	<50	<0.5	<0.5	<0.5	<0.5

TPHG: total petroleum hydrocarbons as gasoline
µg/l: micrograms per liter
*: chromatogram does not match the typical gasoline fingerprint

152753

Base map from USGS 7.5' Quad. Maps:
Oakland East and San Leandro, California.
Photorevised 1980.

- N -

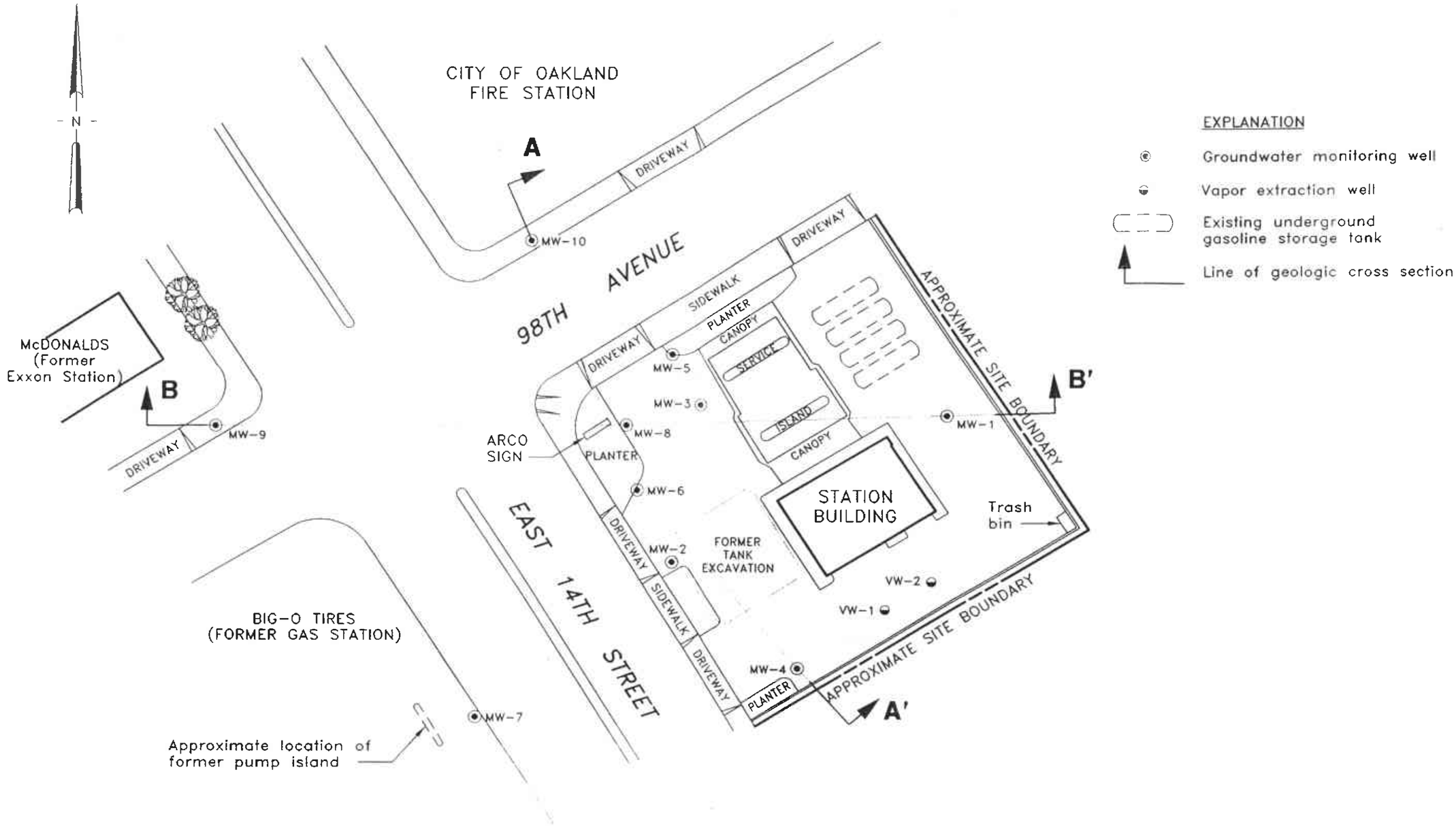
Scale : 0 2000 4000 Feet

EMCON

ARCO PRODUCTS COMPANY
SERVICE STATION 2185. 9800 E. 14TH STREET
OFFSITE ASSESSMENT
OAKLAND, CALIFORNIA

SITE LOCATION

FIGURE
1
PROJECT NO.
805-130.02



Base map modified from RESNA, 1994

EMCON

SCALE: 0 40 80 FEET
(APPROXIMATE)

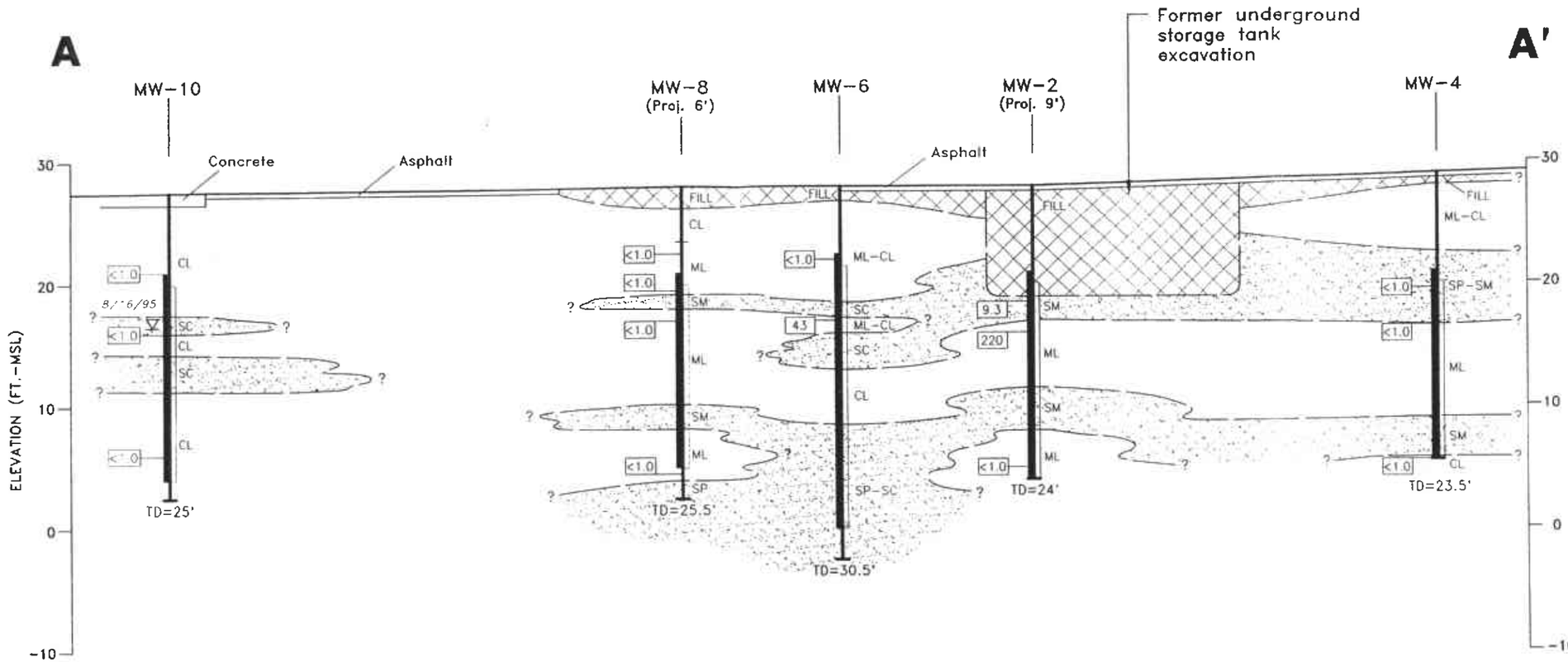
ARCO PRODUCTS COMPANY
SERVICE STATION 2135, 9800 E. 14TH STREET
OFFSITE ASSESSMENT
OAKLAND, CALIFORNIA

SITE PLAN

FIGURE NO.
2
PROJECT NO.
805-130.02

NORTHWEST

SOUTHEAST



EXPLANATION

- FILL
- SILTS AND CLAYS (ML, CL)
- SANDS, SILTY AND CLAYEY SANDS (SP, SM, SC)
- Geologic contact; dashed where approximate, queried where uncertain

- MW-4 — Well/boring designation
- Borehole
- <1.0 — TPH as gasoline (ppm)
- Sand pack interval
- First encountered groundwater (showing date measured)
- Screened interval
- TD=23.5' — Total depth of boring

NOTES:

1. See Figure 2 for location of cross section.
2. See Appendix F for soil symbol explanation.

EMCON

SCALE: 0 20 40 FEET
(Horizontal)

ARCO PRODUCTS COMPANY
SERVICE STATION 2185, 9800 E. 14TH STREET
OFFSITE ASSESSMENT
OAKLAND, CALIFORNIA

GEOLOGIC CROSS SECTION A-A'

FIGURE NO. 3

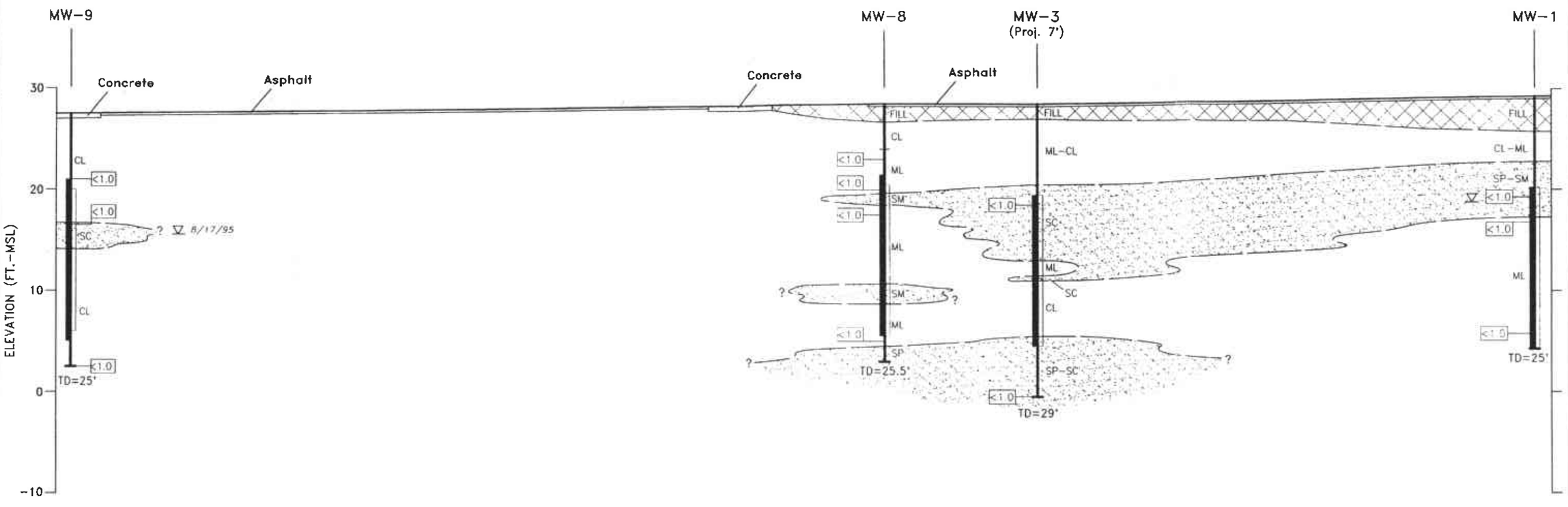
PROJECT NO. 805-130.02

WEST

B

EAST

B'



EXPLANATION

- FILL
- SILTS AND CLAYS (ML, CL)
- SANDS, SILTY AND CLAYEY SANDS (SP, SM, SC)
- ? — Geologic contact; dashed where approximate, queried where uncertain

- MW-4 — Well/boring designation
- Borehole
- <1.0 — TPH as gasoline (ppm)
- Sand pack interval
- ▽ — First encountered groundwater (showing date measured)
- Screened interval
- TD=23.5' — Total depth of boring

NOTES:

1. See Figure 2 for location of cross section.
2. See Appendix F for soil symbol explanation.

EMCON

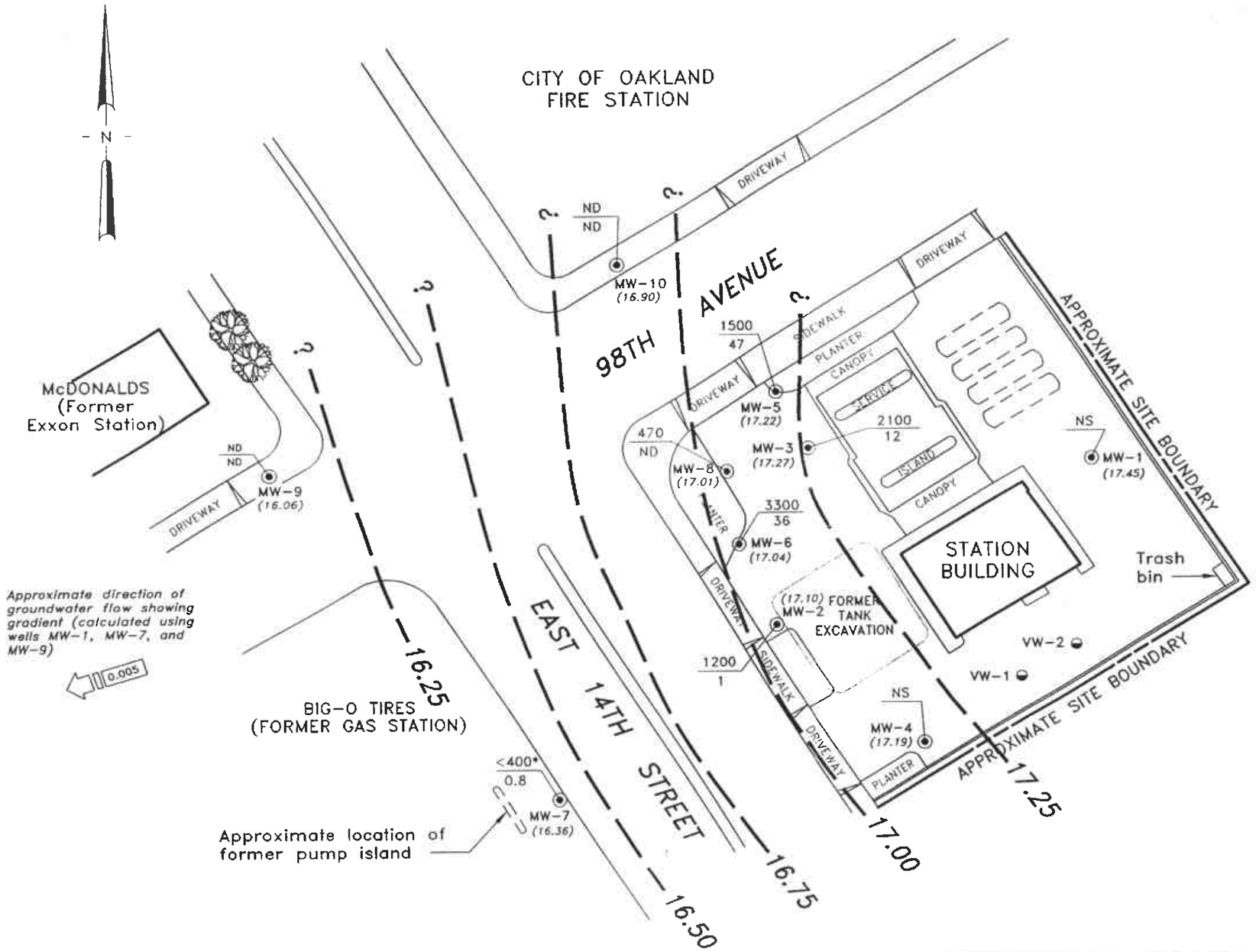
SCALE: 0 20 40 FEET
(Horizontal)

ARCO PRODUCTS COMPANY
SERVICE STATION 2185, 9800 E. 14TH STREET
OFFSITE ASSESSMENT
OAKLAND, CALIFORNIA

GEOLOGIC CROSS SECTION B-B'

FIGURE NO.
4

PROJECT NO.
805-130.02



EXPLANATION

- Groundwater monitoring well
- Vapor extraction well
- Existing underground gasoline storage tank
- (17.01) Groundwater elevation (Ft.–MSL) measured 9/20/95
- ? Groundwater elevation contour (Ft.–MSL)
- 470 / ND — TPH, as gasoline concentration (ug/L); sampled 9/20–21/95 / Benzene concentration (ug/L); sampled 9/20–21/95
- * Chromatogram does not match the typical gasoline figerprint
- NS Not sampled; not scheduled for chemical analysis
- ND Not detected at or above the method reporting limit for TPHG (50 ug/L) or benzene (0.5 ug/L)

Base map modified from RESNA, 1994.

EMCON

SCALE: 0 40 80 FEET
(APPROXIMATE)

ARCO PRODUCTS COMPANY
SERVICE STATION 2185, 9800 E. 14TH STREET
OFFSITE ASSESSMENT
OAKLAND, CALIFORNIA

GROUNDWATER DATA
THIRD QUARTER 1995

FIGURE NO.
5
PROJECT NO.
805–130.02

APPENDIX A

WELL PERMITS

ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
5997 PARKSIDE DRIVE • PLEASANTON, CALIFORNIA 94588 • (510) 484-2600

TELEFAX TRANSMITTAL

DATE: 23 May 95

DELIVER TO: T. Rob D

NAME OF FIRM: Emcon

FAX PHONE #: (408) 437-9526

FROM: Wyman Hong

NUMBER OF PAGES: 2
(Including transmittal)

FOR VOICE CONTACT CALL: (510) 484-2600

FOR RETURN FAX: (510) 462-3914

REMARKS: Drilling permit 95308 for a monitoring well construction project at 9800 E. 14th Street in Oakland for ARCO.

ZONE 7 WATER AGENCY

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

DRILLING PERMIT APPLICATION

FOR APPLICANT TO COMPLETE

LOCATION OF PROJECT ARCO SERVICE STATION #2185
9800 E. 14th Street
Oakland, CA

CLIENT
Name ARCO Products Company
Address 2000 Alameda de las Pulgas Voice (415) 571-2400
City Box 5811 Zip 94402
San Mateo, CA

APPLICANT
Name EMCON
Fax (408) 437-9526
Address 1921 Ringwood Ave. Voice (408) 453-7300
City San Jose, CA Zip 95131

TYPE OF PROJECT

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

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

DRILLING METHOD:
Mud Rotary ___ Air Rotary ___ Auger X
Cable ___ Other ___

DRILLER'S LICENSE NO. C-57 # 554979

WELL PROJECTS
Drill Hole Diameter 8 in. Maximum
Casing Diameter 2 in. Depth 30 ft.
Surface Seal Depth 4-10 ft. Number 2

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

ESTIMATED STARTING DATE 5/22/95
ESTIMATED COMPLETION DATE 6/22/95

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

APPLICANT'S SIGNATURE Robert le Doux for Emcon Date 5/12/95

FOR OFFICE USE

PERMIT NUMBER 95308
LOCATION NUMBER ___

PERMIT CONDITIONS

Circled Permit Requirements Apply

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

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

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

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

E. WELL DESTRUCTION. See attached.

Approved Wyman Hong Date 19 May 95
Wyman Hong

91992

CITY OF OAKLAND

OFFICE OF PLANNING & BUILDING • 1330 BROADWAY • OAKLAND, CALIFORNIA 94612

Building Services Department

(510) 238-3102
TDD 839-6451
FAX: 238-3586

May 1, 1995

Mr. Peter T. Christianson
1921 Ringwood Ave.
San Jose, CA 95131-1721

Dear Mr. Christianson:

RE: MINOR ENCROACHMENT PERMIT FOR 9800 E14th STREET

Enclosed are the Minor Encroachment Permit and Agreement and the Conditions For Granting a Minor Encroachment Permit allowing you to place two monitoring wells within the public right-of-way of 98th Avenue.

Before the permit will become effective, however, it must be signed by the person(s) having the legal authority to do so, properly notarized with notary acknowledgement slip(s) attached, and returned to this office to the attention of Roger Tam for recordation.

You must also obtain a street excavation permit from the Engineering Information Counter, 2nd Floor, 1330 Broadway, prior to the start of the proposed work in the City right-of-way. For questions regarding the street excavation permit, call the Engineering Information Counter at (510) 238-4777 between 8 a.m. and 4 p.m., Monday through Friday.

If you have any other questions regarding this minor encroachment permit, please call Roger Tam at (510) 238-2110.

Very truly yours,

KAY WINER
Director of Planning & Building

By Philip A. Grubstick
PHILIP A. GRUBSTICK
Engineering Services Manager

Enclosures

RT:rt

file: e14-9800.mw\covr-let(7)

City of Oakland
Director of Planning & Building
1330 Broadway, 2nd Floor
Oakland, CA 94612

When Recorded Mail to:
Director of Planning & Building
City of Oakland
1330 Broadway, 2nd Floor
Oakland, CA 94612

(UNRECORDED)

TAX ROLL PARCEL NUMBER
(ASSESSOR'S REFERENCE NUMBER)

046	5425	014	03
MAP	BLOCK	PARCEL	SUB

SPACE ABOVE FOR RECORDER'S USE ONLY

Address: 9800 - E14th Street, Oakland

MINOR ENCROACHMENT PERMIT AND AGREEMENT

Atlantic Richfield Company, a Pennsylvania corporation, owner of that certain property described in the Grant Deed recorded May 31, 1972, Series No. 72-72120, in Reel No. 3144, Image No. 456, in the Office of the Recorder, Alameda County, California and commonly known as 9800 - E14th Street, is hereby granted a Conditional Revocable Permit to encroach into the public right of way area of 98th Avenue with two monitoring wells. The location of said encroachment shall be as delineated in Exhibit 'A' attached hereto and made a part hereof.

The permittee agrees to comply with and be bound by the conditions for granting an Encroachment Permit attached hereto and made a part hereof.

This agreement shall be binding upon the present owner of the property described above, and its successors in interest thereof.

In witness whereof, I, the representative of Atlantic Richfield Company, have set my signature this 23rd day of May, 1995.

Mike Whelan
Name: MIKE WHELAN
Title: ENVIRONMENTAL ENGINEER

<-- Please attach California all-purpose acknowledgment slip here

-- -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --

BELOW FOR OFFICIAL USE ONLY

CITY OF OAKLAND

Dated_____

By:_____
CALVIN N. WONG
Deputy Director
Building Services
For
KAY WINER
Director of Planning & Building

RT:rt
file: e14-9800.mw\per&agt(7)

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

No. 5907

State of CALIFORNIA

County of SANTA CLARA

On MAY 23, 1995 (DATE) before me, TERESA A. BERRY (NAME, TITLE OF OFFICER - E.G., "JANE DOE, NOTARY PUBLIC"),

personally appeared MIKE WHELAN (NAME(S) OF SIGNER(S)),

☒ personally known to me - **OR** - ☐ proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/~~are~~ subscribed to the within instrument and acknowledged to me that he/~~she~~/~~they~~ executed the same in his/~~her~~/~~their~~ authorized capacity(~~ies~~), and that by his/~~her~~/~~their~~ signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

TERESA A. BERRY
COMM. # 1029979
Notary Public — California
SANTA CLARA COUNTY
My Comm. Expires JUL 1, 1998

WITNESS my hand and official seal.

Teresa A. Berry
SIGNATURE OF NOTARY

OPTIONAL

Though the data below is not required by law, it may prove valuable to persons relying on the document and could prevent fraudulent reattachment of this form.

CAPACITY CLAIMED BY SIGNER

☐ INDIVIDUAL
☐ CORPORATE OFFICER

_____
TITLE(S)

☐ PARTNER(S) ☐ LIMITED ☐ GENERAL
☐ ATTORNEY-IN-FACT
☐ TRUSTEE(S)
☐ GUARDIAN/CONSERVATOR
☒ OTHER: ENVIRONMENTAL ENGINEER

SIGNER IS REPRESENTING:
NAME OF PERSON(S) OR ENTITY(IES)
ARO

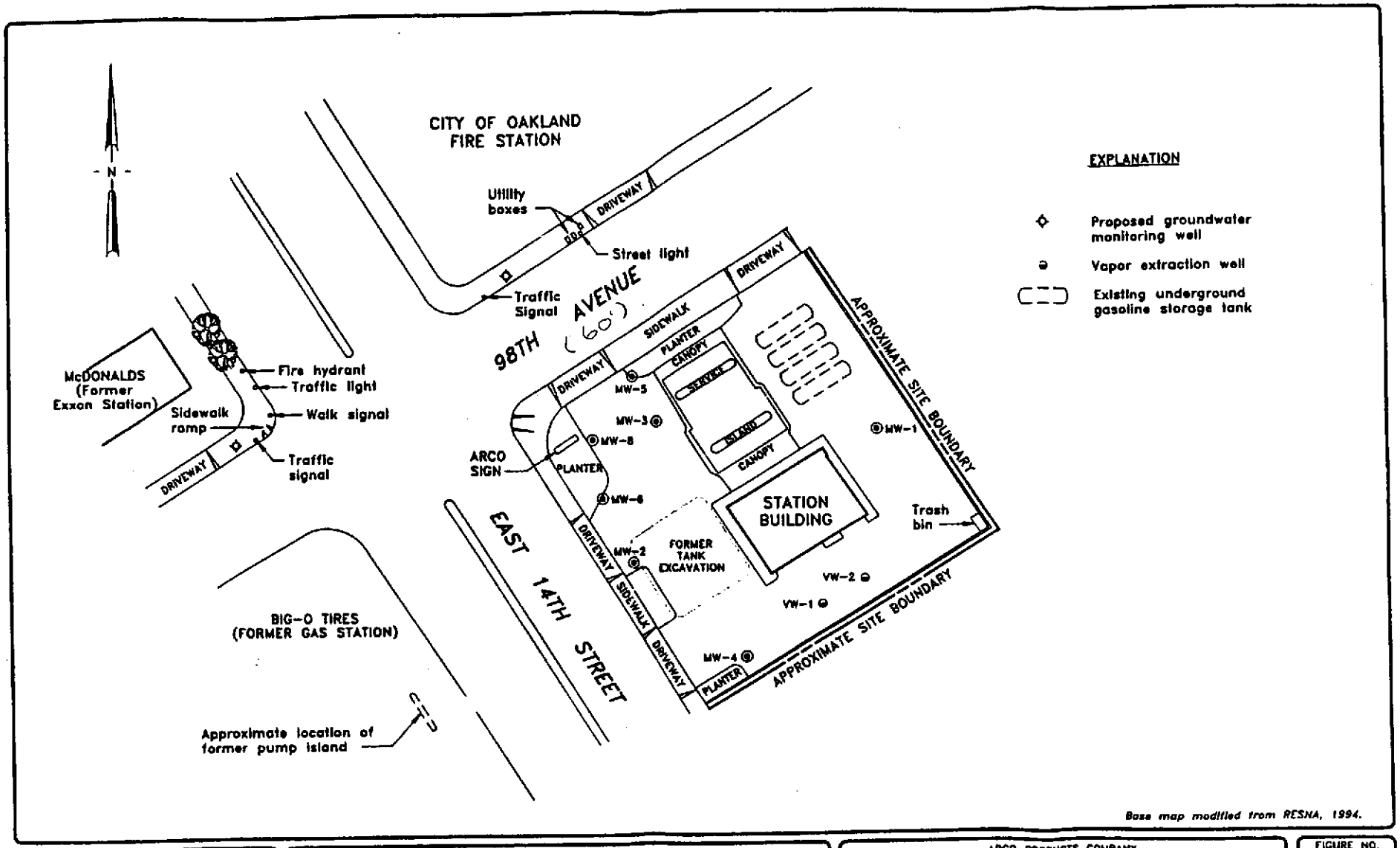
DESCRIPTION OF ATTACHED DOCUMENT

MINOR ENCROACHMENT PERMIT AND AGREEMENT
TITLE OR TYPE OF DOCUMENT

SIX (6)
NUMBER OF PAGES

5/23/95
DATE OF DOCUMENT

CALVIN N. WONG
CITY OF OAKLAND
SIGNER(S) OTHER THAN NAMED ABOVE



EMCON

SCALE: 0 40 80 FEET
(APPROXIMATE)

ARCO PRODUCTS COMPANY
SERVICE STATION 2185, 9800 E. 14TH STREET
OFFSITE ASSESSMENT
OAKLAND, CALIFORNIA

PROPOSED WELL LOCATIONS MAP

FIGURE NO. 1
PROJECT NO. 805-130.02

EXHIBIT "A" (NO SCALE)

TO: Atlantic Richfield Company, a Pennsylvania corporation (APN: 046-5425-014-03)

Address: P. O. Box 5811, San Mateo, CA 94402

RE: Minor Encroachment Permit for Monitoring Well in 98th Avenue

CONDITIONS FOR GRANTING A MINOR ENCROACHMENT PERMIT

1. That this permit shall be revocable at the pleasure of the Director of Planning & Building.

2. That the permittee, by the acceptance, either expressed or implied, of the minor encroachment permit hereby disclaims any right, title, or interest in or to any portion of the public sidewalk or street area, and agrees that said temporary use of said area does not constitute an abandonment on the part of the City of Oakland of any of its rights for street purposes and otherwise.

3. The permittee shall maintain in force and effect at all times that said encroachment occupies said public sidewalk or street area, good and sufficient public liability insurance in the amount of $300,000 for each occurrence, and property damage insurance in the amount of $50,000 for each occurrence, both including contractual liability insuring the City of Oakland against any and all claims arising out of the existence of said encroachment in said public sidewalk or street area, and that a certificate of such insurance and subsequent notices of the renewal thereof, shall be filed with the Director of Planning & Building of the City of Oakland, and that such certificate shall state that said insurance coverage shall not be canceled or be permitted to lapse without thirty (30) days written notice to said Director of Planning & Building. The Permittee also agrees that the City may review the type and amount of insurance required of the Permittee every five (5) years and may require the permittee to increase the amount of and/or change the type of insurance coverage required.

4. That the permittee, by the acceptance, either expressed or implied, of this revocable permit shall be solely and fully responsible for the repair or replacement of any portion or all of said improvements in the event that said improvements shall have failed or have been damaged to the extent of creating a menace or of becoming a hazard to the safety of the general public; and that the permittee shall be liable for the expenses connected therewith.

5. That upon the termination of the permission herein granted, permittee shall immediately remove said encroachment from the sidewalk and street area, and any damage resulting therefrom shall be repaired to the satisfaction of the Director of Planning & Building.

6. That the permittee shall file with the City of Oakland for recordation a Minor Encroachment Permit and Agreement, and shall be bound by and comply with all the terms and conditions of said permit.

7. That said permittee shall obtain an excavation permit prior to the construction and a separate excavation permit prior to the removal of the ground water monitoring wells.

8. That said permittee shall provide to the City of Oakland an AS BUILT plan showing the actual location of the ground water monitoring wells and the results of all data collected from the monitoring wells.

9. That said permittee shall remove the monitoring wells and repair any damage to the sidewalk or street area in accordance with City standards two (2) years after construction or as soon as monitoring is complete.

10. That said permittee shall notify the Office of Planning & Building after the monitoring well(s) is/are removed and the sidewalk or street area restored to initiate the procedure to rescind the minor encroachment permit.

11. That monitoring well covers installed within the sidewalk area shall have a skidproof surface. A precast concrete utility box may be used in conjunction with the bolted cast iron cover with City approval.

12. That the ground water monitoring well casting and cover shall be cast iron and shall meet H-20 load rating. The cover shall be secured with a minimum of two stainless steel bolts. Bolts and cover shall be mounted flush with the surrounding surface.

13. That the permittee acknowledges that the City makes no representations or warranties as to the conditions beneath said encroachment. By accepting this revocable permit, permittee agrees that it will use the encroachment area at its own risk, is responsible for the proper coordination of its activities with all other permittees, underground utilities, contractors, or workmen operating within the encroachment area and for the safety of itself and any of its personnel in connection with its entry under this revocable permit.

14. That the permittee acknowledges that the City is unaware of the existence of any hazardous substances beneath the

encroachment area, and hereby waives and fully releases and forever discharges the City and its officers, directors, employees, agents, servants, representatives, assigns and successors from any and all claims, demands, liabilities, damages, actions, causes of action, penalties, fines, liens, judgments, costs, or expenses whatsoever (including, without limitation, attorneys' fees and costs), whether direct or indirect, known or unknown, foreseen or unforeseen, that may arise out of or in any way connected with the physical condition, or required remediation of the excavation area or any law or regulation applicable thereto, including, without limitation, the Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended (42 U.S.C. Sections 9601 et seq.), the Resource Conservation and Recovery Act of 1976 (42 U.S.C. Section 6901 et seq.), the Clean Water Act (33 U.S.C. Section 466 et Seq.), the Safe Drinking Water Act (14 U.S.C. Sections 1401-1450), the Hazardous Materials Transportation Act (49 U.S.C. Section 1801 et seq.), the Toxic Substance Control Act (15 U.S.C. Sections 2601-2629), the California Hazardous Waste Control Law (California Health and Safety Code Sections 25100 et seq.), the Porter-Cologne Water Quality Control Act (California Health and Safety Code Section 13000 et seq.), the Hazardous Substance Account Act (California Health and Safety Code Section 25300 et seq.), and the Safe Drinking Water and Toxic Enforcement Act (California Health and Safety Code Section 25249.5 et seq.).

15. Permittee further acknowledges that it understands and agrees that it hereby expressly waives all rights and benefits which it now has or in the future may have, under and by virtue of the terms of California Civil Code Section 1542, which reads as follows: "A GENERAL RELEASE DOES NOT EXTEND TO CLAIMS WHICH THE CREDITOR DOES NOT KNOW OR SUSPECT TO EXIST IN HIS FAVOR AT THE TIME OF EXECUTING THE RELEASE, WHICH IF KNOWN BY HIM MUST HAVE MATERIALLY AFFECTED HIS SETTLEMENT WITH THE DEBTOR."

16. Permittee recognizes that by waiving the provisions of this section, permittee will not be able to make any claims for damages that may exist, and to which, if known, would materially affect his/her decision to execute this encroachment agreement, regardless of whether permittee's lack of knowledge is the result of ignorance, oversight, error, negligence, or any other cause.

17. (a) That the permittee, by the acceptance of this revocable permit, agrees and promises to indemnify, defend, and hold harmless the City of Oakland, its officers, agents, and employees, to the maximum extent permitted by law, from any and all claims, demands, liabilities, damages, actions, causes of action, penalties, fines, liens, judgments, costs, or expenses whatsoever (including, without limitation, attorneys' fees and costs;

collectively referred to as "claims"), whether direct or indirect, known or unknown, foreseen or unforeseen, to the extent that such claims were caused by the permittee, its agents, employees, contractors or representatives.

(b) That, if any contamination is discovered below or in the immediate vicinity of the encroachment, and the contaminants found are of the type used, housed, stored, processed or sold on or from the 98th Avenue, Oakland, California site, such shall amount to a rebuttable presumption that the contamination below, or in the immediate vicinity of, the encroachment was caused by the permittee, its agents, employees, contractors or representatives.

(c) That the permittee shall comply with all applicable federal, state, county and local laws, rules, and regulations governing the installation, maintenance, operation and abatement of the encroachment.

(d) That the permittee hereby does remise, release, and forever discharge, and agree to defend, indemnify and save harmless, the City, its officers, agents and employees and each of them, from any and all actions, claims, and demands of whatsoever kind or nature, and any damage, loss or injury which may be sustained directly or by the undersigned and any other person or persons, and arising out of, or by reason of, the occupation of said public property, and the future removal of the above-mentioned encroachment.

18. That the hereinabove conditions shall be binding upon the permittee and the successive owners and assigns thereof.

19. That said Minor Encroachment Permit and Agreement shall take effect when all the conditions hereinabove set forth shall have been complied with to the satisfaction of the Director of Planning & Building, and shall become null and void upon the failure of the permittee to comply with all conditions hereinabove set forth.

APPENDIX B

FIELD AND LABORATORY PROCEDURES

Exploratory Boring and Soil Sampling

EXPLORATORY BORINGS AND SOIL SAMPLING

General procedures for drilling and sampling exploratory borings are discussed below.

Before a drilling rig is mobilized, access issues with private property owners are resolved and an underground utility locating service contracted to investigate proposed boring sites and arrange for site visits by public and private utility companies. The utility companies locate their installations with the aid of maps and the locating service verifies and marks the locations. Final boring locations are determined after these assessments are made. To confirm that no subsurface utilities will obstruct drilling, field personnel excavate the upper four feet of soil from each boring location with a posthole digger.

For sites characterized by relatively shallow (less than 100-feet-deep) groundwater, exploratory borings are drilled with 8- to 12-inch hollow-stem auger drilling equipment. The augers are steam-cleaned to prevent possible cross-contamination between boreholes. Where chemical analysis of samples is indicated, sampling equipment is also steam-cleaned between each sampling event.

Soil samples are collected at depths no farther apart than 5 feet using a modified California split-spoon sampler which is fitted with stainless-steel liners. As the sampler is driven into undisturbed soil ahead of the auger tip, soil accumulates in the liners. The sampler is retrieved from the ground and the liners are removed, sealed with TeflonG tape and polypropylene end-caps, and stored on ice pending selection for analysis and transport to the laboratory. Chain-of-custody documentation accompanies samples to the laboratory.

Field characterization of contamination is based on visual and olfactory observations and on the results of a headspace analysis, in which a soil sample is removed from the liner, sealed in a mason jar, and exposed to direct sunlight for 10 to 15 minutes. The jar is shaken to release volatile hydrocarbons into the headspace between the soil and the jar cover. The headspace is probed by a tube attached to a portable photoionization detector (PID), by which volatile hydrocarbon content is measured. A minimum of one sample, typically that having the highest PID reading from a boring, is submitted for chemical analysis.

A detailed boring log is maintained for each exploratory boring from auger-return material and representative soil samples. Soil is logged in the field according to the Unified Soil Classification System, and the logging supervised by a state-registered geologist. Borings not completed as wells are backfilled with a neat-cement slurry by the tremie method.

Drill cuttings are stockpiled on site and covered with plastic sheeting until the results of chemical analyses are known. The petroleum hydrocarbon content of the stockpile is determined by analysis of a composite formed from samples collected from the subsurface of the stockpile. Recommendations for disposal of the cuttings are made on the basis of the analysis, and the cuttings are disposed of by the client.

Sampling and Analysis Procedures

EMCON's sampling and analysis procedures for soils provide consistent and reproducible results and ensure that the objectives of the sampling program are met.

The following publications were used as guidelines for developing these procedures:

- *Leaking Underground Fuel Tank* (LUFT) *Field Manual* (State Water Resources Control Board, May 1988, revised October 1989)
- *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods* (EPA, SW-846, 3rd edition, November 1986)

Sample Handling

Sample containers are labeled immediately after sample collection, and are kept in ice chests with ice which is replaced daily until the containers are received at the laboratory. As a sample is collected, it is logged on the chain-of-custody record that accompanies samples to the laboratory.

Samples are transferred from the site to EMCON's laboratory by EMCON field personnel. Laboratory personnel assign a different number to each sample container and the number is recorded on the chain-of-custody record and used to identify the sample on all subsequent internal chain-of-custody and analytical records. Within 24 hours of sample receipt, samples are routinely shipped from EMCON to laboratories performing the selected analyses. EMCON's laboratory manager ensures that the holding times for requested analyses are not exceeded.

Sample Documentation

The procedures for sample handling provide chain-of-custody control from collection through storage. Sample documentation includes the following:

- Labels for identifying individual samples
- Chain-of-custody records for documenting possession and transfer of samples

- Laboratory analysis requests for documenting analyses to be performed

Labels

Sample labels contain the following information:

- Project number
- Sample number (i.e., boring designation)
- Sampler's initials
- Date and time of collection

Sampling and Analysis Chain-of-Custody Record

The sampling and analysis chain-of-custody record (Figure 1), initiated at the time of sampling, includes the boring number, sample type, analytical request, date of sampling, the name of the sampler, and other information deemed pertinent. The sampler signs his name and records the date and time on the record sheet when transferring the samples to another person. Custody transfers are recorded for every sample; for example, if samples are split and sent to more than one laboratory, a record sheet accompanies each sample. The number of custodians in the chain of possession is kept to a minimum. A copy of the sampling and analysis chain-of-custody record is returned to EMCON with the analytical results.

Soil Analysis Request

The Soil Analysis Request (Figure 2) or the purchase order that accompanies samples to the laboratory serves as official communication of the particular analysis(es) required for each sample and is evidence that the chain of custody is complete.

At a minimum, the soil analysis request includes the following:

- Date submitted
- Specific analytical parameters
- Boring number
- Sample source

Analytical Methods

Samples collected as part of the proposed sampling programs are analyzed by accepted analytical procedures. The same publications cited under "Sampling and Analysis Procedures are the primary references.

The laboratories performing the analyses are certified by the Department of Health Services (DHS) for hazardous waste testing.

Quality Control

Quality assurance measures confirm the integrity of field and laboratory data generated during the monitoring program. Procedures for assessing data quality are discussed in this section. Field and laboratory quality assurance data are evaluated in the technical reports.

Laboratory Quality Assurance

Laboratory quality assurance includes procedures required under the DHS Hazardous Waste Testing Program. For sites where Columbia Analytical Services conducts the chemical tests, quality assurance procedures include the reporting of surrogate recoveries, matrix spike recoveries, and matrix spike duplicates (or duplicate) results.

Method blanks are analyzed daily for the purpose of assessing the effect of the laboratory environment on analytical results, and are performed for each constituent analyzed.

Samples to be analyzed for organic constituents contain surrogate spike compounds. Surrogate recoveries are used to determine whether analytical instruments are operating within limits. Surrogate recoveries are compared with control limits established and updated by the laboratory on the basis of its historical operation.

Matrix spikes are analyzed at a frequency of approximately 10 percent. Matrix spike results are evaluated to determine whether the sample matrix is interfering with the laboratory analysis, and provide a measure of the accuracy of the analytical data. Matrix spike recoveries are compared with control limits established and updated by the laboratory on the basis of its historical operation.

Laboratory duplicates are analyzed at a frequency of approximately 10 percent. Spike duplicate results are evaluated to determine the reproducibility (precision) of the analytical method. Reproducibility values are compared with control limits established and updated by the laboratory on the basis of its historical operation.

Laboratory QC data included with the analytical results are method blanks, surrogate spike recoveries (for organic parameters only), matrix spike recoveries, and matrix spike duplicates.

When other state-certified laboratories conduct the testing, each laboratory will follow its own internal QA/QC program.

Groundwater Well Installation

GROUNDWATER WELL INSTALLATION PROCEDURES

Well permits are obtained from local and state regulatory agencies preparatory to drilling exploratory borings that will be completed as groundwater wells.

The exploratory borings to be converted to verification monitoring wells or extraction wells are drilled no deeper than 20 feet into saturated soil, or until a layer at least 3 feet thick of relatively impermeable clayey material (aquitard) is encountered, whichever comes first. If the aquitard is sufficiently thick, it is backfilled with bentonite through a tremie pipe. Borings are converted to verification monitoring wells with 2-inch-diameter, flush-threaded, polyvinyl chloride (PVC) casing with a screened section of machine-perforated, 0.020-inch slots. For extraction wells, the boring is reamed with a 12-inch-diameter auger, and 6-inch-diameter casing is installed inside the enlarged borehole.

Boring depths and screen lengths are determined from geologic profiles of the boring. Screened sections of casing extend through the saturated interval as much as 5 feet above first-encountered groundwater. A well is completed by the placement of various materials in the annular space around the casing. The annulus is filled to approximately 2 feet above the screen with a sand pack of a grain size predetermined by sieve analysis of the soil. The sand pack is covered with a bentonite plug at least 1-foot thick, and the remaining annular space is sealed within 1 foot of the surface with a sanitary seal of neat cement in compliance with regulatory guidelines. The wells are completed to ground surface with PVC casing. The well heads are protected with traffic-proof vault boxes set in concrete and capped with water-tight locking devices. Well locations are surveyed and top-of-casing elevations measured to the nearest 0.01 foot. Detailed well completion diagrams are prepared. Water well drillers' reports containing geological data, well locations and construction details are submitted to the California Department of Water Resources.

Groundwater Sampling and Analysis

GROUNDWATER SAMPLING AND ANALYSIS

EMCON's sampling and analysis procedures for water-quality monitoring are designed to provide consistent and reproducible results and ensure that the objectives of the monitoring program are met.

The following publications were used as guidelines for developing these procedures:

- Procedures Manual for Ground-Water Monitoring at Solid Waste Disposal Facilities (EPA-530/SW-611, August 1977)
- RCRA Ground-Water Monitoring Technical Enforcement Guidance Document (OSWER 9950.1, September 1986)
- Test Methods for Evaluating Solid Waste: Physical/Chemical Methods (EPA SW-846, 3rd edition, November 1986)
- Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater (EPA-600/4-82-057, July 1982)
- Methods for Chemical Analysis of Water and Wastes (EPA-600/4-79-020, revised March 1983)

Sample Collection

Sample collection procedures include equipment cleaning, well purging, and water-level, floating-hydrocarbon thickness, and total well-depth measuring.

Equipment Cleaning

The bottles, caps, and septa used to hold samples for volatile and semivolatile organic analysis are triple-rinsed with high-purity deionized water and dried overnight, the bottles at 200°C, the caps and septa at 60°C. The bottles, caps, and septa are protected from solvent contact between drying and use at the site.

The plastic bottles and caps used to hold samples for metals analysis are soaked overnight in a 1 percent nitric acid solution, triple-rinsed with deionized water, and air-dried.

Equipment for sampling groundwater (i.e., pumps, bailers, etc.) is first disassembled, cleaned thoroughly with diluted detergent, and steam-rinsed with deionized water. Parts such as plastic pump valves and bladders, which may absorb contaminants, are cleaned before each use or replaced. The inside of the positive-displacement (bladder) pump tubing is cleaned overnight with a low-flow, inert air source heated to 120°C.

A pump blank made of organic-free water is pumped through the clean bladder-pump assembly, and the resulting effluent is sampled and analyzed by EPA Method 601 or 602. Analytical results must be below the method reporting limit for each constituent analyzed before the pump is used at the site.

The surfaces of well equipment that comes in contact with groundwater during well purging and sampling are steam-cleaned with deionized water between each use.

Water-Level, Floating Hydrocarbon, and Total Well-Depth Measurements

Water levels, floating-hydrocarbon thickness, and total well-depth are measured before wells are purged and sampled. An electric sounder, a bottom-filling, clear Teflon® bailer, or an oil-water interface probe is used to make these measurements. The electric sounder is a transistorized instrument with a reel-mounted, two-conductor, coaxial cable which connects the control panel to the sensor. The cable is stamped in 1-foot increments. The sensor is lowered into the well and as it makes contact with the water, which acts as an electrolyte, a low-current circuit is completed. The current is amplified and fed into an indicator light and an audible buzzer, which produce a signal as the sensor touches the water. A sensitivity control compensates for highly saline or conductive water. The sounder is decontaminated after each use with a deionized-water rinse. The bailer is lowered to a point just below the liquid level, retrieved, and inspected for floating hydrocarbon.

Alternately, an oil-water interface sonic probe can be used to measure floating-hydrocarbon thickness. The probe emits a continuous tone when immersed in a nonconductive fluid, such as oil or gasoline, and an intermittent tone when immersed in a conductive fluid, such as water. Fluid levels are recorded relative to which tone is emitted. The sonic probe is decontaminated after each use with a deionized-water rinse.

Fluid measurements are recorded to the nearest 0.01 foot in a field logbook. The groundwater elevation at the monitoring wells is calculated by subtracting the measured depth to water from the surveyed top-of-casing elevation. When possible, depth to water is measured in all wells on the same day. Water levels are converted to elevations above mean sea level (MSL) and contoured on a groundwater map. Total well depth, recorded to the nearest 0.5 foot, is measured by means of an electric sounder which is lowered to the bottom of a well. This measurement is used for calculating purge volumes and determining the degree to which silt may have obstructed the well screen.

Well Purging

Before a monitoring well is sampled, it is purged of standing water in the casing and gravel pack by one of several devices: a bladder pump, a pneumatic displacement pump, a centrifugal pump, or a Teflon bailer. Water will be evacuated from the well until the amount equals the calculate purge volume (as shown in Monitoring Well Purging Protocol, Figure 3), which will allow indicator parameters to stabilize, or until the well is evacuated to practical limits of dryness, if this occurs before the calculated purge volume is removed. These low-yield monitoring wells are allowed to recharge until the volume of water is sufficient for sampling, but not longer than 24 hours. If insufficient water has recharged after 24 hours, a monitoring well is recorded as dry for the sampling event.

The pH, specific conductance, and the temperature meter are calibrated daily before field activities are begun. Meter calibration is checked daily during field activities to verify performance. Field measurements are recorded on a water-sample field-data sheet (Figure 4) and kept in a waterproof logbook. Data sheets are reviewed by the sampling coordinator at the end of the sampling event.

Well Sampling

A Teflon bailer or a bladder pump is the only acceptable equipment for well sampling. When samples are collected for volatile organic compound (VOC) analysis with a bladder pump, the pump flow is regulated to approximately 100 milliliters per minute to minimize pump-effluent turbulence and aeration. Samples for VOC analysis are preserved in 40-milliliter glass bottles (or larger), which are fitted with Teflon-lined septa. The bottles are filled completely to force out air and to aid in forming a positive meniscus. Bottles are capped with convex Teflon septa to seal out air, and are inverted and tapped to verify that no air bubbles remain. Containers of samples to be analyzed for other constituents are filled, filtered as required, and capped.

When required, an appropriate field-filtration technique is used to determine dissolved concentrations of metals. When a Teflon bailer is used, the contents are emptied into a pressure transfer vessel. A disposable 0.45-micron acrylic copolymer filter is threaded onto the transfer vessel at the discharge point and the vessel is sealed. The vessel is pressurized with a hand pump and the filtrate directed into appropriate containers. Each filter is used once and discarded.

When a bladder pump is used to collect samples for dissolved constituents, a sample is filtered through a disposable 0.450-micron acrylic copolymer filter attached directly to the pump effluent line with a pressure fitting. As the pump cycles, the effluent is pressured through the filter and directed into an appropriate container. Each filter is used once and discarded.

Sample Preservation and Handling

Procedures for handling and preserving samples are consistent with the guidelines referenced in the Introduction. Sample containers vary depending on the type of analysis required (e.g., volatile organics, hydrocarbons, or dissolved metals) and are nonreactive with a given chemical.

Sample Handling

Sample containers are labeled immediately after sample collection, and are kept on cold packs which are replaced daily until the containers are received at the laboratory. As a sample is collected, it is logged on the chain-of-custody record that accompanies samples to the laboratory.

Samples are transferred from the site to EMCON's laboratory by the sampling team. Laboratory personnel assign a different number to each sample container and the number is recorded on the chain-of-custody record and used to identify the sample on all subsequent internal chain-of-custody and analytical records. Within 24 hours of sample receipt, samples are routinely shipped from EMCON to laboratories performing the selected analyses. EMCON's laboratory manager ensures that the holding times for requested analyses are not exceeded.

Sample Documentation

The procedures for sample handling provide chain-of-custody control from collection through storage. Sample documentation includes the following:

- Field logbooks for documenting sampling activities in the field
- Labels for identifying individual samples
- Chain-of-custody records for documenting possession and transfer of samples
- Laboratory analysis requests for documenting analyses to be performed

Field Logbook

In the field, the sampler records the following information on the water sample field data sheet (Figure 4) for each sample:

- Project number

- Client name
- Location
- Sampler's name
- Date and time
- Well accessibility and integrity
- Pertinent well data (e.g., casing diameter, depth to water, well depth)
- Calculated and actual purge volumes
- Purging equipment
- Sampling equipment
- Appearance of each sample (e.g., color, turbidity, sediment)
- Results of field analyses (temperature, pH, specific conductance)
- General comments

The field logbooks are signed by the sampler.

Labels

Sample labels contain the following information:

- Project number
- Sample number (i.e., well designation)
- Sampler's initials
- Date and time of collection
- Type of preservative used (if any)

Sampling and Analysis Chain-of-Custody Record

The sampling and analysis chain-of-custody record (Figure 1), initiated at the time of sampling, includes the well number, sample type, analytical request, date of sampling, the

name of the sampler, and other information deemed pertinent. The sampler signs his name and records the date and time on the record sheet when transferring the samples to another person. Custody transfers are recorded for every sample; for example, if samples are split and sent to more than one laboratory, a record sheet accompanies each sample. The number of custodians in the chain of possession is kept to a minimum. A copy of the sampling and analysis chain-of-custody-record is returned to EMCON with the analytical results.

Groundwater Sampling and Analysis Request

The Groundwater Sampling and Analysis Request or the purchase order that accompanies samples to the laboratory serves as official communication of the particular analysis(es) required for each sample and is evidence that the chain of custody is complete (Figure 5).

At a minimum, the groundwater sampling and analysis request includes the following:

- Date submitted
- Specific analytical parameters
- Well number
- Sample source

Analytical Methods

Samples collected as part of the proposed monitoring programs are analyzed by accepted analytical procedures. The following publications are the primary references:

- Methods for Chemical Analysis of Water and Wastes (EPA-600/4-79-020, revised March 1983)
- Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater (EPA-600/4-82-057), July 1982)
- Test Methods for Evaluating Solid Wastes: Physical/Chemical Methods (EPA SW-846, 3rd edition, November 1986)
- Leaking Underground Fuel Tank (LUFT) Manual, State Water Resources Control Board, State of California Leaking Underground Fuel Tank Task Force, May 1988

The laboratories performing the analyses are certified by the Department of Health services (DHS) for hazardous waste testing.

Quality Control

Quality assurance measures confirm the integrity of field and laboratory data generated during the monitoring program. Procedures for assessing data quality are discussed in this section. Field and laboratory quality assurance data are evaluated in the technical reports.

Field Quality Assurance

Field quality assurance for each monitoring event includes the documentation of field instrument calibration and collection and analysis of trip blanks, field blanks, and duplicate samples. Split samples may also be included in the monitoring program.

Trip and Field Blanks

Trip and field blanks are used to detect contamination introduced through sampling procedures, external field conditions, sample transportation, container preparation, sample storage, and the analytical process.

Trip blanks are prepared at the same time and location as the sample containers for a given sampling event. Trip blanks accompany the containers to and from that event, but are never opened or exposed to the air. One trip blank for volatile organic parameters is typically included for each sampling event.

Field blanks are prepared in the same manner as trip blanks, but are exposed to the ambient atmosphere at a specific monitoring point during sample collection for the purpose of determining the influence of external field conditions on sample integrity. One field blank for volatile organic parameters is typically included for each day of sampling.

Duplicate Samples

Duplicate samples are collected so that field precision can be documented. For each sampling event, a specified percentage (typically 5 percent) of monitoring well samples is collected in duplicate. Where possible, field duplicates are collected at sampling points known or suspected to contain constituents of interest. Duplicates are packed and shipped blind to the laboratory to be analyzed with the samples from that particular event (i.e., duplicates have no special markings indicating that they are quality control samples).

Laboratory Quality Assurance

Laboratory quality assurance includes procedures required under the DHS Hazardous Waste Testing Program. For sites where Columbia Analytical Services conducts the chemical tests, its quality assurance procedures include the reporting of surrogate recoveries, matrix spike recoveries, and matrix spike duplicates (or duplicate) results.

Method blanks are analyzed daily for the purpose of assessing the effect of the laboratory environment on analytical results, and are performed for each constituent analyzed.

Samples to be analyzed for organic constituents contain surrogate spike compounds. Surrogate recoveries are used to determine whether analytical instruments are operating within limits. Surrogate recoveries are compared with control limits established and updated by the laboratory on the basis of its historical operation.

Matrix spikes are analyzed at a frequency of approximately 10 percent. Matrix spike results are evaluated to determine whether the sample matrix is interfering with the laboratory analysis, and provide a measure of the accuracy of the analytical data. Matrix spike recoveries are compared with control limits established and updated by the laboratory on the basis of its historical operation.

Laboratory duplicates are analyzed at a frequency of approximately 10 percent. Spike duplicate results are evaluated to determine the reproducibility (precision) of the analytical method. Reproducibility values are compared with control limits established and updated by the laboratory on the basis of its historical operation.

Laboratory QC data included with the analytical results are method blanks, surrogate spike recoveries (for organic parameters only), matrix spike recoveries, and matrix spike duplicates.

When other state-certified laboratories conduct the testing, each laboratory will follow its own internal QA/QC program.

APPENDIX C

WASTE MANIFESTS

NON-HAZARDOUS SPECIAL WASTE & ASBESTOS MANIFEST

If waste is asbestos waste, complete Sections I, II, III and IV.
If waste is NOT asbestos waste, complete only Sections I, II and III.

No. 786737

Section I. GENERATOR (Generator completes all of Section I)

a. Generator Name: ARCO Products Company
b. Generating Location: Arco Bakersfield Plant
c. Address: 2155 S Bascom Ave., Ste #202
Campbell, CA 95008
d. Address: 9800 E 14th Street
Oakland, CA
e. Phone No.: (408) 377-8686
f. Phone No.: None

If owner of the generating facility differs from the generator, provide:

g. Owner's Name: Arco Products
h. Owner's Phone No.: Same as (e)

i. BFI WASTE CODE: CA 405 09 12 97 — Containers: 57 C

j. Description of Waste: Non Hazardous Soil (TPHg)
k. Quantity: 000.33 — Units: Y — No.: 01 — TYPE: CY

TYPE
DM - METAL DRUM
DP - PLASTIC DRUM
B - BAG
BA - 6 MIL. PLASTIC BAG or WRAP
T - TRUCK
O - OTHER

UNITS
P - POUNDS
Y - YARDS
M³ - CUBIC METERS
Y³ - CUBIC YARDS
O - OTHER

GENERATOR'S CERTIFICATION: I hereby certify that the above named material is not a hazardous waste as defined by 40 CFR Part 261 or any applicable state law, has been properly described, classified and packaged, and is in proper condition for transportation according to applicable regulations; **AND, if the waste is a treatment residue of a previously restricted hazardous waste** subject to the Land Disposal Restrictions, I certify and warrant that the waste has been treated in accordance with the requirements of 40 CFR Part 268 and is no longer a hazardous waste as defined by 40 CFR Part 261. On Behalf of ARCO Products

Jessica Drake
Generator Authorized Agent Name — Signature — Shipment Date: 12/5/97

Section II TRANSPORTER (Generator complete a-d; Transporter I complete e-g; Transporter II complete h-n)

TRANSPORTER I

a. Name: Dillard Trucking Inc.
b. Address: P.O Box 218
Byron, CA 94514
c. Driver Name/Title: (PRINT/TYPE)
d. Phone No.: (510) 634-6650
e. Truck No.:
f. Vehicle License No./State:
Acknowledgement of Receipt of Materials.
g. Driver Signature — Shipment Date: 12/5/97

TRANSPORTER II

h. Name:
i. Address:
j. Driver Name/Title: (PRINT/TYPE)
k. Phone No.:
l. Truck No.:
m. Vehicle License No./State:
Acknowledgement of Receipt of Materials.
n. Driver Signature — Shipment Date:

Section III DESTINATION (Generator completes a-d, destination site completes e-f.)

a. Site Name: BFI Vasco Rd. Landfill
b. Physical Address: 4001 North Vasco Road
Livermore, CA 94550
c. Phone No.: (510) 447-0491
d. Mailing Address: 4001 North Vasco Road
Livermore, CA 94550
e. Discrepancy Indication Space:

I hereby certify that the above named material has been accepted and to the best of my knowledge the foregoing is true and accurate.

f. Name of Authorized Agent — Signature — Receipt Date: 12/5/97
JOB# 1006 29
PO# 09-20354

Section IV ASBESTOS (Generator complete a-d, f, g; Operator* completes e.)

a. Operator's* Name:
b. Operator's* Phone No.:
c. Operator's* Address:
d. *Special Handling Instructions and additional information:*

OPERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and government regulations.

e. Operator's* Name & Title: (Print/Type) — Operator's* Signature — Date

f. Name and Address of Responsible Agency:

g. ☐ Friable; ☐ Non-friable; ☐ Both _____ % friable _____ % nonfriable

* Operator refers to the company which owns, leases, operates, controls, or supervises the facility being demolished or renovated, or the demolition or renovation operation, or both.

TRANSPORTER RETAIN

260-720B 5/93

APPENDIX D

EXPLORATORY BORING LOGS AND WELL CONSTRUCTION DETAILS

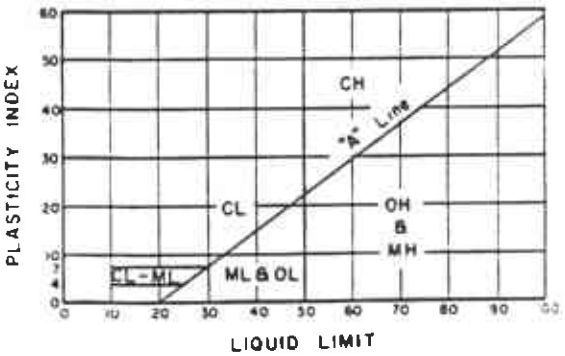
MAJOR DIVISIONS		SYMBOLS	TYPICAL SOIL DESCRIPTIONS
COARSE GRAINED SOILS (More than 1/2 of soil > no. 200 sieve size)	GRAVELS (More than 1/2 of coarse fraction > no. 4 sieve size)	GW	Well graded gravels or gravel-sand mixtures, little or no fines
		GP	Poorly graded gravels or gravel-sand mixtures, little or no fines
		GM	Silty gravels, gravel-sand-silt mixtures
		GC	Clayey gravels, gravel-sand-clay mixtures
	SANDS (More than 1/2 of coarse fraction < no. 4 sieve size)	SW	Well graded sands or gravelly sands, little or no fines
		SP	Poorly graded sands or gravelly sands, little or no fines
		SM	Silty sands, sand-silt mixtures
		SC	Clayey sands, sand-clay mixtures
FINE GRAINED SOILS (More than 1/2 of soil < no 200 sieve size)	SILTS & CLAYS LL < 50	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
		OL	Organic silts and organic silty clays of low plasticity
	SILTS & CLAYS LL > 50	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
		CH	Inorganic clays of high plasticity, fat clays
		OH	Organic clays of medium to high plasticity, organic silty clays, organic silts
HIGHLY ORGANIC SOILS		Pt	Peat and other highly organic soils

CLASSIFICATION CHART

(Unified Soil Classification System)

CLASSIFICATION	RANGE OF GRAIN SIZES	
	U.S. Standard Sieve Size	Grain Size in Millimeters
BOULDERS	Above 12"	Above 305
COBBLES	12" to 3"	305 to 76.2
GRAVEL	3" to No. 4	76.2 to 4.76
coarse	3" to 3/4"	76.2 to 19.1
fine	3/4" to No. 4	19.1 to 4.76
SAND	No. 4 to No. 200	4.76 to 0.074
coarse	No. 4 to No. 10	4.76 to 2.00
medium	No. 10 to No. 40	2.00 to 0.420
fine	No. 40 to No. 200	0.420 to 0.074
SILT & CLAY	Below No. 200	Below 0.074

GRAIN SIZE CHART



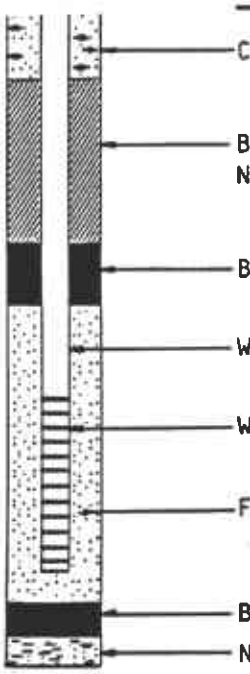
PLASTICITY CHART

METHOD OF SOIL CLASSIFICATION

EMCON ASSOCIATES

EXPLANATION OF SYMBOLS ON EXPLORATORY BORING LOGS

Well Details Column



CONCRETE

BENTONITE-CEMENT GROUT OR NEAT CEMENT GROUT

BENTONITE

} SURFACE SEAL

WELL CASING

WELL SCREEN

FILTER PACK

BENTONITE

NATIVE MATERIAL SLOUGH

} BOTTOM SEAL

Sample Column

BAG/BULK SAMPLES

FIVE-FOOT SPLIT BARREL SAMPLER (CONTINUOUS SAMPLER)

MODIFIED CALIFORNIA SPLIT SPOON

OTHER SAMPLERS (SEE REMARKS FOR TYPE AND SIZE)

PITCHER BARREL

ROCK CORE (SEE REMARKS FOR TYPE AND SIZE)

SHELBY TUBE SAMPLER

STANDARD PENETRATION TEST SPLIT SPOON SAMPLER (2" OD)

(OVER)

EXPLANATION OF SYMBOLS ON
EXPLORATORY BORING LOGS
(CONTINUED)

Ground-Water Level Column

DEPTH TO FIRST OBSERVED GROUND WATER

DEPTH TO STABILIZED GROUND WATER

Miscellaneous

2.5 YR 6/2 — Color as field checked to Munsell Soil Color Chart (1975 Edition)

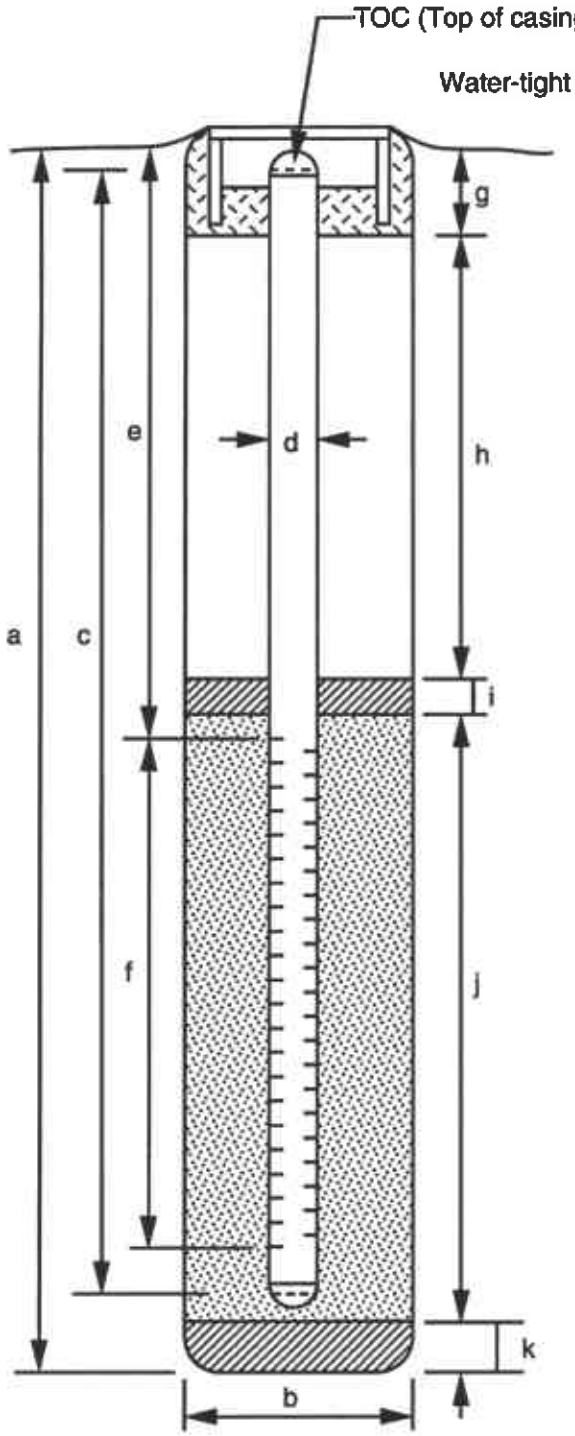
PENETRATION — Blows required to drive sampler 1 foot into soil.
Standard drive hammer weight: 140 pounds.
Standard drop: 30 inches

WELL DETAILS

EMCON ASSOCIATES

PROJECT NUMBER 0805-130.02
PROJECT NAME ARCO 2185
LOCATION 9800 E. 14th Street, Oakland
WELL PERMIT NO. 95308

BORING / WELL NO. MW-9
TOP OF CASING ELEV. 27.73
GROUND SURFACE ELEV. 27.9
DATUM M.S.L.
INSTALLATION DATE 8/17/95



EXPLORATORY BORING

a. Total depth 23.5 ft.
b. Diameter 8.0 in.
Drilling method Hollow Stem Auger

WELL CONSTRUCTION

c. Total casing length 22.75 ft.
Material Schedule 40 PVC
d. Diameter 2.0 in.
e. Depth to top perforations 7.5 ft.
f. Perforated length 14.0 ft.
Perforated interval from 7.5 to 21.5 ft.
Perforation type Machine Slotted
Perforation size 0.020 inch
g. Surface seal 1.0 ft.
Material Concrete
h. Backfill 4.0 ft.
Material Cement
i. Seal 1.5 ft.
Material Bentonite
j. Gravel pack 17.0 ft.
Gravel pack interval from 6.5 to 23.5 ft.
Material 2/12 Sand
k. Bottom seal/fill na ft.
Material

Form prepared by R. Davis

LOG OF EXPLORATORY BORING

PROJECT NUMBER: **0805-130.02**

BORING NO.: **MW-9**

PROJECT NAME: **ARCO 2185**

PAGE: **1** of **2**

BY: **R. Davis**

DATE: **8/17/95**

SURFACE ELEVATION: **27.93 ft.**

RECOVERY (ft/ft)	PID (ppm)	PENETRATION (blws/ft)	GROUND WATER LEVELS	DEPTH IN FEET	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION	WELL DETAIL
							CONCRETE, sidewalk.	
85%	0			5			SANDY CLAY (CL), very dark grayish brown (2.5Y, 3/2); 65-70% medium-plasticity fines; 30-35% fine to coarse sand; trace organic fragments; very stiff; damp; no odor.	
	0	28						
60%	0			10			SILTY CLAY (CL), mottled olive brown and light yellowish brown (2.5Y, 5/4 and 10YR, 6/4); 90-95% low- to medium-plasticity fines; 5-10% fine to coarse sand; very stiff; moist; no odor.	
	0	38	▽ 8/17/95				CLAYEY SAND (SC), yellowish brown (10YR, 5/4); 15-30% medium- plasticity fines; 70-85% fine to medium sand; % fines increasing with depth; dense; wet; no odor.	
75%	0			15			CLAY (CL), light olive brown (2.5Y, 5/4); with yellowish brown (10YR, 5/4) mottling; 95% medium-plasticity fines trace to 5% fine sand; blocky structure; very stiff; moist, wet in rootholes and fractures; no product odor.	
	0	36						
				20				

EMCON ASSOCIATES

REMARKS

Boring drilled with 8-inch-diameter hollow-stem auger equipment. Boring sampled every 5 feet using a 2-inch-diameter modified California split-spoon sampler. Boring completed as a 2-inch-diameter PVC monitoring well. Well construction information is presented in Well Details and shown graphically on this log. See explanation sheet for definition of symbols in Well Detail and Samples columns on this log.

LOG OF EXPLORATORY BORING

PROJECT NUMBER: **0805-130.02**

BORING NO.: **MW-9**

PROJECT NAME: **ARCO 2185**

PAGE: **2 of 2**

BY: **R. Davis**

DATE: **8/17/95**

SURFACE ELEVATION: **27.93 ft.**

RECOVERY (ft/ft)	PID (ppm)	PENETRATION (blws/ft)	GROUND WATER LEVELS	DEPTH IN FEET	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION	WELL DETAIL
95%	0	45					CLAY (CL), continued. @20.0-21.5': as above.	
95%		47		25			BORING SAMPLED TO 25.0 FEET, REAMED TO 23.5 FEET.	
				30				
				35				
				40				

EMCON ASSOCIATES

REMARKS

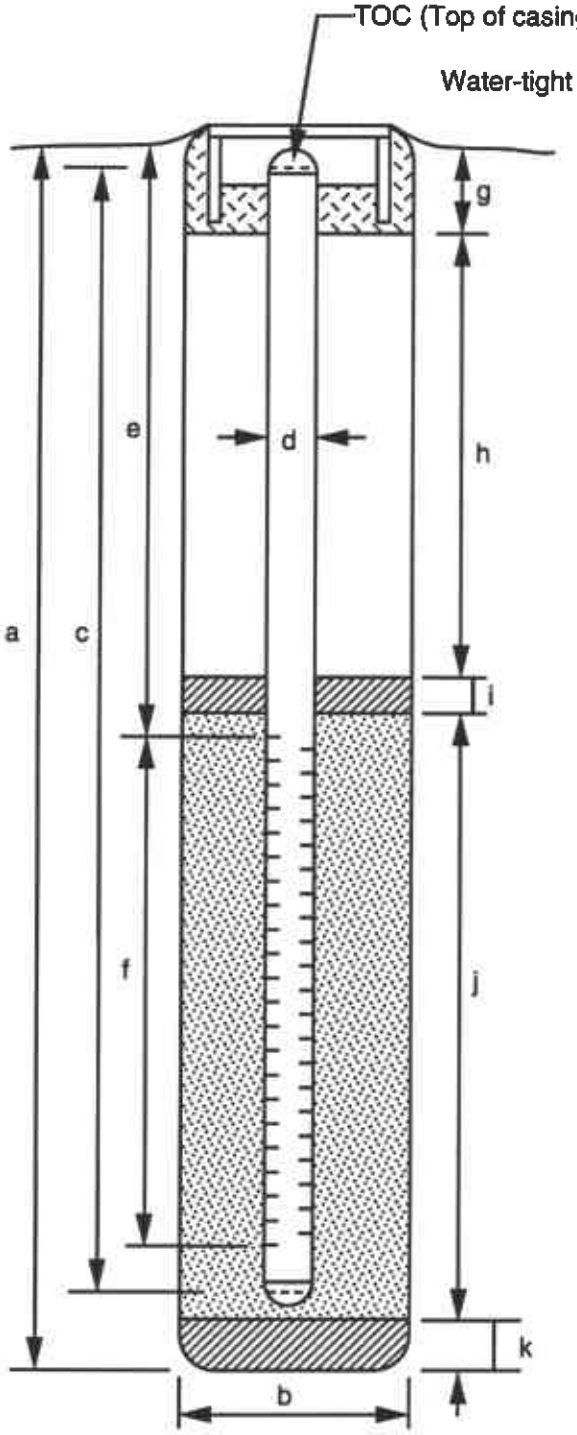
Boring drilled with 8-inch-diameter hollow-stem auger equipment. Boring sampled every 5 feet using a 2-inch-diameter modified California split-spoon sampler. Boring completed as a 2-inch-diameter PVC monitoring well. Well construction information is presented in Well Details and shown graphically on this log. See explanation sheet for definition of symbols in Well Detail and Samples columns on this log.

WELL DETAILS

EMCON ASSOCIATES

PROJECT NUMBER 0805-130.02
PROJECT NAME ARCO 2185
LOCATION 9800 E. 14th Street, Oakland
WELL PERMIT NO. 95308

BORING / WELL NO. MW-10
TOP OF CASING ELEV. 27.55
GROUND SURFACE ELEV. 27.9
DATUM M.S.L.
INSTALLATION DATE 8/16/95



EXPLORATORY BORING

a. Total depth 25.0 ft.
b. Diameter 8.0 in.
Drilling method Hollow Stem Auger

WELL CONSTRUCTION

c. Total casing length 23.1 ft.
Material Schedule 40 PVC
d. Diameter 2.0 in.
e. Depth to top perforations 8.5 ft.
f. Perforated length 14.0 ft.
Perforated interval from 8.5 to 22.5 ft.
Perforation type Machine Slotted
Perforation size 0.020 inch
g. Surface seal 1.0 ft.
Material Concrete
h. Backfill 4.0 ft.
Material Cement
i. Seal 1.5 ft.
Material Bentonite
j. Gravel pack 18.5 ft.
Gravel pack interval from 6.5 to 25.0 ft.
Material 2/12 Sand
k. Bottom seal/fill na ft.
Material

Form prepared by R. Davis

LOG OF EXPLORATORY BORING

PROJECT NUMBER: **0805-130.02**

BORING NO.: **MW-10**

PROJECT NAME: **ARCO 2185**

PAGE: **1 of 2**

BY: **R. Davis**

DATE: **8/16/95**

SURFACE ELEVATION: **27.93 ft.**

RECOVERY (ft/ft)	PID (ppm)	PENETRATION (blws/ft)	GROUND WATER LEVELS	DEPTH IN FEET	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION	WELL DETAIL
							CONCRETE, sidewalk.	
							SILTY GRAVEL, baserock.	
90%	0	26		5			CLAY TO SANDY CLAY (CL), black (10YR, 2/1); 75-90% medium- plasticity fines; 10-25% fine to coarse sand; hard; damp; no product odor. @5.5-6.5': 10% fine gravel.	
							@8.5': driller noted tougher drilling conditions.	
80%	0	48	▽ 8/16/95	10			@10.0-10.2': light olive brown (2.5Y, 5/4); 90% medium-plasticity fines; 10% fine sand; moist. CLAYEY SAND (SC), light olive brown (2.5Y, 5/4); 15-25% medium- plasticity fines; 75-85% fine to coarse sand, f:m:c=4:2:1; trace fine gravel; unit coarsens with depth; dense; moist to wet; no odor.	
							CLAY (CL), light olive brown (2.5Y, 5/4); medium-plasticity fines ; trace fine sand; very stiff; moist; no product odor. fines; 10% fine sand; moist.	
80%	0	41		15			CLAYEY SAND (SC), light olive brown (2.5Y, 5/4); 35-45% medium- plasticity fines; 55-65% fine to medium sand; medium dense; wet; no odor.	
							CLAY (CL), mottled olive brown and yellowish brown (2.5Y, 5/4 and 10YR, 5/3); 95-100% medium-plasticity fines; very stiff; moist, wet in voids; no product odor.]	
				20				

EMCON ASSOCIATES

REMARKS

Boring drilled with 8-inch-diameter hollow-stem auger equipment through the existing sidewalk. Boring sampled every 5 feet using a 2-inch-diameter modified California split-spoon sampler. Boring completed as a 2-inch-diameter PVC monitoring well. Well construction information is presented in Well Details and shown graphically on this log. See explanation sheet for definition of symbols in Well Detail and Sample columns on this log.

LOG OF EXPLORATORY BORING

PROJECT NUMBER: **0805-130.02**

BORING NO.: **MW-10**

PROJECT NAME: **ARCO 2185**

PAGE: **2** of **2**

BY: **R. Davis**

DATE: **8/18/95**

SURFACE ELEVATION: **27.93 ft.**

RECOVERY (ft/ft)	PID (ppm)	PENETRATION (blws/ft)	GROUND WATER LEVELS	DEPTH IN FEET	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION	WELL DETAIL
65%	0	25					SANDY CLAY (CL), mottled olive brown and yellowish brown (2.5Y, 5/4 and 10YR, 5/3); 85% medium-plasticity fines; 15% fine to medium sand; very stiff; wet; no product odor.	
45%		35		25			@23.5-25.0': as above.	
							BORING TERMINATED AT TO 25.0 FEET.	
				30				
				35				
				40				

EMCON ASSOCIATES

REMARKS

Boring drilled with 8-inch-diameter hollow-stem auger equipment through the existing sidewalk. Boring sampled every 5 feet using a 2-inch-diameter modified California split-spoon sampler. Boring completed as a 2-inch-diameter PVC monitoring well. Well construction information is presented in Well Details and shown graphically on this log. See explanation sheet for definition of symbols in Well Detail and Sample columns on this log.

APPENDIX E

FIELD DATA SHEETS

FIELD REPORT
DEPTH TO WATER / FLOATING PRODUCT SURVEY

PROJECT # : 0805-130.02 STATION ADDRESS : 9800 14th Street, Oakland DATE : 09-13-95

ARCO STATION # : 2185 FIELD TECHNICIAN : Joe Williams DAY : Wednesday

DTW Order	WELL ID	Well Box Seal	Well Lid Secure	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-9**	good	YES	NA	good	YES	~~11.78~~	11.78	ND	ND	17.91	
2	**MW-10**	good	YES	NA	good	YES	10.60	10.60	ND	ND	21.25	

SURVEY POINTS ARE TOP OF WELL CASINGS NORTH SIDE

WELL DEVELOPMENT FIELD DATA SHEET

Project Number: 0805-130-02 Performed By: J WILLIAMS

Client: ARCO 2185 Date: 09-13-95

Location: OAKLAND, CA Well ID: MW-9

Casing Diameter: ✓ 2 inch (6.53) ___ 3 inch ___ 4 inch ___ 4.5 inch ___ 6 inch Other ___

Depth to Water (feet): Start 11.78 End 11.71

Well Total Depth (feet): Start 17.91 End 22.62

One Casing Volume at Start (gal): 1 Total Volume Purged (gal): 50

DEVELOPMENT METHOD

✓ Centrifugal Pump ___ Bailer (Teflon ®) ✓ Surge Block (Swab)

___ Submersible Pump ___ Bailer (PVC) ___ Other ___

FIELD INSTRUMENTS

✓ pH, EC, Temp. Meter ✓ NTU Meter ✓ Imhoff Cone ___ Colorimeter Other ___

Purge Water Disposal Method: DRUM

Date	Time	Cumulative Discharge (gal)	Temp. (° F)	E.C. @ 25° C (µmho/cm)	pH (Stnd)	Turbidity Visual (Heavy, Moderate, Light, Trace)	Turbidity NTU (Scale = 0 - 200 or 0 - 1000)	Color Visual (Clear, Cloudy, Yellow, Brown...)	Color Cobalt (Scale = 0 to 500)	Odor	Settleable Solids (%)
9-13	1135	25	73.9	704	6.49	HEAVY	71000	BROWN	7500	MOLD	40%
	1139	30	70.8	726	6.49	↓	↓	↓	↓	↓	0-5
	1144	35	70.2	713	6.49	MOD	↓	↓	↓	↓	0-5
	1149	40	69.1	712	6.45	MOD	↓	↓	↓	↓	0-5
	1153	45	69.1	677	6.44	MOD	↓	↓	↓	↓	0
↓	1200	50	70.0	670	6.40	MOD	535	↓	↓	↓	0

WELL INTEGRITY: GOOD 9/16 LOCK #: 3496

REMARKS: ___

SIGNATURE: ___ REVIEWED BY: ___ Page 1 of 2

Rev. 1, 4/95

WELL DEVELOPMENT FIELD DATA SHEET

Project Number: 0805-130-02 Performed By: J WILLIAMS

Client: ARCO 2185 Date: 9-13-95

Location: OAKLAND CA Well ID: MW-10

Casing Diameter: ✓ 2 inch (0.65) ___ 3 inch ___ 4 inch ___ 4.5 inch ___ 6 inch Other ___

Depth to Water (feet): Start 10.60 End 12.40

Well Total Depth (feet): Start 21.20 End 23.10

One Casing Volume at Start (gal): 1.73 Total Volume Purged (gal): 55

DEVELOPMENT METHOD

✓ Centrifugal Pump ___ Bailer (Teflon ®) ✓ Surge Block (Swab)

___ Submersible Pump ___ Bailer (PVC) ___ Other ___

FIELD INSTRUMENTS

✓ pH, EC, Temp. Meter ✓ NTU Meter ✓ Imhoff Cone ___ Colorimeter Other ___

Purge Water Disposal Method: DRUM

Date	Time	Cumulative Discharge (gal)	Temp. (° F)	E.C. @ 25° C (µmho/cm)	pH (Stnd)	Turbidity Visual (Heavy, Moderate, Light, Trace)	Turbidity NTU (Scale = 0 - 200 or 0 - 1000)	Color Visual (Clear, Cloudy, Yellow, Brown...)	Color Cobalt (Scale = 0 to 500)	Odor	Settleable Solids (%)
9-13-95	1255	25	71.2	558	7.20	HEAVY	7000	BROWN	7500	SLIGHT	10-20
	1300	30	71.8	558	6.72	"	"	"	"	"	0-5
	1303	35	71.4	569	6.86	"	"	"	"	"	0-5
	1305	40	71.2	568	6.72	"	"	"	"	"	0
	1307	45	71.1	565	6.71	"	"	"	"	"	0
↓	1311	50	71.2	566	6.68	"	"	"	"	"	0

WELL INTEGRITY: GOOD 9/16 LOCK #: 3496

REMARKS: SHEEN

SIGNATURE: [signature] REVIEWED BY: [signature] Page 2 of 2

Rev. 1, 4/90

Rev. 3, 2/94

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 1275-226.01 SAMPLE ID: MW-9 (22')

PURGED BY: M. Gallegos CLIENT NAME: ARCO #2185

SAMPLED BY: V LOCATION: OAKLAND, CA.

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

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

CASING ELEVATION (feet/MSL):	N/R	VOLUME IN CASING (gal.):	1.78
DEPTH TO WATER (feet):	11.67	CALCULATED PURGE (gal.):	5.35
DEPTH OF WELL (feet):	22.6	ACTUAL PURGE VOL. (gal.):	5.5

DATE PURGED: 9-20-95 Start (2400 Hr) 1240 End (2400 Hr) 1246

DATE SAMPLED: V Start (2400 Hr) 1253 End (2400 Hr) ___

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1242	2.0	6.75	827	70.7	BRN	Heavy
1244	4.0	6.75	782	70.1		
1246	5.5	6.69	782	70.7	V	V

D. O. (ppm): N/R ODOR: None

N/R (COBALT 0 - 500) N/R (NTU 0 - 200 or 0 - 1000)

Field QC samples collected at this well: N/R

Parameters field filtered at this well: N/R

PURGING EQUIPMENT		SAMPLING EQUIPMENT	
___ 2" Bladder Pump	___ Bailer (Teflon®)	___ 2" Bladder Pump	X Bailer (Teflon®)
___ Centrifugal Pump	X 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: Good LOCK #: ARCO

REMARKS: G.W. Samples to Kas

Meter Calibration: Date: 9-20-95 Time: ___ Meter Serial #: SGW Temperature °F: ___

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

Location of previous calibration: MW-10

Signature: [signature] Reviewed By: [signature] Page 8 of 9

Rev. 3, 2/94

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 1775-236.01 SAMPLE ID: MW-10 (23')

PURGED BY: M. Gallegos CLIENT NAME: ACC-H

SAMPLED BY: ↓ LOCATION: Oakland, CA

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

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

CASING ELEVATION (feet/MSL): N/A VOLUME IN CASING (gal.): 2.01

DEPTH TO WATER (feet): 10.65 CALCULATED PURGE (gal.): 6.05

DEPTH OF WELL (feet): 23.0 ACTUAL PURGE VOL. (gal.): 6.5

DATE PURGED: 9-2-55 Start (2400 Hr) 1155 End (2400 Hr) 1204

DATE SAMPLED: ↓ Start (2400 Hr) 1210 End (2400 Hr) ___

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1158	2.0	6.75	590	73.0	BRN	Heavy
1201	4.0	6.77	595	73.4	↓	↓
1204	6.5	6.78	594	73.1	↓	↓

D. O. (ppm): N/R ODOR: none

COLOR (COBALT 0 - 500): N/R

TURBIDITY (NTU 0 - 200 or 0 - 1000): N/R

Field QC samples collected at this well: N/R

Parameters field filtered at this well: N/R

PURGING EQUIPMENT

___ 2" Bladder Pump
X Bailer (Teflon®)
___ Centrifugal Pump
___ Bailer (PVC)
___ Submersible Pump
___ Bailer (Stainless Steel)
___ Well Wizard™
___ Dedicated
Other: ___

SAMPLING EQUIPMENT

___ 2" Bladder Pump
X Bailer (Teflon®)
___ DDL Sampler
___ Bailer (Stainless Steel)
___ Dipper
___ Submersible Pump
___ Well Wizard™
___ Dedicated
Other: ___

WELL INTEGRITY: Good LOCK #: N.O.

REMARKS: All Samples taken

Meter Calibration: Date: 9-2-55 Time: ___ Meter Serial #: 9011 Temperature °F: 71.8

(EC 1000 964 / 1000) (DI ___) (pH 7 7.04 / 7.00) (pH 10 1000 / 1000) (pH 4 4.00 / 4.00)

Location of previous calibration: ___

Signature: [signature] Reviewed By: [signature] Page 9 of 9

APPENDIX F

CERTIFIED ANALYTICAL REPORTS AND CHAIN-OF-CUSTODY DOCUMENTATION

Columbia Analytical Services, Inc.

September 1, 1995

Service Request No: S951030

John Young
EMCON
1921 Ringwood Avenue
San Jose, CA 95131

Re: **0805-130.02 / TO# 2185-94-2A / 2185 Oakland**

Dear Mr. Young:

The following pages contain analytical results for sample(s) received by the laboratory on August 17, 1995. Results of sample analyses are followed by Appendix A which contains sample custody documentation and quality assurance deliverables requested for this project. The work requested has been assigned the Service Request No. listed above - to help expedite our service please refer to this number when contacting the laboratory.

Analytical results were produced by procedures consistent with Columbia Analytical Services' (CAS) Quality Assurance Manual (with any deviations noted). Signature of this CAS Analytical Report below confirms that pages 2 through 7, following, have been thoroughly reviewed and approved for release in accord with CAS Standard Operating Procedure ADM-DatRev3.

Please feel welcome to contact me should you have questions or further needs.

Sincerely:

Steven L. Green
Project Chemist

Annelise J. Bazar
Regional QA Coordinator

SLG/ajb

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

COLUMBIA ANALYTICAL SERVICES, Inc.
Acronyms

A2LA	American Association for Laboratory Accreditation
ASTM	American Society for Testing and Materials
BOD	Biochemical Oxygen Demand
BTEX	Benzene, Toluene, Ethylbenzene, Xylenes
CAM	California Assessment Metals
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
COD	Chemical Oxygen Demand
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DLCS	Duplicate Laboratory Control Sample
DMS	Duplicate Matrix Spike
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
IC	Ion Chromatography
ICB	Initial Calibration Blank sample
ICP	Inductively Coupled Plasma atomic emission spectrometry
ICV	Initial Calibration Verification sample
J	Estimated concentration. The value is less than the MRL, but greater than or equal to the MDL. If the value is equal to the MRL, the result is actually <MRL before rounding.
LCS	Laboratory Control Sample
LUFT	Leaking Underground Fuel Tank
M	Modified
MBAS	Methylene Blue Active Substances
MCL	Maximum Contaminant Level. The highest permissible concentration of a substance allowed in drinking water as established by the U. S. EPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
MS	Matrix Spike
MTBE	Methyl tert-Butyl Ether
NA	Not Applicable
NAN	Not Analyzed
NC	Not Calculated
NCASI	National Council of the paper industry for Air and Stream Improvement
ND	Not Detected at or above the method reporting/detection limit (MRL/MDL)
NIOSH	National Institute for Occupational Safety and Health
NTU	Nephelometric Turbidity Units
ppb	Parts Per Billion
ppm	Parts Per Million
PQL	Practical Quantitation Limit
QA/QC	Quality Assurance/Quality Control
RCRA	Resource Conservation and Recovery Act
RPD	Relative Percent Difference
SIM	Selected Ion Monitoring
SM	Standard Methods for the Examination of Water and Wastewater, 18th Ed., 1992
STLC	Solubility Threshold Limit Concentration
SW	Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, 3rd Ed., 1986 and as amended by Updates I, II, IIA, and IIB.
TCLP	Toxicity Characteristic Leaching Procedure
TDS	Total Dissolved Solids
TPH	Total Petroleum Hydrocarbons
tr	Trace level. The concentration of an analyte that is less than the PQL but greater than or equal to the MDL. If the value is equal to the PQL, the result is actually <PQL before rounding.
TRPH	Total Recoverable Petroleum Hydrocarbons
TSS	Total Suspended Solids
TTLC	Total Threshold Limit Concentration
VOA	Volatile Organic Analyte(s)

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S951030
Project:	0805-130.02 / TO# 2185-94-2A / 2185 Oakland	**Date Collected:**	8/16/95
Sample Matrix:	Soil	**Date Received:**	8/17/95
		Date Extracted:	NA
		Date Analyzed:	8/29/95

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

Analyte:	**TPH as Gasoline**	**Benzene**	**Toluene**	**Ethyl-benzene**	**Xylenes, Total**
Units:	mg/Kg (ppm)	mg/Kg (ppm)	mg/Kg (ppm)	mg/Kg (ppm)	mg/Kg (ppm)
Method Reporting Limit:	1	0.005	0.005	0.005	0.005
Sample Name	**Lab Code**				
MW-9, 6.5'	S951030-001	ND	ND	ND	ND	ND
MW-9, 11'	S951030-002	ND	ND	ND	ND	ND
MW-9, 25'	S951030-005	ND	ND	ND	ND	ND
MW-10, 6.5'	S951030-006	ND	ND	ND	ND	ND
MW-10, 11.5'	S951030-007	ND	ND	ND	ND	ND
MW-10, 21.5'	S951030-009	ND	ND	ND	ND	ND
Method Blank	S950829-SB	ND	ND	ND	ND	ND

5ABTXGAS/061694

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 0805-130.02 / TO# 2185-94-2A / 2185 Oakland
Sample Matrix: Soil

Service Request: S951030
Date Collected: 8/16/95
Date Received: 8/17/95
Date Extracted: NA
Date Analyzed: 8/29/95

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

Sample Name	Lab Code	Percent Recovery α,α,α-Trifluorotoluene
MW-9, 6.5'	S951030-001	99
MW-9, 11'	S951030-002	93
MW-9, 25'	S951030-005	77
MW-10, 6.5'	S951030-006	94
MW-10, 11.5'	S951030-007	88
MW-10, 21.5'	S951030-009	82
MW-9, 6.5' (MS)	S951030-001MS	105
MW-9, 6.5' (DMS)	S951030-001DMS	92
Method Blank	S950829-SB	94

CAS Acceptance Limits: 51-137

SUR1/062994

QA/QC Report

Client: ARCO Products Company
Project: 0805-130.02 / TO# 2185-94-2A / 2185 Oakland

Service Request: S951030
Date Analyzed: 8/29/95

Initial Calibration Verification (ICV) Summary
BTEX and TPH as Gasoline
EPA Methods 5030/8020/California DHS LUFT Method
Units: ppm

Analyte	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits
Benzene	0.050	0.050	100	85-115
Toluene	0.050	0.048	96	85-115
Ethylbenzene	0.050	0.048	96	85-115
Xylenes, Total	0.15	0.135	90	85-115
Gasoline	1.0	0.95	95	90-110

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	ARCO Products Company	**Service Request:**	S951030
Project:	0805-130.02 / TO# 2185-94-2A / 2185 Oakland	**Date Collected:**	8/16/95
Sample Matrix:	Soil	**Date Received:**	8/17/95
		Date Extracted:	NA
		Date Analyzed:	8/29/95

Matrix Spike/Duplicate Matrix Spike Summary
BTE
EPA Methods 5030/8020
Units: mg/Kg (ppm)
As Received Basis

Sample Name: MW-9, 6.5'
Lab Code: S951030-001

	Spike Level		Sample	Spike Result		Percent Recovery		CAS Acceptance	Relative Percent
Analyte	MS	DMS	**Result**	MS	DMS	MS	DMS	Limits	**Difference**
Benzene	0.05	0.05	ND	0.051	0.052	102	104	57-154	2
Toluene	0.05	0.05	ND	0.049	0.048	98	96	60-142	2
Ethylbenzene	0.05	0.05	ND	0.049	0.047	98	94	46-150	4

DMS1S/060194

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. 2185-94-2A

Chain of Custody

ARCO Facility no. 2185	City (Facility) Oakland	Project manager (Consultant) John Young	Laboratory name CAS - SJ
ARCO engineer Mike Whelan	Telephone no. (ARCO) (408) 377-8697	Telephone no. (Consultant) (408) 453-7300	Fax no. (Consultant) (408) 437-9526
Consultant name EMCON	Address (Consultant) 1921 Ringwood Ave. San Jose, CA		Contract number

Sample I.D.	Lab no.	Container no.	Matrix: Soil	Matrix: Water	Matrix: Other	Preservation: Ice	Preservation: Acid	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH GAS EPA M602/8020/8015	TPH Modified 8015 Gas ☐ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Metals ☐ Semi VOA ☐ VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐	HOLD
MW-9, 6.5'	1	1	/			/		8/17/95			/										
, 11'	2	↓	↓			↓		↓			/										
, 16'	3																				/
, 21.5'	4																				/
, 25'	5		↓			↓		↓			/										
MW-10, 6.5'	6	1						8/16/95			/										
, 11.5'	7	↓	↓			↓		↓			/										
, 16'	8																				/
, 21.5'	9	↓	↓			↓		↓			/										

Special detection Limit/reporting

Special QA/QC

Remarks
EMCON Project #
0805-130.02

Lab number
595-01033D

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: D

Temperature received:

Relinquished by sampler: Robert K. Dorb 5:40 PM	Date 8/17/95	Time 17:40	Received by
Relinquished by	Date	Time	Received by
Relinquished by	Date	Time	Received by laboratory / Date / Time

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

ARCO-3292

Columbia Analytical Services, Inc.

October 6, 1995

Service Request No: S951180

John Young
EMCON
1921 Ringwood Avenue
San Jose, CA 95131

Re: **0805-130.03 / TO# 17075.00 / 2185 Oakland**

Dear Mr. Young:

The following pages contain analytical results for sample(s) received by the laboratory on September 21, 1995. Results of sample analyses are followed by Appendix A which contains sample custody documentation and quality assurance deliverables requested for this project. The work requested has been assigned the Service Request No. listed above -to help expedite our service please refer to this number when contacting the laboratory.

Analytical results were produced by procedures consistent with Columbia Analytical Services' (CAS) Quality Assurance Manual (with any deviations noted). Signature of this CAS Analytical Report below confirms that pages 2 through 17, following, have been thoroughly reviewed and approved for release in accord with CAS Standard Operating Procedure ADM-DatRev3.

Please feel welcome to contact me should you have questions or further needs.

Sincerely:

Steven L. Green
Project Chemist

Annelise J. Bazar
Regional QA Coordinator

SLG/ajb

1921 Ringwood Avenue • San Jose, California 95131 • Telephone 408/437-2400 • Fax 408/437-0256

COLUMBIA ANALYTICAL SERVICES, Inc.

Acronyms

A2LA	American Association for Laboratory Accreditation
ASTM	American Society for Testing and Materials
BOD	Biochemical Oxygen Demand
BTEX	Benzene, Toluene, Ethylbenzene, Xylenes
CAM	California Assessment Metals
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
COD	Chemical Oxygen Demand
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DLCS	Duplicate Laboratory Control Sample
DMS	Duplicate Matrix Spike
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
IC	Ion Chromatography
ICB	Initial Calibration Blank sample
ICP	Inductively Coupled Plasma atomic emission spectrometry
ICV	Initial Calibration Verification sample
J	Estimated concentration. The value is less than the MRL, but greater than or equal to the MDL. If the value is equal to the MRL, the result is actually <MRL before rounding.
LCS	Laboratory Control Sample
LUFT	Leaking Underground Fuel Tank
M	Modified
MBAS	Methylene Blue Active Substances
MCL	Maximum Contaminant Level. The highest permissible concentration of a substance allowed in drinking water as established by the U. S. EPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
MS	Matrix Spike
MTBE	Methyl tert-Butyl Ether
NA	Not Applicable
NAN	Not Analyzed
NC	Not Calculated
NCASI	National Council of the paper industry for Air and Stream Improvement
ND	Not Detected at or above the method reporting/detection limit (MRL/MDL)
NIOSH	National Institute for Occupational Safety and Health
NTU	Nephelometric Turbidity Units
ppb	Parts Per Billion
ppm	Parts Per Million
PQL	Practical Quantitation Limit
QA/QC	Quality Assurance/Quality Control
RCRA	Resource Conservation and Recovery Act
RPD	Relative Percent Difference
SIM	Selected Ion Monitoring
SM	Standard Methods for the Examination of Water and Wastewater, 18th Ed., 1992
STLC	Solubility Threshold Limit Concentration
SW	Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, 3rd Ed., 1986 and as amended by Updates I, II, IIA, and IIB.
TCLP	Toxicity Characteristic Leaching Procedure
TDS	Total Dissolved Solids
TPH	Total Petroleum Hydrocarbons
tr	Trace level. The concentration of an analyte that is less than the PQL but greater than or equal to the MDL. If the value is equal to the PQL, the result is actually <PQL before rounding.
TRPH	Total Recoverable Petroleum Hydrocarbons
TSS	Total Suspended Solids
TTLC	Total Threshold Limit Concentration
VOA	Volatile Organic Analyte(s)

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: ARCO Products Company
Project: 0805-130.03 / TO# 17075.00 / 2185 Oakland
Sample Matrix: Water

Service Request: S951180
Date Collected: 9/20,21/95
Date Received: 9/21/95
Date Extracted: NA

BTEX, MTBE and TPH as Gasoline
EPA Methods 5030/8020/California DHS LUFT Method
Units: ug/L (ppb)

	Sample Name:	MW-9 (22)	MW-10 (23)	MW-7 (25)
	Lab Code:	S951180-002	S951180-003	S951180-004
	Date Analyzed:	9/27/95	9/27/95	9/27/95
Analyte	**MRL**			
TPH as Gasoline	50	ND	ND	<400 **
Benzene	0.5	ND	ND	0.8
Toluene	0.5	ND	ND	ND
Ethylbenzene	0.5	ND	ND	ND
Total Xylenes	0.5	ND	ND	ND
Methyl-tert-butyl ether	3	<4 *	ND	<10 *

* Raised MRL due to matrix interference.

** Raised MRL due to matrix interference. The sample contains discrete components eluting in the gasoline range quantified as gasoline. The chromatogram does not match the typical gasoline fingerprint.

3S22/060194

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S951180
Project:	0805-130.03 / TO# 17075.00 / 2185 Oakland	**Date Collected:**	9/20,21/95
Sample Matrix:	Water	**Date Received:**	9/21/95
		Date Extracted:	NA

BTEX, MTBE and TPH as Gasoline
EPA Methods 5030/8020/California DHS LUFT Method
Units: ug/L (ppb)

		Sample Name:	**MW-5 (26)**	**MW-8 (22)**	**MW-2 (23)**
		Lab Code:	S951180-005	S951180-006	S951180-007
		Date Analyzed:	9/27/95	10/2/95	9/28/95
Analyte	**MRL**				
TPH as Gasoline	50		1,500	470	1,200
Benzene	0.5		47	ND	1
Toluene	0.5		2	ND	<1 *
Ethylbenzene	0.5		120	3.0	68
Total Xylenes	0.5		86	1.2	16
Methyl-tert-butyl ether	3		70	52	<5 *

* Raised MRL due to high analyte concentration requiring sample dilution.

3S22/060194

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S951180
Project:	0805-130.03 / TO# 17075.00 / 2185 Oakland	**Date Collected:**	9/20,21/95
Sample Matrix:	Water	**Date Received:**	9/21/95
		Date Extracted:	NA

BTEX, MTBE and TPH as Gasoline
EPA Methods 5030/8020/California DHS LUFT Method
Units: ug/L (ppb)

		Sample Name:	**MW-6 (27)**	**MW-3 (23)**	**Method Blank**
		Lab Code:	S951180-008	S951180-009	S950927-WB
		Date Analyzed:	9/28/95	9/28/95	9/27/95
Analyte	**MRL**				
TPH as Gasoline	50		3,300	2,100	ND
Benzene	0.5		36	12	ND
Toluene	0.5		<5 *	<3 *	ND
Ethylbenzene	0.5		360	77	ND
Total Xylenes	0.5		120	38	ND
Methyl-tert-butyl ether	3		<30 *	280	ND

* Raised MRL due to high analyte concentration requiring sample dilution.

3S22/060194

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S951180
Project:	0805-130.03 / TO# 17075.00 / 2185 Oakland	**Date Collected:**	9/20,21/95
Sample Matrix:	Water	**Date Received:**	9/21/95
		Date Extracted:	NA

BTEX, MTBE and TPH as Gasoline
EPA Methods 5030/8020/California DHS LUFT Method
Units: ug/L (ppb)

Sample Name:	**Method Blank**
Lab Code:	S951002-WB
Date Analyzed:	10/2/95

Analyte	**MRL**	
TPH as Gasoline	50	ND
Benzene	0.5	ND
Toluene	0.5	ND
Ethylbenzene	0.5	ND
Total Xylenes	0.5	ND
Methyl-tert-butyl ether	3	ND

3S22/060194

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S951180
Project:	0805-130.03 / TO# 17075.00 / 2185 Oakland	**Date Collected:**	9/20,21/95
Sample Matrix:	Water	**Date Received:**	9/21/95
		Date Extracted:	NA
		Date Analyzed:	9/21-10/2/95

Inorganic Parameters [1]
Units: mg/L (ppm)

Analyte:	Ammonia - as N	Total Kjeldahl Nitrogen	pH (units)	Ortho-phosphate
EPA Method:	350.3	351.4	150.1	365.2
Method Reporting Limit:	0.1	1	--	0.02
Sample Name	**Lab Code**			
MW-5 (26)	S951180-005	ND	ND	6.82	0.22
MW-8 (22)	S951180-006	ND	ND	6.84	0.21
MW-2 (23)	S951180-007	ND	ND	6.78	0.36
MW-6 (27)	S951180-008	ND	ND	6.72	0.34
MW-3 (23)	S951180-009	ND	ND	6.76	0.17
Method Blank	S951180-WB	ND	ND	--	ND

1 Unless otherwise noted, all analyses were performed within EPA recommended maximum holding times specified in *Test Methods for Evaluating Solid Waste*, (SW-846, 3rd Edition) and *Methods for Chemical Analysis of Water and Waste* (EPA-600/4-79-020, revised March 1983).

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: ARCO Products Company
Project: TO#2185-94-2A/0805-130.03 / #2185 Oakland
Sample Matrix: Water

Service Request: K9505940
Date Collected: 9/21/95
Date Received: 9/22/95
Date Extracted: 9/26/95
Date Analyzed: 9/27/95

Dissolved Potassium
EPA Method 6010A
Units: µg/L (ppb)

Sample Name	Lab Code	MRL	Result
MW-1(23)	K9505940-001	2000	ND
MW-5(26)	K9505940-002	2000	ND
MW-8(22)	K9505940-003	2000	ND
MW-2(23)	K9505940-004	2000	ND
MW-6(27)	K9505940-005	2000	ND
MW-3(23)	K9505940-006	2000	ND
Method Blank	K9505940-MB	2000	ND

1AMRL/102594

COLUMBIA ANALYTI INC.

Analytica

Client: ARCO Products Company
Project: TO#2185-94-2A/0805-130.03/#2185 OAKLAND
Sample Matrix: Water

Service Request: K9505940
Date Collected: 9/21/95
Date Received: 9/22/95
Date Extracted: NA
Date Analyzed: 9/22/95

Oxidation-Reducti
ASTM Method D
Units: m

Sample Name	Lab Code	Result
MW-5(26)	K9505940-002	328
MW-8(22)	K9505940-003	327
MW-2(23)	K9505940-004	138
MW-6(27)	K9505940-005	150
MW-3(23)	K9505940-006	118

1A/102094

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	K9505940
Project:	TO#2185-94-2A/0805-130.03/#2185 OAKLAND	**Date Collected:**	9/21/95
Sample Matrix:	Water	**Date Received:**	9/22/95
		Date Extracted:	NA
		Date Analyzed:	9/22/95

Heterotrophic Plate Count
SM Method 9215B
Units: CFU/ml

Sample Name	Lab Code	MRL	Time Test Started		Result
MW-1(23)	K9505940-001	2	1130	hrs	380
MW-5(26)	K9505940-002	2	1130	hrs	8500
MW-8(22)	K9505940-003	2	1130	hrs	89000
MW-2(23)	K9505940-004	2	1130	hrs	9400
MW-6(27)	K9505940-005	2	1130	hrs	13400
MW-3(23)	K9505940-006	2	1130	hrs	5500

SM *Standard Methods for the Examination of Water and Wastewater*, 17th Ed., 1989.

BACT/102194

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 0805-130.03 / TO# 17075.00 / 2185 Oakland
Sample Matrix: Water

Service Request: S951180
Date Collected: 9/20,21/95
Date Received: 9/21/95
Date Extracted: NA
Date Analyzed: 9/27-10/2/95

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

Sample Name	Lab Code	PID Detector Percent Recovery 4-Bromofluorobenzene	FID Detector Percent Recovery α,α,α–Trifluorotoluene
MW-9 (22)	S951180-002	92	96
MW-10 (23)	S951180-003	95	99
MW-7 (25)	S951180-004	86	104
MW-5 (26)	S951180-005	94	99
MW-8 (22)	S951180-006	89	110
MW-2 (23)	S951180-007	84	107 *
MW-6 (27)	S951180-008	92	104
MW-3 (23)	S951180-009	91	106
MW-7 (25) MS	S951180-004MS	87	101
MW-7 (25) DMS	S951180-004DMS	86	104
Method Blank	S950927-WB	93	99
Method Blank	S951002-WB	97	94
CAS Acceptance Limits:		69-116	69-116

* The FID surrogate reported for this sample is 4-bromofluorobenzene.

SUR2/060194

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 0805-130.03 / TO# 17075.00 / 2185 Oakland

Service Request: S951180
Date Analyzed: 9/27/95

Initial Calibration Verification (ICV) Summary
BTEX, MTBE and TPH as Gasoline
EPA Methods 5030/8020/California DHS LUFT Method
Units: ppb

Analyte	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits
Benzene	25	23.5	94	85-115
Toluene	25	23.5	94	85-115
Ethylbenzene	25	23.1	92	85-115
Xylenes, Total	75	70.6	94	85-115
Gasoline	250	242	97	90-110
Methyl-tert-butyl Ether	50	47.7	95	85-115

ICV25AL/060194

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	ARCO Products Company	**Service Request:**	S951180
Project:	0805-130.03 / TO# 17075.00 / 2185 Oakland	**Date Collected:**	9/20,21/95
Sample Matrix:	Water	**Date Received:**	9/21/95
		Date Extracted:	NA
		Date Analyzed:	9/27-10/2/95

Matrix Spike/Duplicate Matrix Spike Summary
BTE
EPA Methods 5030/8020
Units: ug/L (ppb)

Sample Name: MW-7 (25)
Lab Code: S951180-004

Analyte	Spike Level MS	Spike Level DMS	Sample Result	Spike Result MS	Spike Result DMS	Percent Recovery MS	Percent Recovery DMS	CAS Acceptance Limits	Relative Percent Difference
Benzene	25	25	0.8	22.4	22.4	86	86	75-135	<1
Toluene	25	25	ND	22.0	21.9	88	88	73-136	<1
Ethylbenzene	25	25	ND	21.7	21.6	87	86	69-142	<1

DMS1S/060194

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 0805-130.03 / TO# 17075.00 / 2185 Oakland
Sample Matrix: Water

Service Request: S951180
Date Collected: 9/20,21/95
Date Received: 9/21/95
Date Extracted: NA
Date Analyzed: 9/21-10/2/95

Matrix Spike/Duplicate Matrix Spike Summary
Inorganic Parameters

Units: mg/L (ppm)

Sample Name: Batch QC, MW-5 (26), MW-3 (23)
Lab Code: S951161-001, 1180-005, 1180-009

Analyte	Spike Level MS	Spike Level DMS	Sample Result	Spike Result MS	Spike Result DMS	Percent Recovery MS	Percent Recovery DMS	CAS Acceptance Limits	Relative Percent Difference
Ammonia-N	200	200	120	320	310	100	95	51-133	3
Kjeldahl-N, Total	4.0	4.0	ND	2.4	2.3	60 *	58 *	62-127	4
Phosphate-P, Ortho-	0.40	0.40	0.17	0.51	0.50	85	83	65-135	2

* MS/DMS recoveries for TKN are below CAS acceptance limits. The laboratory control sample for TKN met the acceptance criteria, so the data was accepted. LCS spike amount 5.0 ppm, LCS result 4.5 ppm, LCS recovery 90%.

DMS1S/060194

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: TO#2185-94-2A/0805-130.03/#2185 OAKLAND
Sample Matrix: Water

Service Request: K9505940
Date Collected: 9/21/95
Date Received: 9/22/95
Date Extracted: NA
Date Analyzed: 9/22/95

Duplicate Summary
Oxidation-Reduction Potential
ASTM Method D 1498-76
Units: mg/L (ppm)

Sample Name	Lab Code	MRL	Sample Result	Duplicate Sample Result	Average	Relative Percent Difference
MW-5(26)	K9505940-002	-	328	329	328	< 1

DUP1A/102194

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: TO#2185-94-2A/0805-130.03 / #2185 Oakland
Sample Matrix: Water

Service Request: K9505940
Date Collected: 9/21/95
Date Received: 9/22/95
Date Extracted: 9/26/95
Date Analyzed: 9/27/95

Duplicate Summary
Total Metals
Units: µg/L (ppb)

Sample Name: Batch QC
Lab Code: K9505965-004

Analyte	EPA Method	MRL	Sample Result	Duplicate Sample Result	Average	Relative Percent Difference
Potassium	6010A	2000	3600	3600	3600	<1

DUP1SEPA/102194

ARCO Products Company
Division of Atlantic Richfield Company

Task Order No. 17075.00

Chain of Custody

ARCO Facility no. 2185	City (Facility) Oakland	Project manager (Consultant) John Young	Laboratory name CAS
ARCO engineer Mike Whelan	Telephone no. (ARCO)	Telephone no. (Consultant) (408)453-7300	Fax no. (Consultant) (408)453-0452
Consultant name EMCON	Address (Consultant) 1921 Ringwood Avenue San Jose, CA 95131		Contract number

Sample I.D.	Lab no.	Container no.	Matrix: Soil	Matrix: Water	Matrix: Other	Preservation: Ice	Preservation: Acid	Sampling date	Sampling time	BTEX 8020/EPA 8020	BTEX/TPH/Oxygenates EPA 8020/8015	TPH Modified 8015 Gas ☐ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM503E	EPA 601/8010	Dissolved Potassium	Ammonia As Nitrogen	Total Kjeldahl Nitrogen	Redox Potential	TCLP Metals ☐ VOA ☐ Semi VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐	Heterotrophic Plate Count	Orthophosphate	pH
MW-1(25)	1	1		X		X		9-21-95	1010														X		
MW-9(22)	2	2		X		X	HCL	9-20-95	1253		X														
MW-10(23)	3	2		X		X	HCL	9-21-95	1210		X														
MW-7(25)	4	2		X		X	HCL	9-20-95	1327		X														
MW-5(26)	5	9		X		X	HCL HNO3 H2SO4	9-21-95	1100		X					X	X	X	X				X	X	X
MW-8(27)	6	9		X		X	HCL HNO3 H2SO4		1235		X					X	X	X	X				X	X	X
MW-2(23)	7	9		X		X	HCL HNO3 H2SO4		1305		X					X	X	X	X				X	X	X
MW-6(27)	8	9		X		X	HCL HNO3 H2SO4		1325		X					X	X	X	X				X	X	X
MW-3(23)	9	9		X		X	HCL HNO3 H2SO4	✓	1355		X					X	X	X	X				X	X	X

Method of shipment: Sampler will deliver

Special detection Limit/reporting: Lowest Possible

Special QA/QC: As Normal

Remarks: TPHG, BTEX } EPA 8020, MTBE

#0905-130.03

Lab number: 495-5940, S9501180

Turnaround time

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

Condition of sample: ok		Temperature received: Cool			
Relinquished by sampler	Date 9-21-95	Time 1522	Received by Joanne Brown	CAS-SV	
Relinquished by	Date	Time	Received by		
Relinquished by Joanne Brown	Date 9-21-95	Time 1840	Received by laboratory	Date 092295	Time 1030

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

APPC-3292 (2-91)

CAS-K: Redox Potential, Diss. K/ICP, Het. Plate Count

Due 10/5

TOTAL P.02