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LETTER REPORT
QUARTERLY GROUNDWATER MONITORING AND REMEDIATION SYSTEM OPERATION
First Quarter 1994

ARCO Station 374
6407 Telegraph Avenue
Oakland, California

60025.16

6/8/94

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TRANSMITTAL

TO: Ms. Susan Hugo
ACHCSA, Dept. of Env. Health
80 Swan Way, Room 200
Oakland, California 94621

DATE: June 9, 1994
PROJECT NUMBER: 60025.16
SUBJECT: ARCO Station 374
6407 Telegraph Avenue, Oakland, California

FROM: David Peterson
TITLE: Staff Engineer

WE ARE SENDING YOU:

COPIES	DATED	NO.	DESCRIPTION
1	06/08/94	60025.16	Final - Letter Report, Quarterly Groundwater Monitorining and Remediation System Operation, First Quarter 1994, for the above subject site

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REMARKS:
Copies: 1 copy for RESNA file.

David Peterson, Staff Engineer

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June 8, 1994

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

Subject: Quarterly Groundwater Monitoring and Remediation System Operation
First Quarter 1994
ARCO Station 374
6407 Telegraph Avenue, Oakland, California

Mr. Whelan:

As requested by ARCO Products Company (ARCO), RESNA Industries Inc. (RESNA) presents this letter report summarizing the results of First Quarter 1994 Groundwater Monitoring and Remediation System Operation at the above-referenced site. The location of the site is shown on Plate 1, and site features such as groundwater monitoring wells, vapor extraction wells, and the remediation compound are shown on Plate 2.

Field work associated with groundwater monitoring was performed by Integrated Wastestream Management, Inc. (IWM) of Milpitas, California. RESNA's scope of work for groundwater monitoring was to interpret field and laboratory analytical data, which included evaluating trends in hydrocarbon concentrations in the local groundwater, the groundwater gradient, and direction of groundwater flow beneath the site. Evaluation and warrant of IWM's groundwater monitoring field procedures and protocols are beyond RESNA's scope of work.

Field work associated with remediation system operation was performed by RESNA. Field work consists of collection of field data, treatment unit influent and effluent sampling of wastewater and adjusting the system to optimize performance. RESNA evaluated remediation system performance using laboratory analytical results and collected field data. Previous environmental work at the site is summarized in RESNA reports cited in the References section.

GROUNDWATER MONITORING

Field Work

IWM field personnel were on site February 3, 1994 to measure depth-to-water (DTW) level, to perform subjective analysis for the presence of product in groundwater in wells MW-1 through MW-7 and to perform quarterly sampling.

Laboratory Analyses

Water samples were analyzed by Columbia Analytical Services, Inc., located in San Jose, California (Hazardous Waste Testing Laboratory Certification #1426) for benzene, toluene, ethylbenzene, and total xylenes (BTEX), and total petroleum hydrocarbons as gasoline (TPHg) using Environmental Protection Agency (EPA) Methods 5030/8020/California DHS LUFT Method. The groundwater sample from monitoring well MW-4 was also analyzed for total petroleum hydrocarbons as diesel (TPHd) using EPA Method 3510/California DHS LUFT Method. The Certified Laboratory Analytical Reports and Chain of Custody Record are included in Appendix A.

Results of Groundwater Monitoring

Groundwater elevations rose an average of approximately 1.30 feet in wells MW-1, MW-2, MW-3, and MW-6, and groundwater elevations fell an average of approximately 0.56 foot in wells MW-4 and MW-5 since last quarter. Evidence of floating product or product sheen was not noted in any of the wells during this quarter. Based on February 3, 1994, DTW data, groundwater is interpreted to flow toward the southwest with a gradient of approximately 0.04 ft/ft (Plate 3). A cone of depression is not evident around groundwater extraction well W-2 due to a low pumping rate during the period when quarterly sampling occurred. Groundwater monitoring data from this and previous quarters are presented in Table 1. The results of IWM's field work on the site are presented in Appendix A.

The following trends in hydrocarbon concentrations have been identified since last quarter: TPHg and benzene have remained nondetectable in offsite well MW-6. Concentrations of TPHg have remained nondetectable in onsite wells MW-1, MW-2, and offsite well MW-5; concentrations of benzene have decreased in well MW-2; and concentrations of benzene have increased from nondetectable in wells MW-1 and MW-5. Concentrations of TPHg and benzene have decreased in onsite well MW-4, and increased in offsite well MW-3. Concentrations of TPHd have decreased in well MW-4, and the laboratory continues to report that the sample contains a lower boiling point hydrocarbon mixture quantitated as

diesel, and the chromatogram does not match the typical diesel fingerprint. Discussion with the laboratory about this indicates this may be due to the pesence of gasoline in the sample. Cumulative analytical results of water samples are presented in Table 2.

GROUNDWATER EXTRACTION SYSTEM OPERATION

Remediation of groundwater beneath the site is accomplished through the operation of a groundwater extraction system (GES). Operation of the GES started on December 21, 1993. The GES consists of groundwater extraction well W-2, a submersible pneumatic pump in well W-2, subsurface conveyance piping, a surge tank for holding groundwater between pumping cycles and sediment precipitation, three 400 pound liquid-phase granular activated carbon (GAC) canisters for treatment, and an onsite sewer connection for groundwater discharge. Sewer discharge is authorized under Wastewater Discharge Permit No. 502-85611 issued by the East Bay Municipal Utilities District (EBMUD).

GES Operation

Cumulative operation and performance data for the GES is summarized in Table 4. RESNA personnel recorded the GES flowrates and quantities of wastewater processed and collected wastewater samples at locations shown on Table 4. Samples were collected for chemical analysis to evaluate the hydrocarbon removal efficiency of the GAC units, to evaluate the carbon units for hydrocarbon loading, and to comply with EBMUD permit requirements.

During the quarter, the GES system flowrate ranged from 0.08 to 0.24 gpm and a total of 18,643 gallons of groundwater was extracted, treated and discharged to the sanitary sewer. Since system start-up a total of 25,835 gallons of groundwater have been extracted and treated. The GES shutdown three times during the quarter due to high water pressure influent to carbon unit one. Cleaning of the bag filter and adjustment of the GES was done to alleviate the problem.

GES Sampling and Analysis

GES samples were analyzed for BTEX and TPHg using modified EPA Methods 5030/8015/8020 by Sequoia Analytical Laboratories (Sequoia), located in Redwood City, California (Hazardous Waste Testing Laboratory Certification No. 1210). GES analytical results are presented in Tables 4 and 5; Table 4 summarizes TPHg analytical results while Table 5 includes all TPHg and BTEX analyses. Appendix B contains copies of laboratory analytical results with chain-of-custody records.

TPHg influent concentrations to the surge tank ranged from 4,200 to 8,600 ppb while TPHg concentrations in the tank effluent ranged from 790 to 3,900 ppb. TPHg concentrations at all other system sampling locations (carbon unit #2 influent and sewer influent) were less than the method detection limit (MDL) of 50 ppb. The sewer influent analyses indicate that GES is in compliance with EBMUD wastewater discharge limits.

GES Hydrocarbon Removal

Based on average hydrocarbon concentrations in extracted groundwater and the volume of groundwater processed, approximately 1.4 pounds of TPHg has been extracted by the interim GES since system startup on December 21, 1993. The GES has operated for approximately 1,558 of the available 2,160 hours this quarter; table 6 shows hydrocarbons removed and hours of operation for the first quarter 1994, as well as totals since startup.

PREVIOUS AND FUTURE WORK

First Quarter 1994

- Submitted Letter Report, Quarterly Groundwater and Remediation System Monitoring, Fourth Quarter 1993 to ARCO and regulatory agencies.
- Performed First Quarter 1994 Groundwater Monitoring.
- Submitted Startup Report - WASTEWATER DISCHARGE PERMIT #502-85611, First Month of Operation and Maintenance, Groundwater Extraction and Remediation System, ARCO Service Station 374.
- Conducted operation and maintenance of Groundwater Remediation System.

Second Quarter 1994

- Submit Letter Report, Quarterly Groundwater Monitoring and Remediation System Operation, First Quarter 1994 to ARCO and regulatory agencies.
- Submit Letter Report, Semi-annual Self Monitoring Report, December 20, 1993 to March 31, 1994 to East Bay Municipal Utility District and ARCO.
- Continue operation and maintenance of Groundwater Remediation System.
- Perform Second Quarter 1994 Groundwater Monitoring.

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REPORTING REQUIREMENTS

RESNA recommends that copies of this report be forwarded to:

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

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

If you have any questions or comments, please call us at (510) 440-3300.

Sincerely,
RESNA Industries Inc.

Mary E. Rysdale
Geologic Technician

David Peterson
Staff Engineer

Richard H. Walls
Richard H. Walls, P.E. 43139
Senior Project Engineer

REGISTERED PROFESSIONAL ENGINEER
RICHARD H. WALLS, JR.
No. C043139
Exp. 3/31/96
CIVIL
STATE OF CALIFORNIA

Attachments:

References

Plate 1: Site Vicinity Map
Plate 2: Generalized Site Plan
Plate 3: Groundwater Gradient Map
Plate 4: TPHg/Benzene Concentrations In Groundwater

Table 1: Cumulative Groundwater Monitoring Data
Table 2: Cumulative Results of Laboratory Analyses of Groundwater -- TPHg, TPHd, BTEX, and TOG
Table 3: Cumulative Results of Laboratory Analyses of Groundwater -- VOCs and Metals
Table 4: Groundwater Extraction System Operation Data
Table 5: Summary of Laboratory Analytical Results of Groundwater Extraction System
Table 6: Groundwater Extraction System Gasoline Removal

Appendix A: IWM's Summary of Ground Water Sample Analyses, Field Reports, Ground Water Field Data Sheets, and Certified Analytical Reports with Chain of Custody Records

Appendix B: Groundwater Extraction System Laboratory Analytical Results with Chain of Custody Record

REFERENCES

RESNA Industries Inc. September 23, 1992. Report on Offsite Subsurface Environmental Investigation at ARCO Station 374, 6407 Telegraph Avenue, Oakland, California. RESNA Report 60035-5.

RESNA Industries Inc. December 16, 1993. Notification of System Startup for Groundwater Extraction and Treatment System at ARCO Station 374, 6407 Telegraph Avenue, Oakland, California. RESNA 60025-11.

RESNA Industries Inc. March 8, 1994. Letter Report, Quarterly Groundwater Monitoring Fourth Quarter 1993 at ARCO Station 374, 6407 Telegraph Avenue, Oakland, California. RESNA Report 60025-12.

Source. U.S Geological Survey
7.5–Minute Quadrangles
Oakland East/ Oakland West, California
Photorevised 1980

N

Approximate Scale
2000 1000 0 2000
feet

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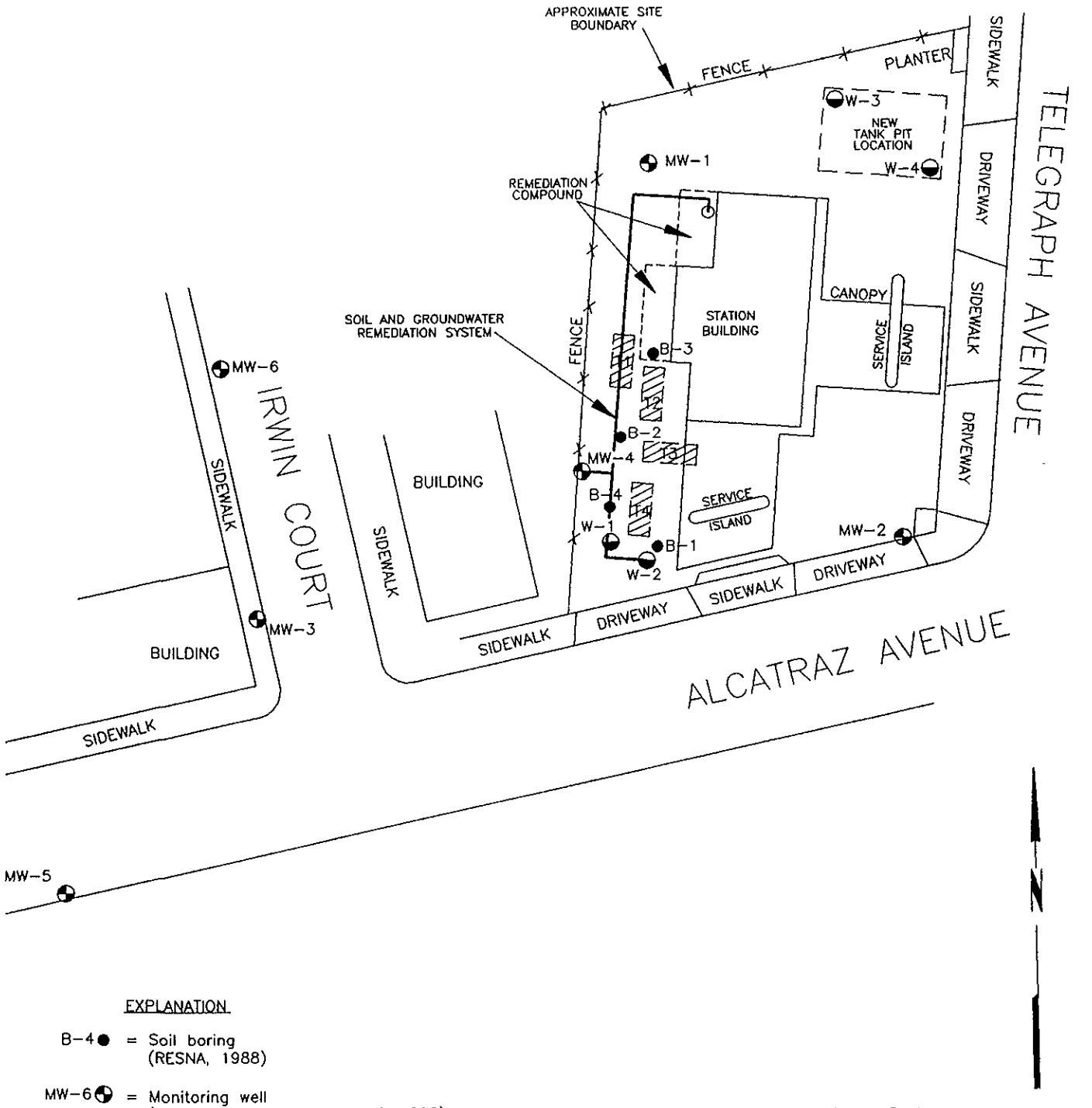
SITE VICINITY MAP
ARCO Station 374
6407 Telegraph Avenue
Oakland, California

PLATE
1



EXPLANATION

B-4 ● = Soil boring (RESNA, 1988)

MW-6 ◓ = Monitoring well (RESNA, July 1989, and April 1992)

W-4 ◒ = Tank pit monitoring well (RESNA, 1988)

▨ = Former underground storage tanks

Approximate Scale

40 20 0 40 80

feet

Source: Surveyed by John Koch, Licensed Land Surveyor.

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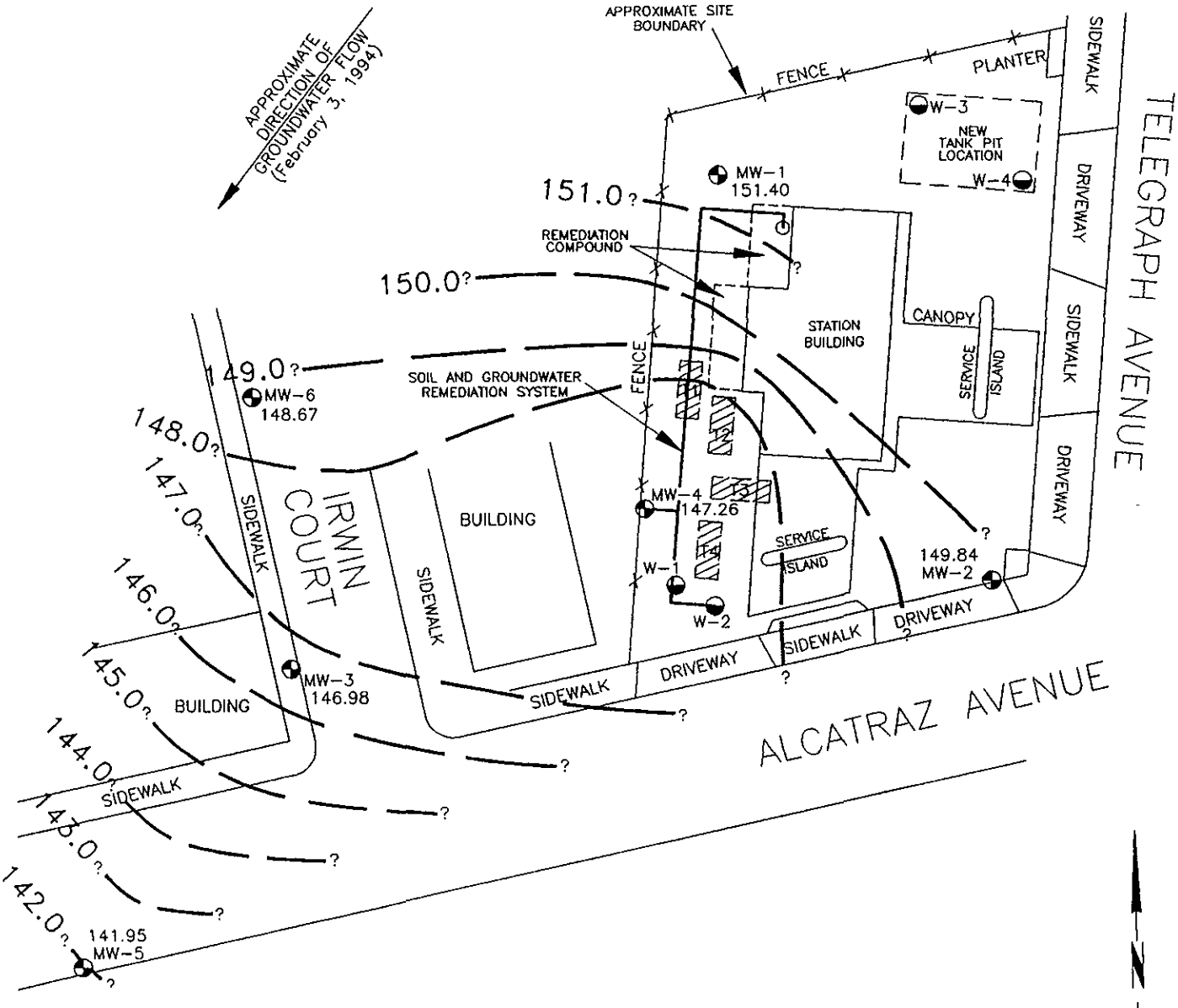
PROJECT 60025.16 00251601

GENERALIZED SITE PLAN
ARCO Station 374
6407 Telegraph Avenue
Oakland, California

PLATE 2



EXPLANATION

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

151 40 = Elevation of groundwater in feet above MSL February 3, 1994

MW-6 = Monitoring well (RESNA, July 1989, and April 1992)

W-4 = Tank pit monitoring well (RESNA, 1988)

= Former underground storage tanks

Approximate Scale

40 20 0 40 80

feet

Source: Surveyed by John Koch, Licensed Land Surveyor.

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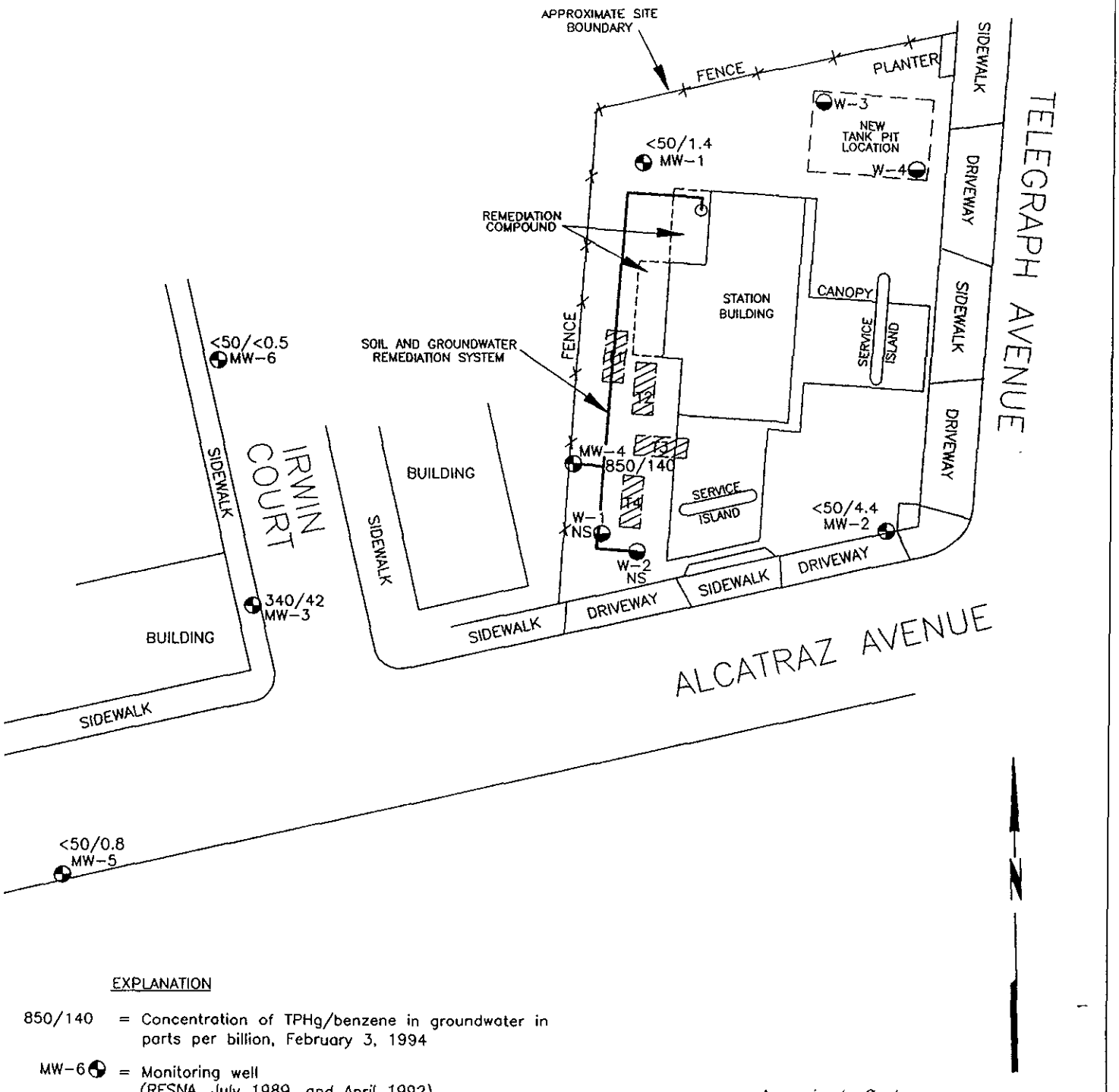
00251601

GROUNDWATER GRADIENT MAP
ARCO Station 374
6407 Telegraph Avenue
Oakland, California

PLATE 3



EXPLANATION

850/140 = Concentration of TPHg/benzene in groundwater in parts per billion, February 3, 1994

MW-6 = Monitoring well (RESNA, July 1989, and April 1992)

W-4 = Tank pit monitoring well (RESNA, 1988)

= Former underground storage tanks

NS = Not sampled, tank pit well

Approximate Scale

40 20 0 40 80

feet

Source: Surveyed by John Koch, Licensed Land Surveyor.

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00251601

TPHg/BENZENE CONCENTRATIONS IN GROUNDWATER
ARCO Station 374
6407 Telegraph Avenue
Oakland, California

PLATE 4

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TABLE 1
CUMULATIVE GROUNDWATER MONITORING DATA
ARCO Station 374
Oakland, California
(Page 1 of 5)

Well / Date	Well Elevation	Depth-to-Water	Water Elevation	Floating Product
MW-1	159.44			
07/20/89		8.04	151.40	None
08/30/89		8.47	150.97	None
10/04/89		8.50	150.94	None
01/10/90		6.74	152.70	None
08/07/90		6.87	152.57	None
12/06/90		7.35	152.09	None
12/19/90		7.22	152.22	None
01/29/91		8.28	151.16	None
02/20/91		7.98	151.46	None
04/25/91		6.89	152.55	None
05/31/91		7.64	151.80	None
07/08/91		8.17	151.27	None
08/09/91		8.58	150.86	None
09/25/91		8.82	150.62	None
10/17/91		8.96	150.48	None
11/20/91		8.60	150.84	None
12/27/91		8.71	150.73	None
01/19/92		7.83	151.61	None
02/19/92		6.68	152.76	None
03/09/92		4.47	154.97	None
04/15/92	158.91**	6.44	152.47	None
05/12/92		7.31	151.60	None
06/16/92		7.97	150.94	None
07/14/92		8.22	150.69	None
08/07/92		8.46	150.45	None
09/22/92		6.76	152.15	None
10/12/92		7.13	151.78	None
11/23/92		7.24	151.67	None
12/16/92		6.44	152.47	None
01/21/93		5.03	153.88	None
02/22/93		4.93	153.98	None
03/25/93		5.13	153.78	None
04/27/93		5.68	153.23	None
08/04/93		7.91	151.00	None
10/13/93		8.81	150.10	None
02/03/94		7.51	151.40	None
MW-2	158.46			
07/20/89		8.15	150.31	None
08/30/89		8.42	150.04	None

See notes on page 5 of 5.

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TABLE 1
CUMULATIVE GROUNDWATER MONITORING DATA
ARCO Station 374
Oakland, California
(Page 2 of 5)

Well / Date	Well Elevation	Depth-to-Water	Water Elevation	Floating Product
MW-2 cont.				
10/04/89		8.40	150.06	None
01/10/90		6.12	152.34	None
08/07/90		6.35	152.11	None
12/06/90		7.15	151.31	None
12/19/90		7.38	151.08	None
01/29/91		8.41	150.05	None
02/20/91		8.26	150.20	None
04/25/91		7.70	150.76	None
05/31/91		8.10	150.36	None
07/08/91		8.34	150.12	None
08/09/91		8.51	149.95	None
09/25/91		8.66	149.80	None
10/17/91		8.80	149.66	None
11/20/91		8.66	149.80	None
12/27/91		8.57	149.89	Sheen
01/19/92		8.25	150.21	None
02/19/92		7.50	150.96	None
03/09/92		7.40	151.06	None
04/15/92	157.92**	7.72	150.20	None
05/12/92		8.01	149.91	None
06/16/92		8.25	149.67	None
07/14/92		8.33	149.59	None
08/07/92		8.42	149.50	None
09/22/92		6.13	151.79	None
10/12/92		6.80	151.12	None
11/23/92		7.15	150.77	None
12/16/92		6.66	151.26	None
01/21/93		5.93	151.99	None
02/22/93		6.01	151.91	None
03/25/93		5.91	152.01	None
04/27/93		6.63	151.29	None
08/04/93		8.02	149.90	None
10/13/93		8.64	149.28	None
02/03/94		8.08	149.84	None
MW-3	154.18			
07/20/89		7.58	146.60	None
08/30/89		8.00	146.18	None
10/04/89		7.73	146.45	Emulsion
01/10/90		7.78	146.40	None

See notes on page 5 of 5.

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TABLE 1
CUMULATIVE GROUNDWATER MONITORING DATA
ARCO Station 374
Oakland, California
(Page 3 of 5)

Well Date	Well Elevation	Depth-to- Water	Water Elevation	Floating Product
MW-3 cont.				
08/07/90		7.66	146.52	None
12/06/90		7.75	146.43	None
12/19/90		7.58	146.60	None
01/29/91		7.60	146.58	None
02/20/91		7.51	146.67	None
04/25/91		6.37	147.81	None
05/31/91		7.19	146.99	None
07/08/91		7.60	146.58	None
08/09/91		7.94	146.24	None
09/25/91		8.23	145.95	None
10/17/91		8.44	145.74	None
11/20/91		8.78	145.40	None
12/27/91		8.05	146.13	Sheen
01/19/92		7.65	146.53	None
02/19/92		6.48	147.70	None
03/09/92		5.45	148.73	None
04/15/92	153.64**	7.75	145.89	None
05/12/92		7.45	146.19	None
06/16/92		7.51	146.13	None
07/14/92		7.60	146.04	None
08/07/92		7.85	145.79	None
09/22/92		7.73	145.91	None
10/12/92		7.83	145.81	None
11/23/92		6.98	146.66	None
12/16/92		5.96	147.68	None
01/21/93		4.62	149.02	None
02/22/93		5.15	148.49	None
03/25/93		5.45	148.19	None
04/27/93		5.79	147.85	None
08/04/93		7.24	146.40	None
10/13/93		8.03	145.61	None
02/03/94		6.66	146.98	None
MW-4	157.08			
07/20/89		8.09	148.99	None
08/30/89		8.45	148.63	Sheen
10/04/89		8.57	148.51	Sheen
01/10/90		7.26	149.82	None
08/07/90		6.87	150.21	None
12/06/90		8.02*	149.06*	Sheen

See notes on page 5 of 5.

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TABLE 1
CUMULATIVE GROUNDWATER MONITORING DATA
ARCO Station 374
Oakland, California
(Page 4 of 5)

Well Date	Well Elevation	Depth-to-Water	Water Elevation	Floating Product
MW-4 cont.				
12/19/90		7.69	149.39	None
01/29/91		8.39	148.69	Sheen
02/20/91		8.16	148.92	None
04/25/91		7.14	149.94	None
05/31/91		7.64	149.44	None
07/08/91		8.34	148.74	None
08/09/91		8.60	148.48	None
09/25/91		8.80	148.28	None
10/17/91		8.98	148.10	None
11/20/91		8.78	148.30	None
12/27/91		8.82	148.26	Sheen
01/19/92		8.18	148.90	None
02/19/92		7.62	149.46	None
03/09/92		6.68	150.40	None
04/15/92	156.53**	6.96	149.57	None
05/12/92		7.45	149.08	None
06/16/92		7.94	148.59	None
07/14/92		8.21	148.32	None
08/07/92		8.41	148.12	None
09/22/92		6.14	150.39	None
10/12/92		6.45	150.08	None
11/23/92		7.48	149.05	None
12/16/92		6.95	149.58	None
01/21/93		5.53	151.00	None
02/22/93		5.83	150.70	None
03/25/93		5.96	150.57	None
04/27/93		6.30	150.23	None
08/04/93		7.71	148.82	None
10/13/93		8.53	148.00	None
02/03/94		9.27	147.26	None
MW-5	151.33**			
04/15/92		8.05	143.28	None
05/12/92		8.44	142.89	None
06/16/92		8.74	142.59	None
07/14/92		9.70	141.63	None
08/07/92		9.10	142.23	None
09/22/92		9.26	142.07	None
10/25/92#		9.24	142.09	None
11/23/92			Well Inaccessible	

See notes on page 5 of 5.

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TABLE 1
CUMULATIVE GROUNDWATER MONITORING DATA
ARCO Station 374
Oakland, California
(Page 5 of 5)

Well Date	Well Elevation	Depth-to- Water	Water Elevation	Floating Product
MW-5 cont.				
12/16/92		8.20	143.13	None
01/21/93		7.89	143.44	None
02/22/93		7.29	144.03	None
03/25/93		7.51	143.82	None
04/27/93		7.72	143.61	None
08/05/93		8.66	142.67	None
10/13/93		9.00	142.33	None
02/03/94		9.38	141.95	None
MW-6	153.84**			
04/15/92		4.55	149.29	None
05/12/92		5.32	148.52	None
06/16/92		5.91	147.93	None
07/14/92		6.08	147.76	None
08/07/92		6.36	147.48	None
09/22/92		6.53	147.31	None
10/25/92#		6.54	147.30	None
11/23/92		5.75	148.09	None
12/16/92		4.69	149.15	None
01/21/93		3.82	150.02	None
02/22/93		3.78	150.06	None
03/25/93		3.93	149.91	None
04/27/93		4.30	149.54	None
08/05/93		5.39	148.45	None
10/13/93		7.12	146.72	None
02/03/94		5.17	148.67	None

NOTES:
Elevations and depth-to-water (DTW) measured in feet.
* = Floating Product.
** = Wellheads surveyed by John E. Koch on April 27, 1992. Well elevation datum is mean sea level (msl).
# = Wells inaccessible on October 12, 1992 due to parked cars. EMCON returned and sampled on October 25, 1992.

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TABLE 2
CUMULATIVE RESULTS OF LABORATORY ANALYSES OF GROUNDWATER--TPHg, TPHd, BTEX, AND TOG
ARCO Service Station 374
Oakland, California
(Page 1 of 3)

Date/Well	TPHg	TPHd	B	T	E	X	TOG
MW-1							
07/21/89	33	NA	0.77	1.6	1.5	5.0	NA
08/30/89	<20	NA	<0.50	<0.50	<0.50	<0.50	NA
10/04/89	<20	NA	<0.50	<0.50	<0.50	<0.50	NA
01/10/90	<20	NA	<0.50	<0.50	<0.50	<0.50	NA
08/07/90	<20	NA	<0.50	<0.50	<0.50	<0.50	NA
12/06/90	<50	NA	3.6	2.7	0.60	5.80	NA
02/20/91	<50	NA	<0.50	<0.50	<0.50	<0.50	NA
07/08/91	<30	NA	<0.30	<0.30	<0.30	<0.30	NA
09/25/91	<30	NA	0.57	0.57	0.54	1.7	NA
11/20/91	57	NA	9.2	3.7	0.63	2.5	NA
03/09/92	<50	NA	<0.5	<0.5	<0.5	<0.5	NA
04/15/92	<50	NA	<0.5	<0.5	<0.5	<0.5	NA
07/14/92	<50	NA	<0.5	0.7	<0.5	1.3	NA
10/12/92	<50	NA	<0.5	<0.5	<0.5	<0.5	NA
01/21/93	<50	NA	<0.5	<0.5	<0.5	<0.5	NA
04/27/93	<50	NA	<0.5	<0.5	<0.5	<0.5	NA
08/04/93	<50	NA	<0.5	<0.5	<0.5	<0.5	NA
10/13/93	<50	NA	<0.5	<0.5	<0.5	<0.5	NA
02/03/94	<50	NA	1.4	2.1	<0.5	2.0	NA
MW-2							
07/21/89	4,200	NA	280	210	38	24	NA
08/30/89	4,200	NA	160	260	45	240	NA
10/04/89	4,300	NA	860	300	29	330	NA
01/10/90	8,000	NA	890	710	120	760	NA
08/07/90	6,000	NA	880	76	25	80	NA
12/06/90	1,600	NA	330	69	18	63	NA
02/20/91	1,300	NA	160	46	13	48	NA
07/08/91	310	NA	76	18	7.7	24	NA
09/25/91	83	NA	17	0.69	2.2	4.1	NA
11/20/91	180	NA	46	6.1	3.0	8.7	NA
03/09/92	690	NA	170	25	21	58	NA
04/15/92	86	NA	20	2.3	3.8	8.5	NA
07/14/92	160	NA	46	1.4	1.2	3.5	NA
10/12/92	230	NA	59	7.0	5.5	11	NA
01/21/93	450	NA	70	6.6	22	54	NA
04/27/93	<50	NA	6.6	<0.5	0.7	1.1	NA
08/04/93	<50	NA	2.1	<0.5	<0.5	<0.5	NA
10/13/93	<50	NA	14	<0.5	<0.5	<0.5	NA
02/03/94	<50	NA	4.4	<0.5	<0.5	0.8	NA

See notes on page 3 of 3.

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TABLE 2
CUMULATIVE RESULTS OF LABORATORY ANALYSES OF GROUNDWATER--TPHg, TPHd, BTEX, AND TOG
ARCO Service Station 374
Oakland, California
(Page 2 of 3)

Date/Well	TPHg	TPHd	B	T	E	X	TOG
MW-3							
07/21/89	430	NA	9	4.8	<0.50	50	NA
08/30/89	1,200	NA	85	46	8.4	55	NA
10/04/89	7,000	NA	580	900	120	670	NA
01/10/90	940	NA	130	59	21	73	NA
08/07/90	2,300	NA	180	64	59	120	NA
12/06/90	460	350	52	55	14	39	NA
02/20/91	470	<100	36	30	9.3	31	<5,000
07/08/91	2,500	NA	240	470	74	320	NA
09/25/91	1,100	NA	120	110	34	120	NA
11/20/91	1,000	NA	180	140	43	140	NA
03/10/92	1,200	NA	200	110	53	130	NA
04/15/92	1,600	NA	200	13	110	81	NA
07/14/92	5,200	NA	620	44	310	250	NA
10/12/92	850	NA	150	5.2	55	46	NA
01/21/93	620	NA	100	12	35	35	NA
04/27/93	1,700	NA	180	83	64	100	NA
08/04/93	380	NA	70	12	29	41	NA
10/13/93	780	NA	90	6.0	40	31	NA
02/03/94	340	NA	42	8.7	9.2	28	NA
MW-4							
07/21/89	8,700	NA	720	360	120	640	NA
08/30/89	7,300	NA	630	220	72	320	NA
10/04/89	21,000	NA	2,300	1,300	280	1,300	NA
01/10/90	4,300	NA	470	250	63	430	NA
08/07/90	69,000	28,000	8,700	4,200	540	4,600	<5,000
12/06/90		Not sampled--product sheen					
02/20/91	5,200	<100	690	200	95	580	<5,000
07/08/91	1,700	NA	280	68	37	170	NA
09/25/91	6,300	NA	2,100	290	210	590	NA
11/20/91	2,700	NA	1,200	200	110	320	NA
03/10/92	690	NA	180	80	18	43	NA
04/15/92	8,500	NA	2,100	750	280	1,000	NA
07/14/92	10,000	NA	2,900	530	290	930	NA
10/12/92	19,000	690*	5,200	1,600	490	1,800	NA
01/21/93	22,000	1,400*	4,400	1,300	580	2,200	NA
04/27/93	21,000	1,100*	4,800	1,200	630	2,400	NA
08/04/93	23,000	1,500*	6,600	1,700	770	2,600	NA
10/13/93	16,000	670*	3,500	800	470	1,800	NA
02/03/94	850	59*	140	84	7.9	59	NA

See notes on page 3 of 3.

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TABLE 2
CUMULATIVE RESULTS OF LABORATORY ANALYSES OF GROUNDWATER--TPHg, TPHd, BTEX, AND TOG
ARCO Service Station 374
Oakland, California
(Page 3 of 3)

Date/Well	TPHg	TPHd	B	T	E	X	TOG
MW-5							
04/15/92	<50	NA	<0.5	<0.5	<0.5	<0.5	NA
07/14/92	<50	NA	<0.5	<0.5	<0.5	<0.5	NA
10/25/92	<50	NA	<0.5	<0.5	<0.5	<0.5	NA
01/21/93	<50	NA	<0.5	<0.5	<0.5	<0.5	NA
04/27/93	<50	NA	0.5	1.0	<0.5	0.8	NA
08/05/93	<50	NA	<0.5	<0.5	<0.5	<0.5	NA
10/14/93	<50	NA	<0.5	<0.5	<0.5	<0.5	NA
02/03/94	<50	NA	0.8	1.7	<0.5	1.5	NA
MW-6							
04/15/92	<50	NA	<0.5	<0.5	<0.5	<0.5	NA
07/15/92	<50	NA	<0.5	<0.5	<0.5	<0.5	NA
10/25/92	<50	NA	<0.5	<0.5	<0.5	<0.5	NA
01/21/93	<50	NA	<0.5	<0.5	<0.5	<0.5	NA
04/27/93	<50	NA	<0.5	<0.5	<0.5	<0.5	NA
08/05/93	<50	NA	<0.5	<0.5	<0.5	<0.5	NA
10/13/93	<50	NA	<0.5	<0.5	<0.5	<0.5	NA
02/03/94	<50	NA	<0.5	<0.5	<0.5	<0.5	NA
MCL:	---	---	1	---	680	1,750	---
DWAL:	---	---	---	100	---	---	---

NOTES:

Results in micrograms per liter ($\mu g/L$) = parts per billion (ppb).
TPHg : Total petroleum hydrocarbons as gasoline using EPA method 5030/8015.
TPHd : Total petroleum hydrocarbons as diesel using EPA method 3510/8015.
BTEX : B: Benzene, T: Toluene, E: Ethylbenzene, X: Total Xylene isomers; measured using EPA method 8020/602.
TOG : Total oil and grease measured using Standard Method 5520 B/F.
< : Results reported as less than the detection limit.
NA : Not analyzed
* : The sample contains a lower boiling point hydrocarbon mixture quantitated as diesel. The chromatogram does not match the typical diesel fingerprint.
FB-1 : Field blank.
MCL : State Maximum Contaminant Level (October 1990).
DWAL: State recommended Drinking Water Action Level (October 1990).

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TABLE 3
CUMULATIVE RESULTS OF LABORATORY ANALYSES OF GROUNDWATER--VOCs and Metals
ARCO Service Station 374
Oakland, California

Well Date	VOC (ppb)	Cd (ppm)	Cr (ppm)	Pb (ppm)	Ni (ppm)	Zn (ppm)
MW-4						
07/31/90	Nondetectable for thirty one compounds tested (<1.0)	NA	NA	NA	NA	NA
02/20/91	Chloromethane* 3.4; nondetectable for twenty eight other compounds tested (<0.5)	NA	NA	NA	NA	NA
11/20/91	NA Sampling discontinued	<0.010	<0.010	<0.0050	<0.050	0.019

NOTES:
Halogenated Volatile Organics measured by EPA method 601/8010.

VOC = Volatile Organic Compound (results in micrograms per liter [µg/L])
ppb = parts per billion (ppb).
ppm = parts per million (ppm). Metal results in milligrams per liter (mg/L)
NA = Not Analyzed
Cd = Cadmium
Cr = Chromium
Pb = Lead
Ni = Nickel
Zn = Zinc

TABLE 4
GROUNDWATER EXTRACTION SYSTEM OPERATION DATA
ARCO 374, OAKLAND, CALIFORNIA
(PAGE 1 of 2)

DATE	VOL WATER TREATED (gal)	TOTAL VOL WATER TREATED (gal)	SYSTEM FLOW RATE (gpm)	TANK INF TPHg CONC (µg/ℓ)	TANK EFF TPHg CONC (µg/ℓ)	SEWER INF TPHg CONC (µg/ℓ)	TPHg EXT IN PERIOD (lb)
12/21/93	22	22	0.21	NS	19,000	<50	NA
12/23/93	4,833	4,855	1.6	9,300	10,000	<50	0.38
12/27/93	2,016	6,871	0.36	5,700	4,400	<50	0.13
12/29/93	371	7,192	0.13	5,800	2,400	<50	0.02
01/03/94	733	7,925	0.10	6,500	3,900	<50	0.01
01/05/94	237	8,162	0.08	5,200	1,100	<50	0.01
01/11/94	745	8,907	0.08	6,300	790	<50	0.03
01/13/94	268	9,175	0.09	8,600	3,900	<50	0.02
01/14/94	SYSTEM SHUTDOWN 1/14/94 TO 1/24/94 DUE TO HIGH WATER PRESSURE						
01/24/94	131	9,306	0.08	NS	NS	NS	0.01
02/10/94	SYSTEM SHUTDOWN 2/10/94 TO 2/24/94 DUE TO HIGH WATER PRESSURE						
02/24/94	5,249	14,555	0.21	4,200	1,500	<50	0.28
03/23/94	SYSTEM SHUTDOWN 3/23/94 TO 3/24/94 DUE TO HIGH WATER PRESSURE						
03/24/94	9,168	23,723	0.24	6,200	2,500	<50	0.40

SEE NOTES ON PAGE 2 OF 2.

TABLE 4
GROUNDWATER EXTRACTION SYSTEM OPERATION DATA
ARCO 374, OAKLAND, CALIFORNIA
(PAGE 2 of 2)

Notes:
VOL WATER TREATED = Volume of groundwater treated in period
TOTAL VOL WATER TREATED = Total volume of groundwater treated since startup
gal = gallons
gpm = gallons per minute
TPHg = Total petroleum hydrocarbons as gasoline
TANK INF TPHg CONC = Concentration of TPHg in surge tank influent
TANK EFF TPHg CONC = Concentration of TPHg in surge tank effluent
SEWER INF TPHg CONC = Concentration of TPHg in sewer influent
$\mu g/\ell$ = micrograms per liter
TPHg EXT IN PERIOD = TPHg extracted in period
NS = Not Sampled
NM = Not measured
NA = Not applicable
Calculations:
TPHg extracted = Average inf conc ($\mu g/\ell$) x volume treated (gal) x 3.785 (ℓ/gal) ÷ 454,000,000 (μg/lb)

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TABLE 5
SUMMARY OF LABORATORY ANALYTICAL RESULTS
OF GROUNDWATER EXTRACTION SYSTEM
ARCO Service Station 374
Oakland, California
(Page 1 of 2)

Sample location and date	Sample ID	TPHg (ppb)	Benzene (ppb)	Toluene (ppb)	Ethylbenzene (ppb)	Total Xylenes (ppb)
TANK INFLUENT						
12/23/93	SP102	9,300	1,200	160	200	1,500
12/27/93	SP102	5,700	820	97	45	1,000
12/29/93	SP102	5,800	950	110	34	1,100
01/03/94	SP102	6,500	860	100	210	1,100
01/05/94	SP102	5,200	970	100	250	1,300
01/11/94	SP102	6,300	900	63	210	1,200
01/13/94	SP-102	8,600	950	68	220	1,300
02/24/94	SP102	4,200	520	24	84	390
03/24/94	W-SP-102	6,200	1,100	43	160	300
CARBON 1 INFLUENT						
12/21/93	SP105	19,000	2,100	460	570	2,500
12/23/93	SP105	10,000	1,200	230	530	1,700
12/27/93	SP105	4,400	480	36	19	830
12/29/93	SP105	2,400	340	18	<0.50	510
01/03/94	SP105	3,900	520	42	33	600
01/05/94	SP105	1,100	300	12	<10	200
01/11/94	SP105	790	41	<5.0	<5.0	97
01/13/94	SP-105A	3,900	360	18	28	550
02/24/94	SP105	1,500	200	13	31	130
03/24/94	W-SP-105A	2,500	490	17	66	140
CARBON 2 INFLUENT						
12/21/93	SP106	<50	<0.50	<0.50	<0.50	<0.50
12/23/93	SP106	<50	<0.50	<0.50	<0.50	<0.50
12/27/93	SP106	<50	<0.50	<0.50	<0.50	<0.50
12/29/93	SP106	<50	<0.50	<0.50	<0.50	<0.50
01/03/94	SP106	<50	<0.50	<0.50	<0.50	<0.50
01/05/94	SP106	<50	<0.50	<0.50	<0.50	<0.50
01/11/94	SP106	<50	<0.50	<0.50	<0.50	<0.50
01/13/94	SP-106B	<50	<0.50	<0.50	<0.50	<0.50
02/24/94	SP106	<50	<0.50	<0.50	<0.50	<0.50
03/24/94	W-SP-106B	<50	<0.50	<0.50	<0.50	<0.50
CARBON 3 EFFLUENT						
12/21/93	SP108	<50	<0.50	<0.50	<0.50	<0.50
12/23/93	SP108	<50	<0.50	<0.50	<0.50	<0.50
12/27/93	SP108	<50	<0.50	<0.50	<0.50	<0.50
12/29/93	SP108	<50	<0.50	<0.50	<0.50	<0.50

SEE NOTES PAGE 2 0F 2.

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TABLE 5
SUMMARY OF LABORATORY ANALYTICAL RESULTS
OF GROUNDWATER EXTRACTION SYSTEM
ARCO Service Station 374
Oakland, California
(Page 2 of 2)

Sample location and date	Sample ID	TPHg (ppb)	Benzene (ppb)	Toluene (ppb)	Ethylbenzene (ppb)	Total Xylenes (ppb)
CARBON 3 EFFLUENT(cont)						
01/03/94	SP108	<50	<0.50	<0.50	<0.50	<0.50
01/05/94	SP108	<50	<0.50	<0.50	<0.50	<0.50
01/11/94	SP108	<50	<0.50	<0.50	<0.50	<0.50
01/13/94	SP-108D	<50	<0.50	<0.50	<0.50	0.53
02/24/94	SP108	<50	<0.50	<0.50	<0.50	<0.50
03/24/94	W-SP-108D	<50	<0.50	<0.50	<0.50	<0.50

NOTES:

TPHg = Total petroleum hydrocarbons as gasoline.
ppb = Parts per billion (micrograms per liter [µg/L])
TANK INFLUENT = Influent to the surge tank
CARBON 1 INFLUENT = Influent to carbon canister #1
CARBON 2 INFLUENT = Influent to carbon canister #2
CARBON 3 EFFLUENT = Effluent from carbon canister #3 (discharge to the sewer)

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TABLE 6
GROUNDWATER EXTRACTION SYSTEM GASOLINE REMOVAL
ARCO STATION 374
Oakland, California

PERIOD		HOURS OF OPERATION	TOTAL HOURS IN PERIOD	PERCENT OF TIME OPERATIONAL	ESTIMATED TOTAL POUNDS TPHg REMOVED	ESTIMATED TOTAL GALLONS TPHg REMOVED
FROM	TO					
1/01/94	1/03/94	62	62	100 %	0.01	0.002
1/03/94	1/13/94	241	241	100 %	0.06	0.01
1/13/94	1/24/94	26	264	10 %	0.01	0.002
1/24/94	2/24/94	408	744	55 %	0.28	0.04
2/24/94	3/24/94	645	673	96 %	0.40	0.06
3/24/94	3/31/94	176	176	100 %	0.11	0.02
TOTAL THIS QUARTER		1,558	2,160	72 %	0.87	0.13
TOTAL SINCE STARTUP		1,809	2,411	75 %	1.4	0.22

Notes:
ppd = pounds per day
TPHg = Total petroleum hydrocarbons as gasoline
Calculation:
Percent of time operational = Hours of operation ÷ Total hours x 100
Gallons removed = pounds removed ÷ 6.22 lb/gal for gasoline

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APPENDIX A

IWM'S SUMMARY OF GROUND WATER SAMPLE ANALYSES, FIELD REPORTS, GROUND WATER SAMPLE FIELD DATA SHEETS, AND CERTIFIED ANALYTICAL REPORTS WITH CHAIN OF CUSTODY RECORDS

I NTEGRATED
W ASTESTREAM
M ANAGEMENT, INC.

February 22, 1994

Mr. John Young
RESNA Industries
3315 Almaden Expressway
Suite 34
San Jose, CA. 95118

Dear Mr. John Young:

Attached are the field data sheets and analytical results for quarterly ground water sampling at ARCO Facility No. A-374 in Oakland, California. Integrated Wastestream Management measured the depth to water and collected samples from wells at this site on February 3, 1994.

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

Please call us if you have any questions.

Sincerely,
Integrated Wastestream Management

Tom DeLon
Project Manager

Walter H. Howe
Registered Geologist

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

I NTEGRATED
W ASTESTREAM
M ANAGEMENT

A374AQA4.XLS

Summary of Ground Water Sample Analyses ARCO Facility No.A-374, Oakland, California

WELL NUMBER	MW-1	MW-2A	MW-3	MW-4	MW-5	MW-6
DATE SAMPLED	2/3/94	2/3/94	2/3/94	2/3/94	2/3/94	2/3/94
DEPTH TO WATER	7.51	8.08	6.66	9.27	9.38	5.17
SHEEN	NONE	NONE	NONE	NONE	NONE	NONE
PRODUCT THICKNESS	NA	NA	NA	NA	NA	NA
TPHg	N.D.	N.D.	340	850	N.D.	N.D.
BTEX						
BENZENE	1.4	4.4	42	140	0.8	N.D.
TOLUENE	2.1	N.D.	8.7	84	1.7	N.D.
ETHLYBENZENE	N.D.	N.D.	9.2	7.9	N.D.	N.D.
XYLENES	2.0	0.8	28	59	1.5	N.D.
TPHd						
DIESEL	NA	NA	NA	59	NA	NA

FOOTNOTES:

Concentrations reported in ug/L (ppb).

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

BTEX Distinction (USEPA Method 8020)

PCE = Tetrachloroethene (USEPA Method 8010)

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

TCE = Trichloroethene (USEAP Method 8010)

N.D. = Not Detected.

[redacted] E AR[redacted] TIM[redacted]

FIELD REPORT

DEPTH TO WATER / FLOATING PRODUCT SURVEY

SITE DEPARTURE TIME: 1875

WEATHER CONDITIONS: cloudy / fair 71

PROJECT NO.: _____ LOCATION: 6107 telegraph hill OAK DATE: Febuary 3, 1994

CLIENT/STATION #: Arco 274 FIELD TECHNICIAN: Vince / Francisco DAY OF WEEK: Thursday

DTW ORDER	WELL ID	SURFACE SEAL	LID SECURE	GASKET	LOCK	EXPANDING CAP	TOTAL DEPTH (Feet)	FIRST DEPTH TO WATER (Feet)	SECOND DEPTH TO WATER (Feet)	DEPTH TO FLOATING PRODUCT (Feet)	FLOATING PRODUCT THICKNESS (Feet)	SHEEN (Y=YES, N=NO)	COMMENTS	MATERIALS
1	MW-1	OK	YES	OK	OK	OK	26.8	7.51	7.51	N/A	N/A	NO	4" Hole in BOX Key	
4	MW-2	OK	YES	OK	OK	OK	26.3	8.08	8.08	N/A			4" Hole in BOX Key	
5	MW-3	OK	YES	OK	OK	OK	26.8	6.66	6.66	N/A			4"	
6	MW-4	OK	YES	OK	OK	OK	26.6	9.27	9.27	N/A			4" Request DATA Sheet	
3	MW-5	OK	YES	OK	OK	OK	23.0	9.38	9.38	N/A			4" Well head ½ filled w/ H2O	
2	MW-6	OK	YES	OK	OK	OK	14.7	5.17	5.17	N/A			4"	

1

GROUND WATER SAMPLE FIELD DATA SHEET

PROJECT NO: _____ WELL ID: MW-1

CLIENT/STATION #: ARCO 374 ADDRESS: 6407 TELEGRAPH AVE.

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

TD 26.8 - DTW 7.51 X GALLON/LINEAR FT. 0.66 X CASING VOLUME 3 = CALCULATED PURGE 38.19 ACTUAL PURGE 39.0

DATE PURGED: 2-3-94 START (2400 Hr) 1545 END (2400 Hr) 1552

DATE SAMPLED: 2-3-94 START (2400 Hr) 1559 END (2400 Hr) 1559

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1546	4	7.39	0.93	66.1	clear	
1547	11	7.11	0.89	65.4	clear	
1548	17	7.02	0.94	65.3	clear	
1549	28	6.87	0.91	65.2	clear	
1552	39	6.70	0.89	64.8	clear	

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

PURGING EQUIPMENT

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

Other: _____

SAMPLING EQUIPMENT

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

Other: _____

REMARKS: _____

PRINT NAME: Vince Valdes

SIGNATURE: Vince Valdes

GROUND WATER SAMPLE FIELD DATA SHEET

PROJECT NO: _____ WELL ID: MW-6

CLIENT/STATION #: ARCO 374 ADDRESS: 6407

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

TD 14.7 - DTW 5.17 X GALLON/LINEAR FT. 0.66 X CASING VOLUME 3 = CALCULATED PURGE 18.86 ACTUAL PURGE 19.0

DATE PURGED: 2-3-94 START (2400 Hr) 1608 END (2400 Hr) 1616

DATE SAMPLED: 2-3-94 START (2400 Hr) 1621 END (2400 Hr) 1621

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1610	2	6.76	0.45	63.9	clear	
1611	6	6.79	0.43	63.4	clear	
1613	10	6.73	0.42	63.0	clear	
1614	15	6.72	0.45	62.9	clear	
1616	19	6.74	0.47	62.8	clear	

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

PURGING EQUIPMENT

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

Other: _____

SAMPLING EQUIPMENT

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

Other: _____

REMARKS: _____

PRINT NAME: Vince Valdez

SIGNATURE: Vincent Valdez

GROUND WATER SAMPLE FIELD DATA SHEET

PROJECT NO: _____ WELL ID: MW-5

CLIENT/STATION #: ARCO 374 ADDRESS: 6407 TELEGRAPH AVE.

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

TD 23.0 - DTW 9.38 X (GALLON/LINEAR FT.) 0.66 X (CASING VOLUME) 3 = (CALCULATED PURGE) 26.96 ACTUAL PURGE 24.0

DATE PURGED: 2-3-94 START (2400 Hr) 1628 END (2400 Hr) 1632

DATE SAMPLED: 2-3-94 START (2400 Hr) 1637 END (2400 Hr) 1637

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1629	3	6.88	0.56	64.9	clear	
1629	9	6.86	0.54	65.6	clear	
1630	15	6.79	0.54	65.4	clear	
1631	21	6.84	0.63	65.3	clear	
1632	24	6.87	0.64	65.1	clear	

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

PURGING EQUIPMENT

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

Other: _____

SAMPLING EQUIPMENT

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

Other: _____

REMARKS: Well pumped dry at 24 gallons

PRINT NAME: Vince Valdes

SIGNATURE: Vincent Valdes

GROUND WATER SAMPLE FIELD DATA SHEET

PROJECT NO: _____ WELL ID: MW-2

CLIENT/STATION #: ARCO 374 ADDRESS: 6407 TELEGRAPH AVE.

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

TD 26.3 - DTW 8.08 X (GALLON/LINEAR FT.) 0.66 X (CASING VOLUME) 3 = (CALCULATED PURGE) 36.07 ACTUAL PURGE 37.0

DATE PURGED: 2-3-94 START (2400 Hr) 1715 END (2400 Hr) 1722

DATE SAMPLED: 2-3-94 START (2400 Hr) 1726 END (2400 Hr) 1726

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1716	3	7.25	0.57	66.1	clear	
1717	10	7.15	0.58	66.3	clear	
1719	18	7.07	0.61	66.2	clear	
1720	27	7.00	0.60	66.0	clear	
1722	37	6.96	0.62	65.8	clear	

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

PURGING EQUIPMENT

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

Other: _____

SAMPLING EQUIPMENT

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

Other: _____

REMARKS: _____

PRINT NAME: Vince Valdes

SIGNATURE: Vince Valdés

GROUND WATER SAMPLE FIELD DATA SHEET

PROJECT NO: _____ WELL ID: MW-3

CLIENT/STATION #: ARCO 374 ADDRESS: 6407 TELEGRAPH AVE.

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

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

TD 26.8 - DTW 6.66 X GALLON/LINEAR FT. 0.66 X CASING VOLUME 3 = CALCULATED PURGE 39.87 ACTUAL PURGE 40.0

DATE PURGED: 2-3-94 START (2400 Hr) 1737 END (2400 Hr) 1745

DATE SAMPLED: 2-3-94 START (2400 Hr) 1750 END (2400 Hr) 1750

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1738	4	6.72	0.54	64.5	clear	
1739	12	6.77	0.57	64.3	clear	
1741	19	6.67	0.61	64.1	clear	
1743	29	6.67	0.61	64.0	clear	
1745	40	6.65	0.60	63.8	clear	

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

PURGING EQUIPMENT

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

Other: _____

SAMPLING EQUIPMENT

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

Other: _____

REMARKS: No sheen, but strong odor observed prior to purging.

PRINT NAME: Vince Valdez

SIGNATURE: Vince Valdez

GROUND WATER SAMPLE FIELD DATA SHEET

PROJECT NO: _____ WELL ID: MW-4

CLIENT/STATION #: ARCO 374 ADDRESS: 6407 TELEGRAPH AVE

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

TD 26.6 - DTW 9.27 X GALLON/LINEAR FT. 0.66 X CASING VOLUME 3 = CALCULATED PURGE 34.31 ACTUAL PURGE 35.0

DATE PURGED: 2-3-94 START (2400 Hr) 1800 END (2400 Hr) 1808

DATE SAMPLED: 2-3-94 START (2400 Hr) 1812 END (2400 Hr) 1812

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1801	3	6.66	0.74	65.3	clear	
1803	11	6.67	0.72	65.5	clear	
1805	20	6.69	0.73	65.4	clear	
1806	26	6.65	0.76	65.1	clear	
1808	35	6.69	0.80	64.8	clear	

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

PURGING EQUIPMENT

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

Other: _____

SAMPLING EQUIPMENT

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

Other: _____

REMARKS: Well pumped dry at 35 gallons. Vaccuum present in well prior to taking of water level. Resna consultant on site. Owned & V.E.W connected to MW-4, prior to subjective evaluation and again prior to purging & Sampling PRINT NAME: Vince Valdez

PAGE 7 OF 7 SIGNATURE: Vincent Valdez

Columbia Analytical Services, Inc.

February 16, 1994

Service Request No. SJ94-0167

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

Re: **ARCO Facility No. A374**

Dear Ms. Austin/Mr. DeLon:

Attached are the results of the water samples submitted to our lab on February 7, 1994. For your reference, these analyses have been assigned our service request number SJ94-0167.

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

Please call if you have any questions.

Respectfully submitted:

COLUMBIA ANALYTICAL SERVICES, INC.

Keoni A. Murphy
Laboratory Manager

Annelise J. Bazar
Regional QA Coordinator

KAM/kmh

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

Acronyms

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

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	IWM	**Dates Collected:**	02/03/94
Project:	ARCO Facility No. A374	**Date Received:**	02/07/09
Sample Matrix:	Water	**Date Extracted:**	02/11/94
		Date Analyzed:	02/15/94
		Service Request:	SJ94-0167

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

Sample Name	TPH as Deisel
MW-4	59. (a)
Method Blank	ND
MRL	50

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

Approved By: Kevin Murphy Date: February 17, 1994

[940167 XLW]Tphdw10/2/16/94

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: IWM
Project: ARCO Facility No. A374
Sample Matrix: Water

Dates Collected: 02/03/94
Date Received: 02/07/09
Date Extracted: N/A
Date Analyzed: 02/09, 10/94
Service Request: SJ94-0167

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

Analyte:		Benzene	Toluene	Ethyl-benzene	Total Xylenes	TPH as Gasoline
Units:		µg/L (ppb)	µg/L (ppb)	µg/L (ppb)	µg/L (ppb)	µg/L (ppb)
Method Reporting Limit:		0.5	0.5	0.5	0.5	50
Sample Name	**Date Analyzed**					
MW-1	02/09/93	1.4	2.1	ND	2.0	ND
MW-2	02/09/94	4.4	ND	ND	0.8	ND
MW-3	02/10/94	42.	8.7	9.2	28.	340.
MW-4	02/10/94	140.	84.	7.9	59.	850.
MW-5	02/09/94	0.8	1.7	ND	1.5	ND
MW-6	02/09/94	ND	ND	ND	ND	ND
Method Blank	02/09/94	ND	ND	ND	ND	ND
Method Blank	02/10/94	ND	ND	ND	ND	ND

Approved By: Kevin A Murphy Date: February 17, 1994

1094 Ri... | A... | San Jose, California 95131 • Telephone 408/437-2400 • Fax 408/437-9356

APPENDIX A

LABORATORY QC RESULTS

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COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: IWM
Project: ARCO Facility No. A374
Sample Matrix: Water

Dates Collected: 02/03/94
Date Received: 02/07/09
Date Extracted: 02/11/94
Date Analyzed: 02/15/94
Service Request: SJ94-0167

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

Sample Name	Percent Recovery p-Terphenyl
MW-4	86.
MS	88.
DMS	101.
Method Blank	96.

CAS Acceptance Limits: 66-123

Approved By: Robin A Murphy Date: February 17, 1994

[940167 XLW]Tphdsr13/2/16/94

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COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: IWM
Project: ARCO Facility No. A374
Sample Matrix: Water

Dates Collected: 02/03/94
Date Received: 02/07/09
Date Extracted: N/A
Date Analyzed: 02/15/94
Service Request: SJ94-0167

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

Analyte	True Value	Result	Percent Recovery	CAS Acceptance Criteria
TPH as Diesel	500.	505.	101.	90-110

Approved By: Robert Murphy Date: February 17, 1994

[940167 XLW]Tphdccs11/2/16/94

Page No

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: IWM
Project: ARCO Facility No. A374
Sample Matrix: Water

Dates Collected: 02/03/94
Date Received: 02/07/09
Date Extracted: 02/11/94
Date Analyzed: 02/15/94
Service Request: SJ94-0167

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

					Percent Recovery		
		Sample	Spike Result				CAS Acceptance
Analyte	Spike Level	Result	MS	DMS	MS	DMS	Criteria
Diesel	4,000.	1,970.	4,920.	5,400.	74.	86.	61-141

Approved By: Kevin Murphy Date: February 17, 1994

[940167 XLW]Tpldms12/2/16/94

Page No

Client: IWM
Project: ARCO Facility No. A374
Sample Matrix: Water

Dates Collected: 02/03/94
Date Received: 02/07/09
Date Extracted: N/A
Date Analyzed: 02/09, 10/94
Service Request: SJ94-0167

Surrogate Recovery Summary
BTEX and Total Petroleum Hydrocarbons (TPH) as Gasoline
EPA Methods 5030/8020/California DHS LUFT Method

Sample Name	Date Analyzed	Percent Recovery a,a,a-Trifluorotoluene
MW-1	02/09/93	88.
MW-2	02/09/94	90.
MW-3	02/10/94	80.
MW-4	02/10/94	88.
MW-5	02/09/94	89.
MW-6	02/09/94	90.
MS	02/09/94	82.
DMS	02/09/94	87.
Method Blank	02/09/94	89.
Method Blank	02/10/94	87.

CAS Acceptance Limits: 62-112

Approved By: Kevin A Murphy Date: February 17, 1994

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COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	IWM	**Dates Collected:**	02/03/94
Project:	ARCO Facility No. A374	**Date Received:**	02/07/09
Sample Matrix:	Water	**Date Extracted:**	N/A
		Date Analyzed:	02/09, 10/94
		Service Request:	SJ94-0167

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

Analyte	True Value	Result	Percent Recovery	CAS Acceptance Criteria
Benzene	25.	27.7	111.	85-115
Toluene	25.	27.2	109.	85-115
Ethylbenzene	25.	27.2	109.	85-115
Total Xylenes	75.	82.7	110.	85-115
TPH as Gasoline	250.	249.	100.	90-110

Approved By: Deanna Murphy Date: February 17, 1994

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COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	IWM	**Dates Collected:**	02/03/94
Project:	ARCO Facility No. A374	**Date Received:**	02/07/09
Sample Matrix:	Water	**Date Extracted:**	N/A
		Date Analyzed:	02/09/94
		Service Request:	SJ94-0167

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

			Spike Result		Percent Recovery		CAS Acceptance
Analyte	**Spike Level**	**Sample Result**	**MS**	**DMS**	**MS**	**DMS**	**Criteria**
TPH as Gasoline	250.	61.0	305.	303.	98.	97.	67-121

Approved By: Robert Murphy Date: February 17, 1994

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APPENDIX B

CHAIN OF CUSTODY

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. IWM-94-5CC

Chain of Custody

ARCO Facility no. A 374	City (Facility) OAKLAND	Project manager (Consultant) TOM DeLon	Laboratory name Columbia
ARCO engineer Kyle Christie	Telephone no. (ARCO)	Telephone no. (Consultant) 408/942 8955	Fax no. (Consultant) 408/942 1499
Consultant name IWM.	Address (Consultant) 950 AMES AV Milp. CA. 95035		Contract number 07077

Method of shipment: CAS COURIER

Sample I.D.	Lab no.	Container no.	Matrix: Soil	Matrix: Water	Matrix: Other	Preservation: Ice	Preservation: Acid HCL	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH EPA M602/8020/8015	TPH Modified 8015 Gas ☒ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Metals ☐ Semi VOA ☐ VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐	EPA 3510 TPHd
TB-FB	1-2	2		✓		✓	✓	2-3-94	1245		✓	✓									
MW-1	3-4	2		✓		✓	✓		1559		✓	✓									
MW-2	5-6	2		✓		✓	✓		1726		✓	✓									
MW-3	7-8	2		✓		✓	✓		1750		✓	✓									
MW-4	9-11	3		✓		✓	✓		1812		✓	✓									✓
MW-5	12-13	2		✓		✓	✓		1637		✓	✓									
MW-6	14-15	2		✓		✓	✓		1621		✓	✓									

Special detection Limit/reporting:

Special QA/QC:

Remarks: Hold on T-B F-B

Lab number: 5J94-0167

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: 0001	
Relinquished by sampler: Vince Salcido	Date: 2-7-94	Time: 9:03AM	Received by: Gina Austin
Relinquished by: Gina Austin	Date: 2/7/94	Time:	Received by: Cas 2-7-94 10:10
Relinquished by:	Date:	Time:	Received by laboratory: Date: Time:

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

APPC-3292 (2-91)

RESNA
Working to Restore Nature

APPENDIX B

GROUNDWATER EXTRACTION SYSTEM LABORATORY ANALYTICAL RESULTS WITH CHAIN OF CUSTODY RECORD

SEQUOIA ANALYTICAL

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

RECEIVED
JAN 1 1994

RESNA
3315 Almaden Expwy., Suite 34
San Jose, CA 95118
Attention: John Young

Project: Arco 374, Oakland

Enclosed are the results from 4 water samples received at Sequoia Analytical on January 3,1994. The requested analyses are listed below:

SAMPLE #	SAMPLE DESCRIPTION	DATE OF COLLECTION	TEST METHOD
4A08201	Water, SP105	1/3/94	EPA 5030/8015/8020
4A08202	Water, SP106	1/3/94	EPA 5030/8015/8020
4A08203	Water, SP108	1/3/94	EPA 5030/8015/8020
4A08204	Water, SP102	1/3/94	EPA 5030/8015/8020

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

Very truly yours,

SEQUOIA ANALYTICAL

Vickie Tague
Project Manager

SEQUOIA ANALYTICAL

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

1994

RESNA
3315 Almaden Expwy., Suite 34
San Jose, CA 95118
Attention: John Young

Client Project ID: Arco 374, Oakland
Sample Matrix: Water
Analysis Method: EPA 5030/8015/8020
First Sample #: 4A08201

Sampled: Jan 3, 1994
Received: Jan 3, 1994
Reported: Jan 10, 1994

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit µg/L	Sample I.D. 4A08201 SP105	Sample I.D. 4A08202 SP106	Sample I.D. 4A08203 SP108	Sample I.D. 4A08204 SP102
Purgeable Hydrocarbons	50	3,900	N.D.	N.D.	6,500
Benzene	0.50	520	N.D.	N.D.	860
Toluene	0.50	42	N.D.	N.D.	100
Ethyl Benzene	0.50	33	N.D.	N.D.	210
Total Xylenes	0.50	600	N.D.	N.D.	1,100
Chromatogram Pattern:		Gas	--	--	Gas

Quality Control Data

Report Limit Multiplication Factor:	10	1.0	1.0	50
Date Analyzed:	1/6/94	1/5/94	1/5/94	1/5/94
Instrument Identification:	GCHP-17	GCHP-17	GCHP-17	GCHP-17
Surrogate Recovery, %: (QC Limits = 70-130%)	101	90	92	89

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

SEQUOIA ANALYTICAL

Vickie Tague
Project Manager

4A08201.RES

SEQUOIA ANALYTICAL

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

RESNA
3315 Almaden Expwy., Suite 34
San Jose, CA 95118
Attention: John Young

Client Project ID: Arco 374, Oakland
Matrix: Liquid

QC Sample Group: 4A08201

Reported: Jan 10, 1994

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl Benzene	Xylenes
Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Analyst:	M.Nipp	M.Nipp	M.Nipp	M.Nipp
MS/MSD Batch#:	G3LD9802	G3LD9802	G3LD9802	G3LD9802
Date Prepared:	N.A.	N.A.	N.A.	N.A.
Date Analyzed:	1/6/94	1/6/94	1/6/94	1/6/94
Instrument I.D.#:	GCHP-17	GCHP-17	GCHP-17	GCHP-17
Conc. Spiked:	10 µg/L	10 µg/L	10 µg/L	30 µg/L
Matrix Spike % Recovery:	98	97	98	97
Matrix Spike Duplicate % Recovery:	98	98	99	100
Relative % Difference:	0.0	1.0	1.0	3.0
LCS Batch#:	-	-	-	-
Date Prepared:	-	-	-	-
Date Analyzed:	-	-	-	-
Instrument I.D.#:	-	-	-	-
LCS % Recovery:	-	-	-	-
% Recovery Control Limits:	71-133	72-128	72-130	71-120

SEQUOIA ANALYTICAL

Vickie Tague
Project Manager

Please Note:
The LCS is a control sample of known, interferent free matrix that is analyzed using the same reagents, preparation, and analytical methods employed for the samples. The matrix spike is an aliquot of sample fortified with known quantities of specific compounds and subjected to the entire analytical procedure. If the recovery of analytes from the matrix spike does not fall within specified control limits due to matrix interference, the LCS recovery is to be used to validate the batch.

ARCO Products Company

Task Order No. [redacted]

Chain of Custody

ARCO Facility no	374	City (Facility)	OAKLAND
ARCO engineer	MICHAEL WHELAN	Telephone no (ARCO)	
Consultant name	RESNA INDUSTRIES	Address (Consultant)	3315 ALMADEN EXP. SUITE 34, SJ, CA 95118
Project manager (Consultant)	JOHN YOUNG		
Telephone no (Consultant)	(408) 264-7723	Fax no. (Consultant)	264-2435
Laboratory name	SEQUOIA		
Contract number	07-075		
Method of shipment			

Sample I.D	Lab no	Container no	Matrix: Soil	Matrix: Water	Matrix: Other	Preservation: Ice	Preservation: Acid	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH EPA M602/8020/8015	TPH Modified 8015 Gas X Diesel	Oil and Grease 413.1 413.2	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Metals Sem VOA VOA	CAM Metals EPA 6010/7000 TTLC STLC	Lead Org./DHS Lead EPA 7420/7421	Special detection Limit/reporting
SP105		4		X		X	HCL	1-3-94	14:35	X		X						-01			9401082
SP106		4		X		X	↓	↓	14:35	X		X						-02			
SP108		3		X		X	↓	↓	13:00	X		X						-03			
SP102		3		X		X	↓	↓	13:13	X		X						-04			

Special QA/QC

Remarks

Lab number

Turnaround time

Priority Rush
1 Business Day ☐

Rush
2 Business Days ☐

Expedited
5 Business Days (ARCO STANDARD) X

Standard
10 Business Days ☐

Condition of sample:

Temperature received:

Relinquished by Sampler	Date 1-3-94	Time 345	Received by
Relinquished by	Date	Time	Received by
Relinquished by	Date	Time	Received by laboratory Date 1/3/94 Time 345

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

APPC 3292 (2 91)

SEQUOIA ANALYTICAL

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

RESNA
3315 Almaden Expwy., Suite 34
San Jose, CA 95118
Attention: John Young

Project: Arco, 374 Oakland

Enclosed are the results from 4 water samples received at Sequoia Analytical on January 7,1994. The requested analyses are listed below:

SAMPLE #	SAMPLE DESCRIPTION	DATE OF COLLECTION	TEST METHOD
4A39401	Water, SP105	1/5/94	EPA 5030/8015/8020
4A39402	Water, SP106	1/5/94	EPA 5030/8015/8020
4A39403	Water, SP108	1/5/94	EPA 5030/8015/8020
4A39404	Water, SP102	1/5/94	EPA 5030/8015/8020

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

Very truly yours,

SEQUOIA ANALYTICAL

Vickie Tague
Project Manager

SEQUOIA ANALYTICAL

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RESNA	Client Project ID:	Arco, 374 Oakland	Sampled:	Jan 5, 1994
3315 Almaden Expwy., Suite 34	Sample Matrix:	Water	Received:	Jan 7, 1994
San Jose, CA 95118	Analysis Method:	EPA 5030/8015/8020	Reported:	Jan 20, 1994
Attention: John Young	First Sample #:	4A39401		

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit µg/L	Sample I.D. 4A39401 SP105	Sample I.D. 4A39402 SP106	Sample I.D. 4A39403 SP108	Sample I.D. 4A39404 SP102
Purgeable Hydrocarbons	50	1,100	N.D.	N.D.	5,200
Benzene	0.50	300	N.D.	N.D.	970
Toluene	0.50	12	N.D.	N.D.	100
Ethyl Benzene	0.50	N.D.	N.D.	N.D.	250
Total Xylenes	0.50	200	N.D.	N.D.	1,300
Chromatogram Pattern:		Gas	--	--	Gas

Quality Control Data

Report Limit Multiplication Factor:	20	1.0	1.0	20
Date Analyzed:	1/12/94	1/13/94	1/12/94	1/12/94
Instrument Identification:	GCHP-2	GCHP-2	GCHP-2	GCHP-2
Surrogate Recovery, %: (QC Limits = 70-130%)	*88*	*89*	*86*	*94*

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

SEQUOIA ANALYTICAL

Vickie Tague
Project Manager

SEQUOIA ANALYTICAL

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RECEIVED
JAN 24 1994
RESNA
SAN JOSE

RESNA
3315 Almaden Expwy., Suite 34
San Jose, CA 95118
Attention: John Young

Client Project ID: Arco, 374 Oakland
Matrix: Water

QC Sample Group: 4A39401, 3-4

Reported: Jan 20, 1994

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl Benzene	Xylenes
Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Analyst:	R. Geckler	R. Geckler	R. Geckler	R. Geckler
MS/MSD Batch#:	4A34201	4A34201	4A34201	4A34201
Date Prepared:	-	-	-	-
Date Analyzed:	1/12/94	1/12/94	1/12/94	1/12/94
Instrument I.D.#:	GCHP-2	GCHP-2	GCHP-2	GCHP-2
Conc. Spiked:	10 µg/L	10 µg/L	10 µg/L	30 µg/L
Matrix Spike % Recovery:	95	93	93	93
Matrix Spike Duplicate % Recovery:	100	100	100	100
Relative % Difference:	5.1	7.3	7.3	7.3
LCS Batch#:	-	-	-	-
Date Prepared:	-	-	-	-
Date Analyzed:	-	-	-	-
Instrument I.D.#:	-	-	-	-
LCS % Recovery:	-	-	-	-
% Recovery Control Limits:	71-133	72-128	72-130	71-120

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

Please Note:
The LCS is a control sample of known, interferent free matrix that is analyzed using the same reagents, preparation, and analytical methods employed for the samples. The matrix spike is an aliquot of sample fortified with known quantities of specific compounds and subjected to the entire analytical procedure. If the recovery of analytes from the matrix spike does not fall within specified control limits due to matrix interference, the LCS recovery is to be used to validate the batch.

SEQUOIA ANALYTICAL

Vickie Tague
Project Manager

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
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RECEIVED
JAN 24 1994
RESNA
SAN JOSE

RESNA
3315 Almaden Expwy., Suite 34
San Jose, CA 95118
Attention: John Young

Client Project ID: Arco, 374 Oakland
Matrix: Water

QC Sample Group: 4A39402

Reported: Jan 20, 1994

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl Benzene	Xylenes
Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Analyst:	M. Nipp	M. Nipp	M. Nipp	M. Nipp
MS/MSD Batch#:	4A23504	4A23504	4A23504	4A23504
Date Prepared:	-	-	-	-
Date Analyzed:	1/13/94	1/13/94	1/13/94	1/13/94
Instrument I.D.#:	GCHP-2	GCHP-2	GCHP-2	GCHP-2
Conc. Spiked:	10 µg/L	10 µg/L	10 µg/L	30 µg/L
Matrix Spike % Recovery:	110	99	99	100
Matrix Spike Duplicate % Recovery:	100	98	98	100
Relative % Difference:	9.5	1.0	1.0	0.0
LCS Batch#:	-	-	-	-
Date Prepared:	-	-	-	-
Date Analyzed:	-	-	-	-
Instrument I.D.#:	-	-	-	-
LCS % Recovery:	-	-	-	-
% Recovery Control Limits:	71-133	72-128	72-130	71-120

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

SEQUOIA ANALYTICAL

Vickie Tague
Project Manager

Please Note:
The LCS is a control sample of known, interferent free matrix that is analyzed using the same reagents, preparation, and analytical methods employed for the samples. The matrix spike is an aliquot of sample fortified with known quantities of specific compounds and subjected to the entire analytical procedure. If the recovery of analytes from the matrix spike does not fall within specified control limits due to matrix interference, the LCS recovery is to be used to validate the batch.

[redacted]ARC[redacted]rod[redacted]s C[redacted]any[redacted] Task Order No. [redacted]3[redacted]-[redacted]-0[redacted] [redacted]hain [redacted]ustody

Division of AtlanticRichfieldCompany

ARCO Facility no. A 374 | City (Facility) OAKLAND | Project manager (Consultant) JOHN YOUNG | Laboratory name SEQUOIA

ARCO engineer MICHAEL WHELAN | Telephone no. (ARCO) | Telephone no. (Consultant) (408) 264-7723 | Fax no. (Consultant) 264-2435 | Contract number 07-073

Consultant name RESNA INDUSTRIES | Address (Consultant) 3315 ALMADEN EXP. SUITE 34, SJ, CA 95118

Sample I.D.	Lab no.	Container no.	Matrix: Soil	Matrix: Water	Matrix: Other	Preservation: Ice	Preservation: Acid	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH EPA M602/8020/8015	TPH Modified 8015 Gas ☒ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Metals ☐ VOA ☐ Semi VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐		
SP105		3		X		X	HCL	1-5-94		X		X										-01
SP106		3		X		X	↓	↓		X		X										-02
SP108		3		X		X	↓	↓		X		X										-03
SP102		3		X		X	↓	↓		X		X										-04

Method of shipment

Special detection Limit/reporting

Special QA/QC

Remarks

Lab number 9401294

Turnaround time

Priority Rush 1 Business Day ☐

Rush 2 Business Days ☐

Expedited 5 Business Days ☒ ARCO STANDARD

Standard 10 Business Days ☐

Condition of sample:

Temperature received:

Relinquished by sampler [signature] | Date 1-7-94 | Time 10:30 | Received by [signature] Robin Hayes

Relinquished by Robin Hayes | Date 1/7/94 | Time 11:31 | Received by [signature] 1/7/94 1131

Relinquished by | Date | Time | Received by laboratory | Date | Time

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SEQUOIA ANALYTICAL

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RESNA
3315 Almaden Expwy., Suite 34
San Jose, CA 95118
Attention: Zbig Ignatowicz

Project: Arco, 374 Oakland

Enclosed are the results from 4 water samples received at Sequoia Analytical on January 12,1994. The requested analyses are listed below:

SAMPLE #	SAMPLE DESCRIPTION	DATE OF COLLECTION	TEST METHOD
4A56501	Water, SP108	1/11/94	EPA 5030/8015/8020
4A56502	Water, SP106	1/11/94	EPA 5030/8015/8020
4A56503	Water, SP105	1/11/94	EPA 5030/8015/8020
4A56504	Water, SP102	1/11/94	EPA 5030/8015/8020

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

Very truly yours,

SEQUOIA ANALYTICAL

Vickie Tague
Project Manager

SEQUOIA ANALYTICAL

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RESNA
3315 Almaden Expwy., Suite 34
San Jose, CA 95118
Attention: Zbig Ignatowicz

Client Project ID: Arco, 374 Oakland
Sample Matrix: Water
Analysis Method: EPA 5030/8015/8020
First Sample #: 4A56501

Sampled: Jan 11, 1994
Received: Jan 12, 1994
Reported: Jan 20, 1994

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit µg/L	Sample I.D. 4A56501 SP108	Sample I.D. 4A56502 SP106	Sample I.D. 4A56503 SP105	Sample I.D. 4A56504 SP102
Purgeable Hydrocarbons	50	N.D.	N.D.	790	6,300
Benzene	0.50	N.D.	N.D.	41	900
Toluene	0.50	N.D.	N.D.	N.D.	63
Ethyl Benzene	0.50	N.D.	N.D.	N.D.	210
Total Xylenes	0.50	N.D.	N.D.	97	1,200
Chromatogram Pattern:		--	--	Gas	Gas

Quality Control Data

Report Limit Multiplication Factor:	1.0	1.0	10	20
Date Analyzed:	1/14/94	1/14/94	1/14/94	1/14/94
Instrument Identification:	GCHP-3	GCHP-3	GCHP-3	GCHP-3
Surrogate Recovery, %: (QC Limits = 70-130%)	96	96	84	103

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

SEQUOIA ANALYTICAL

Vickie Tague
Project Manager

SEQUOIA ANALYTICAL

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RESNA
3315 Almaden Expwy., Suite 34
San Jose, CA 95118
Attention: Zbig Ignatowicz

Client Project ID: Arco. 374 Oakland
Matrix: Liquid

QC Sample Group: 4A56501-4

Reported: Jan 20, 1994

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl Benzene	Xylenes
Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Analyst:	M. Nipp	M. Nipp	M. Nipp	M Nipp
MS/MSD Batch#:	4A38709	4A38709	4A38709	4A38709
Date Prepared:	-	-	-	-
Date Analyzed:	1/14/94	1/14/94	1/14/94	1/14/94
Instrument I.D.#:	GCHP-3	GCHP-3	GCHP-3	GCHP-3
Conc. Spiked:	10 µg/L	10 µg/L	10 µg/L	30 µg/L
Matrix Spike % Recovery:	100	100	100	100
Matrix Spike Duplicate % Recovery:	100	100	99	100
Relative % Difference:	0.0	0.0	1.0	0.0
LCS Batch#:	-	-	-	-
Date Prepared:	-	-	-	-
Date Analyzed:	-	-	-	-
Instrument I.D.#:	-	-	-	-
LCS % Recovery:	-	-	-	-
% Recovery Control Limits:	71-133	72-128	72-130	71-120

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

Please Note:
The LCS is a control sample of known, interferent free matrix that is analyzed using the same reagents preparation, and analytical methods employed for the samples. The matrix spike is an aliquot of sample fortified with known quantities of specific compounds and subjected to the entire analytical procedure. If the recovery of analytes from the matrix spike does not fall within specified control limits due to matrix interference, the LCS recovery is to be used to validate the batch.

SEQUOIA ANALYTICAL

Vickie Tague
Project Manager

4A56501.RES

ARCO P[illegible]ucts Company
[illegible] of AtlanticRichfieldCompany

Task Order No. 3[illegible]-93-4

Chain [illegible] Custody

ARCO Facility no. 374 | City (Facility) Oakland | Project manager (Consultant) ZBIG IGNATOWICZ | Laboratory name SEQUIOA

ARCO engineer Michael Whelan | Telephone no. (ARCO) | Telephone no. (Consultant) 264-7723 | Fax no. (Consultant) 264-2435

Consultant name Reena Industries | Address (Consultant) 3315 Almaden Exp Suit 34 S.J. 95118

Contract number 07-073

Method of shipment

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 ☐ VOA ☐ Semi VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐		
SP108		3				—	—	1-11-94	3:00		X										0	1
SP106		3				—	—	"	3:03		X										0	2
SP105		3				—	—	"	3:07		X										0	3
SP102		3				—	—	"	3:10		X										0	4

Special detection Limit/reporting

Special QA/QC

Remarks [illegible] 4

Lab number 9401565

Turnaround time

Priority Rush 1 Business Day ☐

Rush 2 Business Days ☐

ARCO contract

Expedited 5 Business Days ☒ 4 days

Standard 10 Business Days ☐

Condition of sample:

Temperature received:

	Date	Time		Date	Time
Relinquished by sampler [signature]	1-12-94	14:40	Received by SPO	1/12/94	14:41
Relinquished by SPO	1/12/94	1645	Received by		
Relinquished by			Received by laboratory B Davis	01/12/94	16:15

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JAN 20 '94 10:49 SEQUOIA ANALYTICAL P.4

SEQUOIA ANALYTICAL

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1994

RESNA
3315 Almaden Expwy., Suite 34
San Jose, CA 95118
Attention: John Young

Project: ARCO, 374 Oakland

Enclosed are the results from 4 water samples received at Sequoia Analytical on January 14,1994. The requested analyses are listed below:

SAMPLE #	SAMPLE DESCRIPTION	DATE OF COLLECTION	TEST METHOD
4A75501	Water, SP-108D	1/13/94	EPA 5030/8015 Mod./8020
4A75502	Water, SP-106B	1/13/94	EPA 5030/8015 Mod./8020
4A75503	Water, SP-105A	1/13/94	EPA 5030/8015 Mod./8020
4A75504	Water, SP-102	1/13/94	EPA 5030/8015 Mod./8020

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

Very truly yours,

SEQUOIA ANALYTICAL

Vickie Tague
Project Manager

SEQUOIA ANALYTICAL

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RESNA
3315 Almaden Expwy., Suite 34
San Jose, CA 95118
Attention: John Young

Client Project ID: ARCO, 374 Oakland
Sample Matrix: Water
Analysis Method: EPA 5030/8015 Mod./8020
First Sample #: 4A75501

Sampled: Jan 13, 1994
Received: Jan 14, 1994
Reported: Jan 31, 1994

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit µg/L	Sample I.D. 4A75501 SP-108D	Sample I.D. 4A75502 SP-106B	Sample I.D. 4A75503 SP-105A	Sample I.D. 4A75504 SP-102
Purgeable Hydrocarbons	50	N.D.	N.D.	3,900	8,600
Benzene	0.50	N.D.	N.D.	360	950
Toluene	0.50	N.D.	N.D.	18	68
Ethyl Benzene	0.50	N.D.	N.D.	28	220
Total Xylenes	0.50	0.53	N.D.	550	1,300
Chromatogram Pattern:		Discrete Peak	--	Gas	Gas

Quality Control Data

Report Limit Multiplication Factor:	1.0	1.0	20	50
Date Analyzed:	1/20/94	1/20/94	1/23/94	1/23/94
Instrument Identification:	GCHP-4	GCHP-4	GCHP-4	GCHP-4
Surrogate Recovery, %: (QC Limits = 70-130%)	98	98	99	100

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

SEQUOIA ANALYTICAL

V.M. Tague

Vickie Tague
Project Manager

4A75501 RES

SEQUOIA ANALYTICAL

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RESNA
3315 Almaden Expwy., Suite 34
San Jose, CA 95118
Attention: John Young

Client Project ID: ARCO, 374 Oakland
Matrix: Water

QC Sample Group: 4A75501-2

Reported: Jan 31, 1994

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl Benzene	Xylenes
Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Analyst:	A. Tuzon	A. Tuzon	A. Tuzon	A. Tuzon
MS/MSD Batch#:	4010441	4010441	4010441	4010441
Date Prepared:	1/20/94	1/20/94	1/20/94	1/20/94
Date Analyzed:	1/20/94	1/20/94	1/20/94	1/20/94
Instrument I.D.#:	GCHP-4	GCHP-4	GCHP-4	GCHP-4
Conc. Spiked:	20 µg/L	20 µg/L	20 µg/L	60 µg/L
Matrix Spike % Recovery:	100	95	97	98
Matrix Spike Duplicate % Recovery:	100	100	97	99
Relative % Difference:	0.0	5.1	0.0	1.0
LCS Batch#:	LCS012091	LCS012094	LCS012094	LCS012094
Date Prepared:	1/20/94	1/20/94	1/20/94	1/20/94
Date Analyzed:	1/20/94	1/20/94	1/20/94	1/20/94
Instrument I.D.#:	GCHP-4	GCHP-4	GCHP-4	GCHP-4
LCS % Recovery:	100	100	105	102
% Recovery Control Limits:	71-133	72-128	72-130	71-120

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

Please Note:
The LCS is a control sample of known, interferent free matrix that is analyzed using the same reagents, preparation, and analytical methods employed for the samples. The matrix spike is an aliquot of sample fortified with known quantities of specific compounds and subjected to the entire analytical procedure. If the recovery of analytes from the matrix spike does not fall within specified control limits due to matrix interference, the LCS recovery is to be used to validate the batch.

SEQUOIA ANALYTICAL

Vickie Tague
Project Manager

SEQUOIA ANALYTICAL

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

RESNA
3315 Almaden Expwy., Suite 34
San Jose, CA 95118
Attention: John Young

Client Project ID: ARCO, 374 Oakland
Matrix: Water

QC Sample Group: 4A75503-4

Reported: Jan 31, 1994

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl Benzene	Xylenes
Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Analyst:	A. Tuzon	A. Tuzon	A. Tuzon	A. Tuzon
MS/MSD Batch#:	4010894	4010894	4010894	4010894
Date Prepared:	1/23/94	1/23/94	1/23/94	1/23/94
Date Analyzed:	1/23/94	1/23/94	1/23/94	1/23/94
Instrument I.D.#:	GCHP-4	GCHP-4	GCHP-4	GCHP-4
Conc. Spiked:	20 µg/L	20 µg/L	20 µg/L	60 µg/L
Matrix Spike % Recovery:	100	100	100	98
Matrix Spike Duplicate % Recovery:	95	95	95	94
Relative % Difference:	5.1	5.1	5.1	4.2
LCS Batch#:	LCS012394	LCS012394	LCS012394	LCS012394
Date Prepared:	1/23/94	1/23/94	1/23/94	1/23/94
Date Analyzed:	1/23/94	1/23/94	1/23/94	1/23/94
Instrument I.D.#:	GCHP-4	GCHP-4	GCHP-4	GCHP-4
LCS % Recovery:	95	94	93	94
% Recovery Control Limits:	71-133	72-128	72-130	71-120

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

Please Note:
The LCS is a control sample of known, interferent free matrix that is analyzed using the same reagents preparation, and analytical methods employed for the samples. The matrix spike is an aliquot of sample fortified with known quantities of specific compounds and subjected to the entire analytical procedure. If the recovery of analytes from the matrix spike does not fall within specified control limits due to matrix interference, the LCS recovery is to be used to validate the batch.

SEQUOIA ANALYTICAL

Vickie Tague
Project Manager

[redacted] ARCO Prod[redacted] Company [redacted] Task Order No. 5[redacted]13 [redacted] C[redacted] ([redacted]stody

ARCO Facility no. 5724	City (Facility) Oakland	Project manager (Consultant) John Young	Laboratory name Sequoia
ARCO engineer Michael Whelan	Telephone no. (ARCO)	Telephone no. (Consultant) 264-7723	Fax no. (Consultant) 264-2435
Consultant name Reney		Address (Consultant) 3315 Almaden Exp Suite 34 S. J. 95118	Contract number 07-073

Sample I.D.	Lab no.	Container no.	Matrix: Soil	Matrix: Water	Matrix: Other	Preservation: Ice	Preservation: Acid	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH Gas EPA M602/8020/8015	TPH Modified 8015 Gas ☐ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Metals ☐ VOA ☐ Semi VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐		
SP-108D				✓		✓	✓	1-13-94	15:30		+									-01		
SP-106B				✓		✓	✓	"	15:35		+									-02		
SP-105A				✓		✓	✓	"	15:38		+									-03		
SP-102				✓		✓	✓	"	15:48		+									-04		

Method of shipment: 9401755

Special detection Limit/reporting

Special QA/QC

Remarks: RTC # 1 2L

Lab number: 9401755

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

Condition of sample:			Temperature received:	
Relinquished by sampler: [signature]	Date 1/14/94	Time 9:50	Received by: Robin Hayes	
Relinquished by: Robin Hayes	Date 1/14	Time 1:25	Received by:	
Relinquished by:	Date	Time	Received by laboratory: [signature]	Date 01/14/94 Time 1325

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

Sequoia Analytical

680 Chesapeake Drive, Redwood City, CA 94063, (415) 364-9600, FAX (415) 364-9233
1900 Bates Avenue, Suite L, Concord, CA 94520, (510) 686-9600, FAX (510) 686-9689
819 Striker Avenue, Suite 8, Sacramento, CA 95834, (916) 921-9600, FAX (916) 921-0100

RESNA
3315 Almaden Expwy., Suite 34
San Jose, CA 95118
Attention: John Young

Project: ARCO, 374 Oakland

Enclosed are the results from 4 water samples received at Sequoia Analytical on February 25,1994. The requested analyses are listed below:

SAMPLE #	SAMPLE DESCRIPTION	DATE OF COLLECTION	TEST METHOD
4BG0901	Water, SP105	2/24/94	EPA 5030/8015 Mod./8020
4BG0902	Water, SP106	2/24/94	EPA 5030/8015 Mod./8020
4BG0903	Water, SP108	2/24/94	EPA 5030/8015 Mod./8020
4BG0904	Water, SP102	2/24/94	EPA 5030/8015 Mod./8020

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

Very truly yours,

SEQUOIA ANALYTICAL

VMTClark

Vickie Tague Clark
Project Manager

Sequoia Analytical

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RESNA
3315 Almaden Expwy., Suite 34
San Jose, CA 95118
Attention: John Young

Client Project ID: ARCO, 374 Oakland
Sample Matrix: Water
Analysis Method: EPA 5030/8015 Mod./8020
First Sample #: 4BG0901

Sampled: Feb 24, 1994
Received: Feb 25, 1994
Reported: Mar 7, 1994

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit µg/L	Sample I.D. 4BG0901 SP105	Sample I.D. 4BG0902 SP106	Sample I.D. 4BG0903 SP108	Sample I.D. 4BG0904 SP102
Purgeable Hydrocarbons	50	1,500	N.D.	N.D.	4,200
Benzene	0.50	200	N.D.	N.D.	520
Toluene	0.50	13	N.D.	N.D.	24
Ethyl Benzene	0.50	31	N.D.	N.D.	84
Total Xylenes	0.50	130	N.D.	N.D.	390
Chromatogram Pattern:		Gas	--	--	Gas

Quality Control Data

Report Limit Multiplication Factor:	5.0	1.0	1.0	10
Date Analyzed:	3/2/94	3/1/94	3/1/94	3/2/94
Instrument Identification:	GCHP-17	GCHP-17	GCHP-17	GCHP-17
Surrogate Recovery, %: (QC Limits = 70-130%)	87	86	74	91

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

SEQUOIA ANALYTICAL

Vickie Tague Clark
Project Manager

Sequoia Analytical

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819 Striker Avenue, Suite 8, Sacramento, CA 95834, (916) 921-9600, FAX (916) 921-0100

RESNA
3315 Almaden Expwy., Suite 34
San Jose, CA 95118
Attention: John Young

Client Project ID: ARCO, 374 Oakland
Matrix: Water
QC Sample Group: 4BG0901, 4

Reported: Mar 7, 1994

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl Benzene	Xylenes
Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Analyst:	R. Vincent	R. Vincent	R. Vincent	R. Vincent
MS/MSD Batch#:	4BE4607	4BE4607	4BE4607	4BE4607
Date Prepared:	-	-	-	-
Date Analyzed:	3/2/94	3/2/94	3/2/94	3/2/94
Instrument I.D.#:	GCHP-17	GCHP-17	GCHP-17	GCHP-17
Conc. Spiked:	10 µg/L	10 µg/L	10 µg/L	30 µg/L
Matrix Spike % Recovery:	95	93	94	93
Matrix Spike Duplicate % Recovery:	100	98	97	100
Relative % Difference:	5.1	5.2	3.1	7.3
LCS Batch#:	-	-	-	-
Date Prepared:	-	-	-	-
Date Analyzed:	-	-	-	-
Instrument I.D.#:	-	-	-	-
LCS % Recovery:	-	-	-	-
% Recovery Control Limits:	71-133	72-128	72-130	71-120

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

Please Note:
The LCS is a control sample of known, interferent free matrix that is analyzed using the same reagents, preparation, and analytical methods employed for the samples. The matrix spike is an aliquot of sample fortified with known quantities of specific compounds and subjected to the entire analytical procedure. If the recovery of analytes from the matrix spike does not fall within specified control limits due to matrix interference, the LCS recovery is to be used to validate the batch.

SEQUOIA ANALYTICAL

Vickie Tague Clark
Project Manager

4BG0901.RES <2>

Sequoia Analytical

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RESNA
3315 Almaden Expwy., Suite 34
San Jose, CA 95118
Attention: John Young

Client Project ID: ARCO, 374 Oakland
Matrix: Water
QC Sample Group: 4BG0902-3

Reported: Mar 7, 1994

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl Benzene	Xylenes
Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Analyst:	R. Vincent	R. Vincent	R. Vincent	R. Vincent
MS/MSD Batch#:	4BG3007	4BG3007	4BG3007	4BG3007
Date Prepared:	-	-	-	-
Date Analyzed:	3/1/94	3/1/94	3/1/94	3/1/94
Instrument I.D.#:	GCHP-17	GCHP-17	GCHP-17	GCHP-17
Conc. Spiked:	10 µg/L	10 µg/L	10 µg/L	30 µg/L
Matrix Spike % Recovery:	78	92	92	90
Matrix Spike Duplicate % Recovery:	81	93	95	90
Relative % Difference:	3.8	1.1	3.2	0.0
LCS Batch#:	-	-	-	-
Date Prepared:	-	-	-	-
Date Analyzed:	-	-	-	-
Instrument I.D.#:	-	-	-	-
LCS % Recovery:	-	-	-	-
% Recovery Control Limits:	71-133	72-128	72-130	71-120

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

SEQUOIA ANALYTICAL

Vickie Tague Clark
Project Manager

Please Note:
The LCS is a control sample of known, interferent free matrix that is analyzed using the same reagents, preparation, and analytical methods employed for the samples. The matrix spike is an aliquot of sample fortified with known quantities of specific compounds and subjected to the entire analytical procedure. If the recovery of analytes from the matrix spike does not fall within specified control limits due to matrix interference, the LCS recovery is to be used to validate the batch.

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. 374-95-4

Chain of Custody

ARCO Facility no. 374	City (Facility) OAKLAND	Project manager (Consultant) JOHN YOUNG	Laboratory name SEQUOIA
ARCO engineer M. WHELAN	Telephone no. (ARCO)	Telephone no. (Consultant) (408) 264-7723 / Fax no. (Consultant) (408) 264-2435	Contract number 07-073
Consultant name RESNA		Address (Consultant) 3315 ALMADEN EXP SUITE 34, SAN JOSE, CA 95118	

Sample I.D.	Lab no.	Container no.	Matrix: Soil	Matrix: Water	Matrix: Other	Preservation: Ice	Preservation: Acid	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH EPA M602/8020/8015	TPH Modified 8015 Gas ☒ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Metals ☐ VOA ☐ Semi VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐		
SP105		2		X		X	HCL	2-24-94	16:00	X		X					9402609				-	01
SP106		2		X		X	HCL	↓	15:55	X		X									-	02
SP108		2		X		X	HCL	↓	15:50	X		X									-	03
SP102		2		X		X	HCL	↓	16:05	X		X									-	04

Method of shipment

Special detection Limit/reporting

Special QA/QC

Remarks
ON Site time
20 MIN

Lab number
9402609

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

Condition of sample:		Temperature received:	
Relinquished by sampler [signature]	Date 2-24-94 Time 8:50	Received by Steve Ten	
Relinquished by Steve Ten	Date 2/25 Time 12:19	Received by	
Relinquished by	Date Time	Received by laboratory [signature]	Date 2/25 Time 12:19

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

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RESNA
3315 Almaden Expwy., Suite 34
San Jose, CA 95118
Attention: John Young

Project: ARCO 374, Oakland

Enclosed are the results from 4 water samples received at Sequoia Analytical on March 25,1994. The requested analyses are listed below:

SAMPLE #	SAMPLE DESCRIPTION	DATE OF COLLECTION	TEST METHOD
4CG0501	Water, W-SP-108D	3/24/94	EPA 5030/8015 Mod./8020
4CG0502	Water, W-SP-106B	3/24/94	EPA 5030/8015 Mod./8020
4CG0503	Water, W-SP-105A	3/24/94	EPA 5030/8015 Mod./8020
4CG0504	Water, W-SP-102	3/24/94	EPA 5030/8015 Mod./8020

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

Very truly yours,

SEQUOIA ANALYTICAL

VMTClark

Vickie Tague Clark
Project Manager

Sequoia Analytical

680 Chesapeake Drive, Redwood City, CA 94063, (415) 364-9600, FAX (415) 364-9233
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819 Striker Avenue, Suite 8, Sacramento, CA 95834, (916) 921-9600, FAX (916) 921-0100

RESNA	Client Project ID:	ARCO 374, Oakland	Sampled:	Mar 24, 1994
3315 Almaden Expwy., Suite 34	Sample Matrix:	Water	Received:	Mar 25, 1994
San Jose, CA 95118	Analysis Method:	EPA 5030/8015 Mod./8020	Reported:	Apr 1, 1994
Attention: John Young	First Sample #:	4CG0501		

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit µg/L	Sample I.D. 4CG0501 W-SP-108D	Sample I.D. 4CG0502 W-SP-106B	Sample I.D. 4CG0503 W-SP-105A	Sample I.D. 4CG0504 W-SP-102
Purgeable Hydrocarbons	50	N.D.	N.D.	2,500	6,200
Benzene	0.50	N.D.	N.D.	490	1,100
Toluene	0.50	N.D.	N.D.	17	43
Ethyl Benzene	0.50	N.D.	N.D.	66	160
Total Xylenes	0.50	N.D.	N.D.	140	300
Chromatogram Pattern:		--	--	Gas	Gas

Quality Control Data

Report Limit Multiplication Factor:	1.0	1.0	10	20
Date Analyzed:	3/28/94	3/28/94	3/28/94	3/28/94
Instrument Identification:	GCHP-17	GCHP-2	GCHP-3	GCHP-17
Surrogate Recovery, %: (QC Limits = 70-130%)	83	80	88	93

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

SEQUOIA ANALYTICAL

VMT Clark

Vickie Tague Clark
Project Manager

Sequoia Analytical

680 Chesapeake Drive, Redwood City, CA 94063, (415) 364-9600, FAX (415) 364-9233
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819 Striker Avenue, Suite 8, Sacramento, CA 95834, (916) 921-9600, FAX (916) 921-0100

RESNA
3315 Almaden Expwy., Suite 34
San Jose, CA 95118
Attention: John Young

Client Project ID: ARCO 374, Oakland
Matrix: Liquid
QC Sample Group: 4CG0501, 4

Reported: Apr 1, 1994

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl Benzene	Xylenes
Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Analyst:	J. Minkel	J. Minkel	J. Minkel	J. Minkel
MS/MSD Batch#:	4CD4406	4CD4406	4CD4406	4CD4406
Date Prepared:	-	-	-	-
Date Analyzed:	3/28/94	3/28/94	3/28/94	3/28/94
Instrument I.D.#:	GCHP-17	GCHP-17	GCHP-17	GCHP-17
Conc. Spiked:	10 µg/L	10 µg/L	10 µg/L	30 µg/L
Matrix Spike % Recovery:	100	99	99	100
Matrix Spike Duplicate % Recovery:	100	100	100	100
Relative % Difference:	0.0	1.0	1.0	0.0
LCS Batch#:	-	-	-	-
Date Prepared:	-	-	-	-
Date Analyzed:	-	-	-	-
Instrument I.D.#:	-	-	-	-
LCS % Recovery:	-	-	-	-
% Recovery Control Limits:	71-133	72-128	72-130	71-120

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

SEQUOIA ANALYTICAL

Vickie Tague Clark
Project Manager

Please Note:
The LCS is a control sample of known, interferent free matrix that is analyzed using the same reagents, preparation, and analytical methods employed for the samples. The matrix spike is an aliquot of sample fortified with known quantities of specific compounds and subjected to the entire analytical procedure. If the recovery of analytes from the matrix spike does not fall within specified control limits due to matrix interference, the LCS recovery is to be used to validate the batch.

Sequoia Analytical

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819 Striker Avenue, Suite 8, Sacramento, CA 95834, (916) 921-9600, FAX (916) 921-0100

RESNA
3315 Almaden Expwy., Suite 34
San Jose, CA 95118
Attention: John Young

Client Project ID: ARCO 374, Oakland
Matrix: Liquid
QC Sample Group: 4CG0502

Reported: Apr 1, 1994

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl Benzene	Xylenes
Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Analyst:	J. Minkel	J. Minkel	J. Minkel	J. Minkel
MS/MSD Batch#:	4CD5402	4CD5402	4CD5402	4CD5402
Date Prepared:	-	-	-	-
Date Analyzed:	3/28/94	3/28/94	3/28/94	3/28/94
Instrument I.D.#:	GCHP-2	GCHP-2	GCHP-2	GCHP-2
Conc. Spiked:	10 µg/L	10 µg/L	10 µg/L	30 µg/L
Matrix Spike % Recovery:	100	100	99	100
Matrix Spike Duplicate % Recovery:	98	99	99	100
Relative % Difference:	2.0	1.0	0.0	0.0
LCS Batch#:	-	-	-	-
Date Prepared:	-	-	-	-
Date Analyzed:	-	-	-	-
Instrument I.D.#:	-	-	-	-
LCS % Recovery:	-	-	-	-
% Recovery Control Limits:	71-133	72-128	72-130	71-120

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

Please Note:
The LCS is a control sample of known, interferent free matrix that is analyzed using the same reagents, preparation, and analytical methods employed for the samples. The matrix spike is an aliquot of sample fortified with known quantities of specific compounds and subjected to the entire analytical procedure. If the recovery of analytes from the matrix spike does not fall within specified control limits due to matrix interference, the LCS recovery is to be used to validate the batch.

SEQUOIA ANALYTICAL

Vickie Tague Clark
Project Manager

Sequoia Analytical

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819 Striker Avenue, Suite 8, Sacramento, CA 95834, (916) 921-9600, FAX (916) 921-0100

RESNA
3315 Almaden Expwy., Suite 34
San Jose, CA 95118
Attention: John Young

Client Project ID: ARCO 374, Oakland
Matrix: Liquid
QC Sample Group: 4CG0503

Reported: Apr 1, 1994

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl Benzene	Xylenes
Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Analyst:	J. Minkel	J. Minkel	J. Minkel	J. Minkel
MS/MSD Batch#:	4CD4406	4CD4406	4CD4406	4CD4406
Date Prepared:	-	-	-	-
Date Analyzed:	3/28/94	3/28/94	3/28/94	3/28/94
Instrument I.D.#:	GCHP-3	GCHP-3	GCHP-3	GCHP-3
Conc. Spiked:	10 µg/L	10 µg/L	10 µg/L	30 µg/L
Matrix Spike % Recovery:	100	100	100	100
Matrix Spike Duplicate % Recovery:	94	94	92	93
Relative % Difference:	6.2	6.2	8.3	7.3
LCS Batch#:	-	-	-	-
Date Prepared:	-	-	-	-
Date Analyzed:	-	-	-	-
Instrument I.D.#:	-	-	-	-
LCS % Recovery:	-	-	-	-
% Recovery Control Limits:	71-133	72-128	72-130	71-120

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

Please Note:
The LCS is a control sample of known, interferent free matrix that is analyzed using the same reagents, preparation, and analytical methods employed for the samples. The matrix spike is an aliquot of sample fortified with known quantities of specific compounds and subjected to the entire analytical procedure. If the recovery of analytes from the matrix spike does not fall within specified control limits due to matrix interference, the LCS recovery is to be used to validate the batch.

SEQUOIA ANALYTICAL

Vickie Tague Clark
Project Manager

ARCO Products Company
Division of AtlanticRichfieldCompany

Chain of Custody

Task Order No. 374-94-5

ARCO Facility no. 371	City (Facility) Oakland	Project manager (Consultant) John Young	Laboratory name Sequoia
ARCO engineer Michael Whelan	Telephone no. (ARCO)	Telephone no. (Consultant) 264-7723	Fax no. (Consultant) 264 2435
Consultant name Rosa	Address (Consultant) 3311 Alhaden Exp Suit 34 S.J.		Contract number 07-073

Sample I.D.	Lab no.	Container no.	Matrix: Soil	Matrix: Water	Matrix: Other	Preservation: Ice	Preservation: Acid	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH EPA M602/8020/8015	TPH Modified 8015 Gas ☐ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	Semi VOA ☐ VOA ☐ TCLP Metals ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐	
W-SP-108D				✓		✓	✓	3/24/94	14:30		X				01	A/B					
W-SP-106B				✓		✓	✓		14:33		X				02	A/B					
W-SP-105A				✓		✓	✓		15:00		X				03	A/B					
W-SP-102				✓		✓	✓		15:00		X				04	A/B					

Special detection Limit/reporting

Special QA/QC

Remarks

Lab number 9403G05

Turnaround time

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

Condition of sample:		Temperature received:	
Relinquished by sampler	Date 3/25/94 Time 14:00	Received by	
Relinquished by	Date Time	Received by	
Relinquished by	Date Time	Received by laboratory	Date 3/25/94 Time 14:00

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