PACIFIC
ENVIRONMENTAL
GROUP, INC.

December 30, 1994
Project 330-084.2A

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

Re: Quarterly Report - Third Quarter 1994
Remedial System Performance Evaluation
ARCO Service Station 0374
6407 Telegraph Avenue at Alcatraz Avenue
Oakland, California

Dear Mr. Whelan:

This letter, prepared by Pacific Environmental Group, Inc., (PACIFIC) on behalf of ARCO Products Company (ARCO), presents the results of the third quarter 1994 groundwater monitoring and performance evaluation of the groundwater extraction (GWE) system at the site referenced above. In addition, a summary of work completed and anticipated at the site is included.

QUARTERLY GROUNDWATER MONITORING RESULTS

Groundwater samples were collected by Integrated Wastestream Management, Inc., (IWM) on August 2, 1994, and analyzed for the presence of total petroleum hydrocarbons calculated as gasoline (TPH-g), benzene, toluene, ethylbenzene, and xylenes (BTEX compounds), and TPH calculated as diesel (TPH-d). IWM's certified analytical reports, chain-of-custody documentation, and field data sheets are presented as Attachment A. IWM's groundwater sampling procedures are presented as Attachment B.

Depth to water data collected on August 2, 1994, indicate that groundwater levels across the site have fallen an average of 0.16 feet since April 29, 1994. Groundwater flow was to the southwest with an approximate gradient of 0.03. This flow direction and gradient are consistent with historical data. Groundwater elevation data are presented in

Table 1. A liquid surface elevation contour map based on the August 2, 1994 data is shown on Figure 1.

TPH-g and benzene were not detected in Wells MW-1, MW-2, MW-5, and MW-6. Results of groundwater monitoring this quarter are generally consistent with previous results. Wells MW-3 and MW-4 contained their historically lowest concentrations of TPH-g. TPH-g concentrations in Wells MW-3 and MW-4 were 220 and 52 parts per billion (ppb), respectively. Benzene concentrations in Wells MW-3 and MW-4 were 25 and 5.7 ppb, respectively. Separate-phase hydrocarbons were not observed in any site well this quarter, or during any sampling event since December 1991. Groundwater analytical data are presented in Table 2. A TPH-g and benzene concentration map is shown on Figure 2.

REMEDIAL SYSTEM PERFORMANCE EVALUATION

Remedial action consisting of GWE is currently in progress at this site. The GWE system has been in operation since December 21, 1993. PACIFIC assumed environmental consulting responsibilities for the site from Resna Industries, Inc. during November 1994.

Remedial objectives for the site include: (1) migration control of the impacted groundwater plume, and (2) petroleum hydrocarbon mass reduction. To evaluate GWE system performance, PACIFIC monitors extraction well groundwater levels, instantaneous and average flow rate, and analyzes samples from system influent and effluent for TPH-g, cyanide, and BTEX compounds, all on a monthly basis.

Below is a brief description of the GWE and an evaluation of its performance from June 1 to September 30, 1994.

GROUNDWATER EXTRACTION SYSTEM

Description

The GWE system utilizes an electric pump in Well W-2, and three 400-pound granular activated carbon (GAC) vessels arranged in series to treat the extracted groundwater. The carbon vessels are connected and valved so that the primary and secondary vessel order can be rotated upon renewal of the primary vessel's GAC. Sample ports are located at the treatment system influent, between the carbon vessels, at the effluent, and at the individual well head. Groundwater system influent is discharged into the East Bay Municipal Utility District (EBMUD) sanitary sewers system under Account

Number 50285611, which is effective through December 31, 1997. Annual permit renewal is currently underway.

Migration Control

Progress toward meeting the migration control objective is evaluated by comparison of the groundwater elevation contour map (Figure 1) and TPH-g and benzene concentration map (Figure 2) from previous and current groundwater monitoring events.

The GWE system was not operational during the quarterly monitoring events. Therefore, the migration control objective could not be evaluated directly. However, TPH-g and benzene concentrations in downgradient groundwater monitoring wells were either non-detectable or decreased compared to previous quarters. Therefore, the migration control objective appears to have been met during the reporting period.

Mass Reduction

Progress toward meeting the mass reduction objective is determined by evaluating the GWE system mass removal data and the TPH-g concentration trends in associated groundwater monitoring wells. GWE system operational data are collected monthly. The system flow and influent sample analysis data are used to estimate TPH-g mass removal values. During the reporting period, the GWE system did not operate; therefore, no hydrocarbon mass was removed from impacted groundwater beneath the site. To date, GWE has removed approximately 1.75 pounds (0.29 gallons) of TPH-g and 0.24 pounds (0.03 gallons) of benzene from impacted groundwater beneath the site. Mass removal data for the GWE system are presented in Table 3. Certified analytical reports and chain-of-custody documentation are presented as Attachment C. Progress toward site remediation is presented in the table below.

	Mass Removed			
	06/01/94 to 09/30/94		Cumulative	
Analyte	(lbs)	(gal)	(lbs)	(gal)
TPH-g	0	0	1.75	0.29
Benzene	0	0	0.24	0.03

lbs = Pounds
gal = Gallons
TPH-g = Total petroleum hydrocarbons calculated as gasoline

Groundwater Extraction System Operational Data

The GWE system was not operational during the reporting period, due to change in environmental consulting firm operating the system. Reactivation of the system has been scheduled by PACIFIC during fourth quarter 1994.

SUMMARY OF WORK

Work Completed Third Quarter 1994

- Sampled site wells for third quarter 1994 groundwater monitoring program. Sampling performed by IWM.

Work Anticipated Fourth Quarter 1994

- Reactivate, monitor, and troubleshoot GWE system.
- Preparation and submittal of third quarter 1994 groundwater monitoring and remedial system performance evaluation report.
- Sample site wells for fourth quarter 1994 groundwater monitoring program. Sampling to be performed by IWM.
- Preparation of fourth quarter 1994 groundwater monitoring and remedial system performance evaluation report.
- Issue quarterly self-monitoring report to the EBMUD.
- Pursue EBMUD discharge permit renewal.
- Correct the leak problem from secondary containment pad into the service station building.

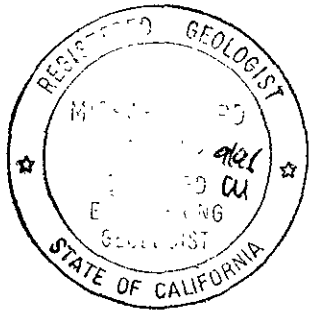
If there are any questions regarding the contents of this letter, please call.

Sincerely,

Pacific Environmental Group, Inc.

Shaw Garakani
Project Engineer

Michael Hurd
Senior Geologist
CEG 1885



Attachments:
- Table 1 - Liquid Surface Elevation Data
- Table 2 - Groundwater Analytical Data - Total Petroleum Hydrocarbons (TPH as Gasoline and BTEX Compounds)
- Table 3 - Groundwater Extraction System Mass Removal Data - Total Petroleum Hydrocarbons (TPH as Gasoline and Benzene)
- Figure 1 - Liquid Surface Elevation Contour Map
- Figure 2 - TPH-g/Benzene Concentration Map
- Attachment A - Certified Analytical Reports, Chain-of-Custody Documentation, and Field Data Sheets
- Attachment B - Groundwater Sampling Procedures

cc: Ms. Susan Hugo, Alameda County Health Care Services Agency
Mr. Kevin Graves, Regional Water Quality Control Board - S.F. Bay Region

Table 1
Liquid Surface Elevation Data

ARCO Service Station 0374
6407 Telegraph Avenue at Alcatraz Avenue
Oakland, California

Well Number	Date Gauged	Well Elevation (feet, MSL)	Depth to Water (feet, TOC)	SPH Thickness (feet)	Liquid Surface Elevation (feet, MSL)
MW-1	07/20/89	159.44	8.04	--	151.40
	08/30/89		8.47	--	150.97
	10/04/89		8.50	--	150.94
	01/10/90		6.74	--	152.70
	08/07/90		6.87	--	152.57
	12/06/90		7.35	--	152.09
	12/19/90		7.22	--	152.22
	01/29/91		8.28	--	151.16
	02/20/91		7.98	--	151.46
	04/25/91		6.89	--	152.55
	05/31/91		7.64	--	151.80
	07/08/91		8.17	--	151.27
	08/09/91		8.58	--	150.86
	09/25/91		8.82	--	150.62
	10/17/91		8.96	--	150.48
	11/20/91		8.60	--	150.84
	12/27/91		8.71	--	150.73
	01/19/92		7.83	--	151.61
	02/19/92		6.68	--	152.76
	03/09/92		4.47	--	154.97
	04/15/92	158.91	6.44	--	152.47
	05/12/92		7.31	--	151.60
	06/16/92		7.97	--	150.94
	07/14/92		8.22	--	150.69
	08/07/92		8.46	--	150.45
	09/22/92		6.76	--	152.15
	10/12/92		7.13	--	151.78
	11/23/92		7.24	--	151.67
	12/16/92		6.44	--	152.47
	01/21/93		5.03	--	153.88
	02/22/93		4.93	--	153.98
	03/25/93		5.13	--	153.78
	04/27/93		5.68	--	153.23
	08/04/93		7.91	--	151.00
	10/13/93		8.81	--	150.10
	02/03/94		7.51	--	151.40
	04/29/94		7.20	--	151.71
	08/02/94		8.02	--	150.89
MW-2	07/20/89	158.46	8.15	--	150.31
	08/30/89		8.42	--	150.04
	10/04/89		8.40	--	150.06
	01/10/90		6.12	--	152.34
	08/07/90		6.35	--	152.11
	12/06/90		7.15	--	151.31
	12/19/90		7.38	--	151.08
	01/29/91		8.41	--	150.05
	02/20/91		8.26	--	150.20
	04/25/91		7.70	--	150.76
	05/31/91		8.10	--	150.36
	07/08/91		8.34	--	150.12

Table 1 (continued)
Liquid Surface Elevation Data

ARCO Service Station 0374
6407 Telegraph Avenue at Alcatraz Avenue
Oakland, California

Well Number	Date Gauged	Well Elevation (feet, MSL)	Depth to Water (feet, TOC)	SPH Thickness (feet)	Liquid Surface Elevation (feet, MSL)
MW-2	08/09/91		8.51	--	149.95
(cont.)	09/25/91		8.66	--	149.80
	10/17/91		8.80	--	149.66
	11/20/91		8.66	--	149.80
	12/27/91		8.57	Sheen	149.89
	01/19/92		8.25	--	150.21
	02/19/92		7.50	--	150.96
	03/09/92		7.40	--	151.06
	04/15/92	157.92	7.72	--	150.20
	05/12/92		8.01	--	149.91
	06/16/92		8.25	--	149.67
	07/14/92		8.33	--	149.59
	08/07/92		8.42	--	149.50
	09/22/92		6.13	--	151.79
	10/12/92		6.80	--	151.12
	11/23/92		7.15	--	150.77
	12/16/92		6.66	--	151.26
	01/21/93		5.93	--	151.99
	02/22/93		6.01	--	151.91
	03/25/93		5.91	--	152.01
	04/27/93		6.63	--	151.29
	08/04/93		8.02	--	149.90
	10/13/93		8.64	--	149.28
	02/03/94		8.08	--	149.84
	04/29/94		8.14	--	149.78
	08/02/94		8.31	--	149.61
MW-3	07/20/89	154.18	7.58	--	146.60
	08/30/89		8.00	--	146.18
	10/04/89		7.73	Emulsion	146.45
	01/10/90		7.78	--	146.40
	08/07/90		7.66	--	146.52
	12/06/90		7.75	--	146.43
	12/19/90		7.58	--	146.60
	01/29/91		7.60	--	146.58
	02/20/91		7.51	--	146.67
	04/25/91		6.37	--	147.81
	05/31/91		7.19	--	146.99
	07/08/91		7.60	--	146.58
	08/09/91		7.94	--	146.24
	09/25/91		8.23	--	145.95
	10/17/91		8.44	--	145.74
	11/20/91		8.78	--	145.40
	12/27/91		8.05	Sheen	146.13
	01/19/92		7.65	--	146.53
	02/19/92		6.48	--	147.70
	03/09/92		5.45	--	148.73
	04/15/92	153.64	7.75	--	145.89
	05/12/92		7.45	--	146.19
	06/16/92		7.51	--	146.13
	07/14/92		7.60	--	146.04

Table 1 (continued)
Liquid Surface Elevation Data

ARCO Service Station 0374
6407 Telegraph Avenue at Alcatraz Avenue
Oakland, California

Well Number	Date Gauged	Well Elevation (feet, MSL)	Depth to Water (feet, TOC)	SPH Thickness (feet)	Liquid Surface Elevation (feet, MSL)
MW-3	08/07/92		7.85	--	145.79
(cont.)	09/22/92		7.73	--	145.91
	10/12/92		7.83	--	145.81
	11/23/92		6.98	--	146.66
	12/16/92		5.96	--	147.68
	01/21/93		4.62	--	149.02
	02/22/93		5.15	--	148.49
	03/25/93		5.45	--	148.19
	04/27/93		5.79	--	147.85
	08/04/93		7.24	--	146.40
	10/13/93		8.03	--	145.61
	02/03/94		6.66	--	146.98
	04/29/94		7.70	--	145.94
	08/02/94		7.47	--	146.17
MW-4	07/20/89	157.08	8.09	--	148.99
	08/30/89		8.45	Sheen	148.63
	10/04/89		8.57	Sheen	148.51
	01/10/90		7.26	--	149.82
	08/07/90		6.87	--	150.21
	12/06/90		8.02	Sheen	149.06
	12/19/90		7.69	--	149.39
	01/29/91		8.39	Sheen	148.69
	02/20/91		8.16	--	148.92
	04/25/91		7.14	--	149.94
	05/31/91		7.64	--	149.44
	07/08/91		8.34	--	148.74
	08/09/91		8.60	--	148.48
	09/25/91		8.80	--	148.28
	10/17/91		8.98	--	148.10
	11/20/91		8.78	--	148.30
	12/27/91		8.82	--	148.26
	01/19/92		8.18	--	148.90
	02/19/92		7.62	--	149.46
	03/09/92		6.68	--	150.40
	04/15/92	156.53	6.96	--	149.57
	05/12/92		7.45	--	149.08
	06/16/92		7.94	--	148.59
	07/14/92		8.21	--	148.32
	08/07/92		8.41	--	148.12
	09/22/92		6.14	--	150.39
	10/12/92		6.45	--	150.08
	11/23/92		7.48	--	149.05
	12/16/92		6.95	--	149.58
	01/21/93		5.53	--	151.00
	02/22/93		5.83	--	150.70
	03/25/93		5.96	--	150.57
	04/27/93		6.30	--	150.23
	08/04/93		7.71	--	148.82
	10/13/93		8.53	--	148.00
	02/03/94		9.27	--	147.26

Table 1 (continued)
Liquid Surface Elevation Data

ARCO Service Station 0374
6407 Telegraph Avenue at Alcatraz Avenue
Oakland, California

Well Number	Date Gauged	Well Elevation (feet, MSL)	Depth to Water (feet, TOC)	SPH Thickness (feet)	Liquid Surface Elevation (feet, MSL)
MW-4	04/29/94		9.50	--	147.03
(cont.)	08/02/94		8.69	--	147.84
MW-5	04/15/92	151.33	8.05	--	143.28
	05/12/92		8.44	--	142.89
	06/16/92		8.74	--	142.59
	07/14/92		9.70	--	141.63
	08/07/92		9.10	--	142.23
	09/22/92		9.26	--	142.07
	10/25/92		9.24	--	142.09
	11/23/92		---------- Well Inaccessible ----------		
	12/16/92		8.20	--	143.13
	01/21/93		7.89	--	143.44
	02/22/93		7.29	--	144.04
	03/25/93		7.51	--	143.82
	04/27/93		7.72	--	143.61
	08/05/93		8.66	--	142.67
	10/13/93		9.00	--	142.33
	02/03/94		9.38	--	141.95
	04/29/94		---------- Well Inaccessible ----------		
	08/02/94		8.71	--	142.62
MW-6	04/15/92	153.84	4.55	--	149.29
	05/12/92		5.32	--	148.52
	06/16/92		5.91	--	147.93
	07/14/92		6.08	--	147.76
	08/07/92		6.36	--	147.48
	09/22/92		6.53	--	147.31
	10/25/92		6.54	--	147.30
	11/23/92		5.75	--	148.09
	12/16/92		4.69	--	149.15
	01/21/93		3.82	--	150.02
	02/22/93		3.78	--	150.06
	03/25/93		3.93	--	149.91
	04/27/93		4.30	--	149.54
	08/05/93		5.39	--	148.45
	10/13/93		7.12	--	146.72
	02/03/94		5.17	--	148.67
	04/29/94		4.66	--	149.18
	08/02/94		5.64	--	148.20

MSL = Mean sea level
TOC = Top of casing
SPH = Separate-phase hydrocarbons

Table 2
Groundwater Analytical Data
Total Petroleum Hydrocarbons
(TPH as Gasoline, BTEX Compounds, TPH as Diesel, and Oil and Grease)

ARCO Service Station 0374
6407 Telegraph Avenue at Alcatraz Avenue
Oakland, California

Well Number	Date Sampled	TPH as Gasoline (ppb)	Benzene (ppb)	Toluene (ppb)	Ethyl-benzene (ppb)	Xylenes (ppb)	TPH as Diesel (ppb)	Oil and Grease (ppb)
MW-1	07/21/89	33	0.77	1.6	15	5	NA	NA
	08/30/89	<20	<0.50	<0.50	<0.50	<0.50	NA	NA
	10/04/89	<20	<0.50	<0.50	<0.50	<0.50	NA	NA
	01/10/90	<20	<0.50	<0.50	<0.50	<0.50	NA	NA
	08/07/90	<20	<0.50	<0.50	<0.50	<0.50	NA	NA
	12/06/90	<50	3.6	2.7	0.60	5.8	NA	NA
	02/20/91	<50	<0.50	<0.50	<0.50	<0.50	NA	NA
	07/08/91	<30	<0.30	<0.30	<0.30	<0.30	NA	NA
	09/25/91	<30	57	57	54	1.7	NA	NA
	11/20/91	57	9.2	3.7	0.63	25	NA	NA
	03/09/92	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
	04/15/92	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
	07/14/92	<50	<0.5	0.7	<0.5	1.3	NA	NA
	10/12/92	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
	01/21/93	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
	04/27/93	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
	08/04/93	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
	10/13/93	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
	02/03/94	<50	1.4	2.1	<0.5	2	NA	NA
	04/29/94	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
	08/02/94	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
MW-2	07/21/89	4,200	280	210	38	24	NA	NA
	08/30/89	4,200	160	260	45	240	NA	NA
	10/04/89	4,300	860	300	29	330	NA	NA
	01/10/90	8,000	890	710	120	760	NA	NA
	08/07/90	6,000	880	76	25	80	NA	NA
	12/06/90	1,600	330	69	18	63	NA	NA
	02/20/91	1,300	160	46	13	48	NA	NA
	07/08/91	310	76	18	7.7	24	NA	NA
	09/25/91	83	17	0.69	2.2	4.1	NA	NA
	11/20/91	180	46	6.1	3	8.7	NA	NA
	03/09/92	690	170	25	21	58	NA	NA
	04/15/92	86	20	2.3	3.8	85	NA	NA
	07/14/92	160	46	1.4	1.2	35	NA	NA
	10/12/92	230	59	7	55	11	NA	NA
	01/21/93	450	70	6.6	22	54	NA	NA
	04/27/93	<50	6.6	<0.5	0.7	1.1	NA	NA
	08/04/93	<50	2.1	<0.5	<0.5	<0.5	NA	NA
	10/13/93	<50	14	<0.5	<0.5	<0.5	NA	NA
	02/03/94	<50	4.4	<0.5	<0.5	0.8	NA	NA
	04/29/94	150	38	0.7	4.3	4.8	NA	NA
	08/02/94	<50	<0.5	<0.5	<0.5	<0.5	NA	NA

Table 2 (continued)
Groundwater Analytical Data
Total Petroleum Hydrocarbons
(TPH as Gasoline, BTEX Compounds, TPH as Diesel, and Oil and Grease)

ARCO Service Station 0374
6407 Telegraph Avenue at Alcatraz Avenue
Oakland, California

Well Number	Date Sampled	TPH as Gasoline (ppb)	Benzene (ppb)	Toluene (ppb)	Ethyl-benzene (ppb)	Xylenes (ppb)	TPH as Diesel (ppb)	Oil and Grease (ppb)
MW-3	07/21/89	430	9	4.8	<0.50	50	NA	NA
	08/30/89	1,200	85	46	84	55	NA	NA
	10/04/89	7,000	580	900	120	670	NA	NA
	01/10/90	940	130	59	21	73	NA	NA
	08/07/90	2,300	180	64	59	120	NA	NA
	12/06/90	460	52	55	14	39	350	NA
	02/20/91	470	36	30	9.3	31	<100	<5,000
	07/08/91	2500	240	470	74	320	NA	NA
	09/25/91	1,100	120	110	34	120	NA	NA
	11/20/91	1,000	180	140	43	140	NA	NA
	03/10/92	1,200	200	110	53	130	NA	NA
	04/15/92	1,600	200	13	110	81	NA	NA
	07/14/92	5,200	620	44	310	250	NA	NA
	10/12/92	850	150	5.2	55	46	NA	NA
	01/21/93	620	100	12	35	35	NA	NA
	04/27/93	1,700	180	83	64	100	NA	NA
	08/04/93	380	70	12	29	41	NA	NA
	10/13/93	780	90	6	40	31	NA	NA
	02/03/94	340	42	8.7	9.2	28	NA	NA
	04/29/94	830	150	38	27	48	NA	NA
	08/02/94	220	25	1.7	7.6	8.3	NA	NA
MW-4	07/21/89	8,700	720	360	120	640	NA	NA
	08/30/89	7,300	630	220	n	320	NA	NA
	10/04/89	21,000	2,300	1,300	280	1,300	NA	NA
	01/10/90	4,300	470	250	63	430	NA	NA
	08/07/90	69,000	8,700	4,200	540	4,600	28,000	<5,000
	12/06/90	---------- Separate-Phase Hydrocarbon Sheen ----------						
	02/20/91	5,200	690	200	95	580	<100	<5,000
	07/08/91	1,700	280	68	37	170	NA	NA
	09/25/91	6,300	2,100	290	210	590	NA	NA
	11/20/91	2,700	1,200	200	110	320	NA	NA
	03/10/92	690	180	80	18	43	NA	NA
	04/15/92	8,500	2,100	750	280	1,000	NA	NA
	07/14/92	10,000	2,900	530	290	930	NA	NA
	10/12/92	19,000	5,200	1,600	490	1,800	690	NA
	01/21/93	22,000	4,400	1,300	580	2,200	1,400	NA
	04/27/93	21,000	4,800	1,200	630	2,400	1,100	NA
	08/04/93	23,000	6,600	1,700	770	2,600	1500	NA
	10/13/93	16,000	3,500	800	470	1,800	670	NA
	02/03/94	850	140	84	7.9	59	59	NA
	04/29/94	68	1.1	<0.5	<0.5	1.7	<50	NA
	08/02/94	52	5.7	<0.5	1.2	1.9	<50	NA

Table 2 (continued)
Groundwater Analytical Data
Total Petroleum Hydrocarbons
(TPH as Gasoline, BTEX Compounds, TPH as Diesel, and Oil and Grease)

ARCO Service Station 0374
6407 Telegraph Avenue at Alcatraz Avenue
Oakland, California

Well Number	Date Sampled	TPH as Gasoline (ppb)	Benzene (ppb)	Toluene (ppb)	Ethyl-benzene (ppb)	Xylenes (ppb)	TPH as Diesel (ppb)	Oil and Grease (ppb)
MW-5	04/15/92	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
	07/14/92	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
	10/25/92	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
	01/21/93	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
	04/27/93	<50	0.5	1	<0.5	0.8	NA	NA
	08/05/93	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
	10/14/93	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
	02/03/94	<50	0.8	1.7	<0.5	15	NA	NA
	04/29/94	---------- Well Inaccessible ----------						
	08/02/94	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
MW-6	04/15/92	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
	07/15/92	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
	10/25/92	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
	01/21/93	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
	04/27/93	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
	08/05/93	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
	10/13/93	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
	02/03/94	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
	04/29/94	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
	08/02/94	<50	<0.5	<0.5	<0.5	<0.5	NA	NA

ppb = Parts per billion
NA = Not analyzed

Table 3

Groundwater Extraction System Mass Removal Data

Total Petroleum Hydrocarbons

(TPH as Gasoline and Benzene)

ARCO Service Station 0374

6407 Telegraph Avenue at Alcatraz Avenue

Oakland, California

					TPH as Gasoline			Benzene			
Sample I.D.	Date Sampled	Totalizer Reading (gallons)	Net Volume (gallons)	Average Flow Rate (gpm)	Influent Concentration (µg/L)	Net Removed (lbs)	Removed to Date (lbs)	Influent Concentration (µg/L)	Net Removed (lbs)	Removed to Date (lbs)	Primary Carbon Loading (percent)
INFL	12/21/93 a	22	22	0.21	NS	0.00	0.00	NS	0.000	0.00	0.0
INFL	12/23/93 a	4,855	4,833	1.60	9,300	0.38	0.38	1200	0.024	0.02	0.5
INFL	12/27/93 a	6,871	2,016	0.36	5,700	0.13	0.51	820	0.017	0.04	0.6
INFL	12/29/93 a	7,192	371	0.13	5,800	0.02	0.53	950	0.003	0.04	0.7
INFL	01/03/94 a	7,925	733	0.10	6,500	0.01	0.54	860	0.006	0.05	0.7
INFL	01/05/94 a	8,162	237	0.08	5,200	0.01	0.55	970	0.002	0.05	0.7
INFL	01/11/94 a	8,907	745	0.08	6,300	0.03	0.58	900	0.006	0.06	0.7
INFL	01/13/94 a	9,175	268	0.09	6,600	0.02	0.60	950	0.002	0.06	0.7
INFL	01/24/94 a	9,306	131	0.05	NS	0.01	0.60	NS	0.001	0.06	0.8
INFL	02/24/94 a	14,555	5,249	0.21	4,200	0.28	0.88	520	0.011	0.07	1.1
INFL	03/24/94 a	23,723	9,168	0.24	6,200	0.40	1.40	1100	0.062	0.13	1.8
INFL	04/26/94 b	29,543	5,820	0.12	6,400	0.15	1.55	1400	0.061	0.19	1.9
INFL	05/24/94 c	35,082	5,539	0.14	NS	0.20	1.75	NS	0.043	0.24	2.2
REPORTING PERIOD: 6/1/94 - 9/30/94											
TOTAL POUNDS REMOVED:							1.75			0.24	
TOTAL GALLONS REMOVED:							0.29			0.03	
PERIOD POUNDS REMOVED:						0.00			0.00		
PERIOD GALLONS REMOVED:						0.00			0.00		
TOTAL GALLONS EXTRACTED:					35,082						
PERIOD GALLONS EXTRACTED:					0						
PERIOD AVERAGE FLOW RATE (gpm):					0.00						
PRIMARY BED CAPACITY REMAINING (%):					97.81						

gpm = Gallons per minute

µg/L = Micrograms per liter

lbs = Pounds

NS = Not sampled

a. All data prior to 03/24/94 provided by prior consultant.

b. Samples taken 04/21/94; totalizer reading from 04/26/94.

c. Last site visit by RESNA on 05/24/94.

d. Pacific Environmental Group, Inc., became consultant for the site Nov. 94.

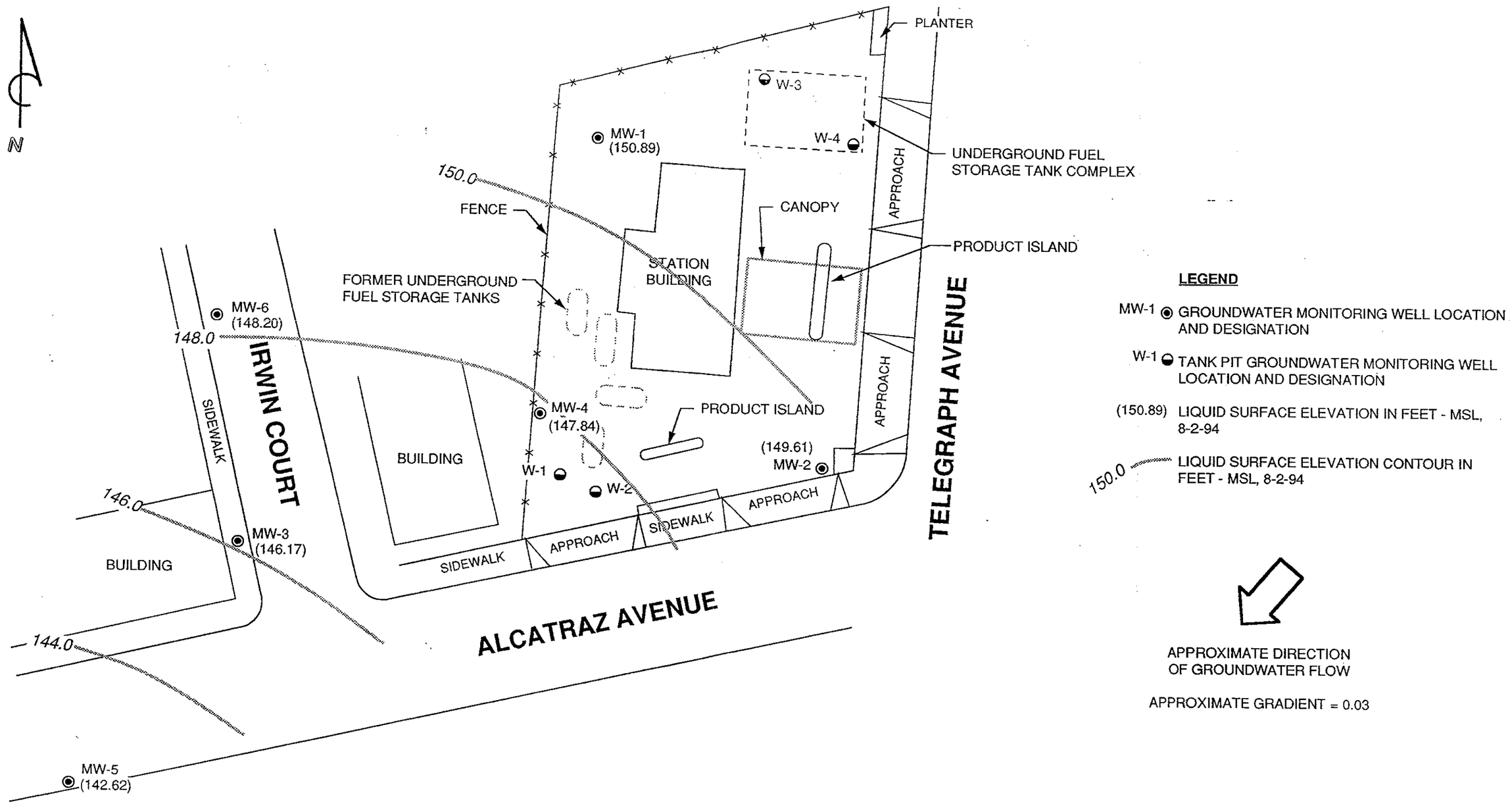
System operation began December 21, 1993, under RESNA Industries, Inc.; system shut down on May 24, 1994.

Pounds of hydrocarbons removed to date through March 24, 1994, provided by prior consultant.

Benzene mass removal from 12/21/93 through 4/27/94 estimated from data provided by prior consultant.

Carbon loading assumes an 8% isotherm.

Note: See certified analytical reports for detection limits.



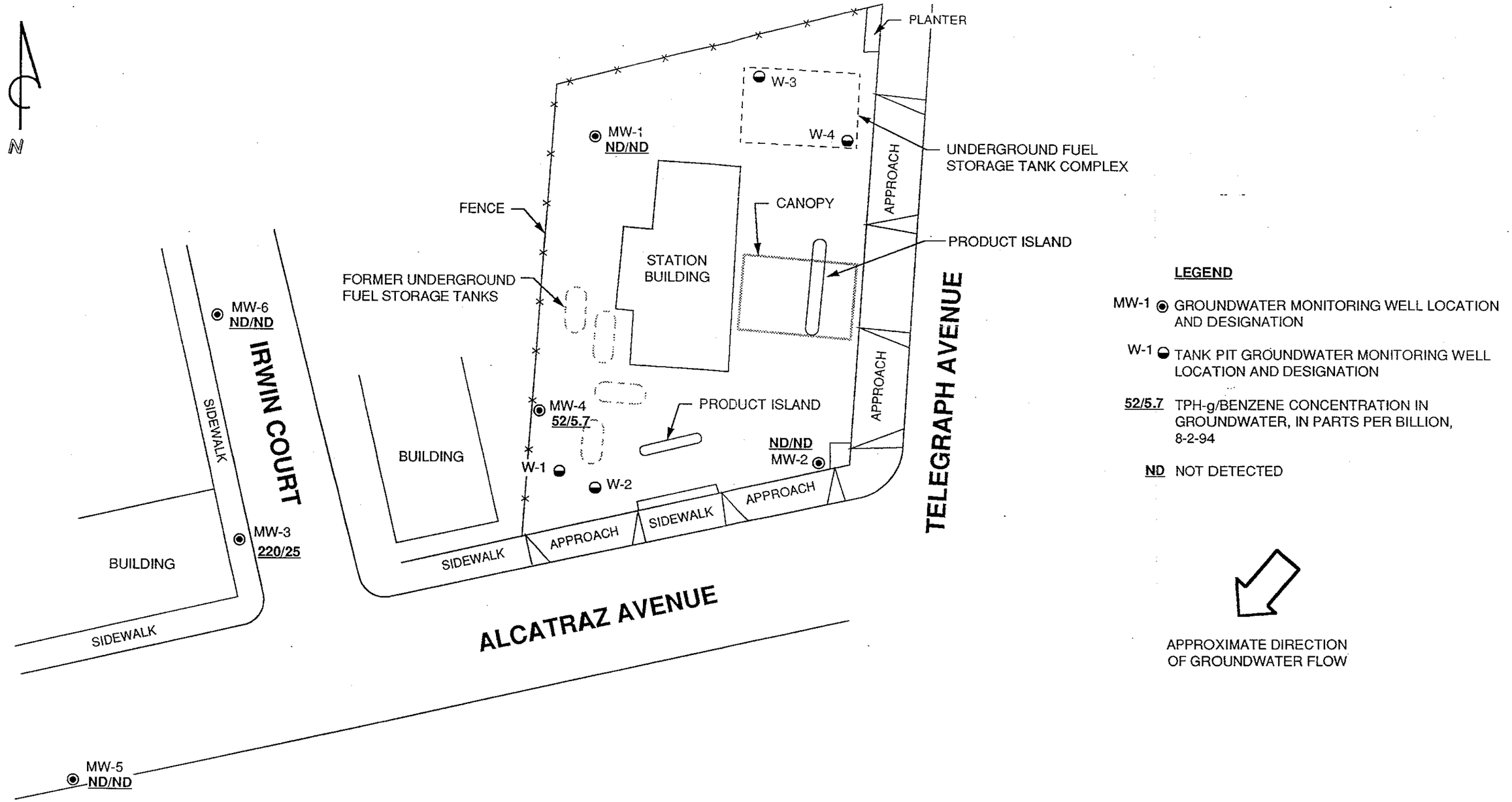
PACIFIC ENVIRONMENTAL GROUP, INC.

SCALE
0 30 60 FEET

ARCO SERVICE STATION 0374
6407 Telegraph Avenue at Alcatraz Avenue
Oakland, California

LIQUID SURFACE ELEVATION CONTOUR MAP

FIGURE:
1
PROJECT:
330-084.2A



LEGEND

MW-1 ◉ GROUNDWATER MONITORING WELL LOCATION AND DESIGNATION

W-1 ◒ TANK PIT GROUNDWATER MONITORING WELL LOCATION AND DESIGNATION

52/5.7 TPH-g/BENZENE CONCENTRATION IN GROUNDWATER, IN PARTS PER BILLION, 8-2-94

ND NOT DETECTED

APPROXIMATE DIRECTION OF GROUNDWATER FLOW

PACIFIC ENVIRONMENTAL GROUP, INC.

SCALE
0 30 60 FEET

ARCO SERVICE STATION 0374
6407 Telegraph Avenue at Alcatraz Avenue
Oakland, California

TPH-g/BENZENE CONCENTRATION MAP

FIGURE:
2
PROJECT:
330-084.2A

ATTACHMENT A

CERTIFIED ANALYTICAL REPORTS, CHAIN-OF-CUSTODY DOCUMENTATION, AND FIELD DATA SHEETS

330-084

I NTEGRATED
W ASTESTREAM
M ANAGEMENT, INC.

August 24, 1994

John Young
EMCON Associates
1921 Ringwood Avenue
San Jose, CA 95131

Dear Mr. 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 August 2, 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

INTEGRATED
WASTESTREAM
MANAGEMENT

A0374Q3.XLS

Summary of Ground Water Sample Analyses for ARCO Facility A-374, Oakland, California

WELL NUMBER	MW-1	MW-2A	MW-3	MW-4	MW-5	MW-6
DATE SAMPLED	8/2/94	8/2/94	8/2/94	8/2/94	8/2/94	8/2/94
DEPTH TO WATER	8.02	8.31	7.47	8.69	8.71	5.64
SHEEN	NONE	NONE	NONE	NONE	NONE	NONE
PRODUCT THICKNESS	NA	NA	NA	NA	NA	NA
TPHg	ND	ND	220	52	ND	ND
BTEX						
BENZENE	ND	ND	25	5.7	ND	ND
TOLUENE	ND	ND	1.7	ND	ND	ND
ETHLYBENZENE	ND	ND	7.6	1.2	ND	ND
XYLENES	ND	ND	8.3	1.9	ND	ND
EPA 3510						
DIESEL	NA	NA	NA	ND	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)
* = Well inaccessible

** = Not sampled per consultant request
DCE = cis-1, 2-Dichloroethene (USEPA Method 8010)
TCE = Trichloroethene (USEAP Method 8010)
ND = Not Detected
NA = Not applicable
FP = Floating product

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

FIELD REPORT

Depth To Water / Floating Product Survey

Site Arrival Time: 1610
Site Departure Time: 1815
Weather Conditions: Cloudy Sunny

DTW: Well Box or Well Casing (circle one)

Project No.: _____ Location: 6407 telegraph ave. OAK Date: Aug 2, 1994

Client / Station#: Arco 374 Field Technician: Vince / Cisco Day of Week: Tuesday

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) FP=FLOATING PRODUCT	COMMENTS	MATERIALS
1	MW-1	OK	Yes	OK	OK	OK	27.00	8.02	8.02	N/A	N/A	NO	4"	Hole in Lock
5	MW-2A	OK	Yes	OK	OK	OK	26.80	8.31	8.31	N/A	N/A	NO	4"	Hole in Lock
6	MW-3	OK	Yes	OK	OK	OK	27.00	7.47	7.47	N/A	N/A	NO	4"	Hole in Hex
4	MW-4	OK	Yes	bent	bent	OK	27.80	8.69	8.69	N/A	N/A	NO	4"	3/4
3	MW-5	OK	Yes	OK	OK	OK	22.91	8.71	8.71	N/A	N/A	NO	4"	15/16
2	MW-6	OK	Yes	OK	OK	OK	15.10	5.64	5.64	N/A	N/A	NO	4"	15/16

AGE 2 OF 3 DATE: 8-2-94 CLIENT/STATION #: ARCO 374 ADDRESS: 6407 Telegraph Ave. OAK

WELL ID: MW-6 TD 15.10 - DTW 5.64 X 0.66 (Gal. / Linear Ft.) X 3 (Casing Volume) - 18.73 (Calculated Purge)

DATE PURGED: 8-2-94 START (2400 HR): 1650 END (2400 HR) 1654
DATE SAMPLED: 8-2-94 TIME (2400 HR): 1700 DTW: 11.1

TIME (2400 HR)	VOLUME (GAL)	pH (UNITS)	(E.C. X 1,000) (UMHOS/CM@25 C)	TEMP. (F)	COLOR (VISUAL)
1657	5	7.80	0.31	72.7	CLEAR
1652	10	7.77	0.30	72.2	CLEAR
1659	18	7.75	0.37	71.7	CLEAR

Total purge: 18
PURGING EQUIP.: Centrifugal Pump Bailer Disp. SAMPLING EQUIP: Bailer Disp.
REMARKS:

WELL ID: MW-3 TD 27.0 - DTW 7.47 X 0.66 (Gal. / Linear Ft.) X 3 (Casing Volume) - 38.66 (Calculated Purge)

DATE PURGED: 8-2-94 START (2400 HR): 1705 END (2400 HR) 1716
DATE SAMPLED: 8-2-94 TIME (2400 HR): 1723 DTW: 24.7

TIME (2400 HR)	VOLUME (GAL)	pH (UNITS)	(E.C. X 1,000) (UMHOS/CM@25 C)	TEMP. (F)	COLOR (VISUAL)
1706	5	7.15	0.32	71.2	CLEAR
1707	10	7.18	0.31	71.0	CLEAR
1711	25	7.15	0.35	70.5	CLEAR
1716	30	7.13	0.35	69.5	CLEAR

Total purge: 30
PURGING EQUIP.: Centrifugal Pump Bailer Disp. SAMPLING EQUIP: Bailer Disp.
REMARKS: WELL PUMP DRY AT 30 GALLONS.

WELL ID: MW-5 TD 22.91 - DTW 8.71 X 0.66 (Gal. / Linear Ft.) X 3 (Casing Volume) - 28.11 (Calculated Purge)

DATE PURGED: 8-2-94 START (2400 HR): 1734 END (2400 HR) 1733
DATE SAMPLED: 8-2-94 TIME (2400 HR): 1736 DTW: 20.1

TIME (2400 HR)	VOLUME (GAL)	pH (UNITS)	(E.C. X 1,000) (UMHOS/CM@25 C)	TEMP. (F)	COLOR (VISUAL)
1735	5	7.45	0.31	71.6	CLEAR
1738	10	7.40	0.31	71.3	CLEAR
1739	15	7.39	0.31	70.5	CLEAR
1733	27	7.37	0.32	70.2	CLEAR

Total purge: 27
PURGING EQUIP.: Centrifugal Pump Bailer Disp. SAMPLING EQUIP: Bailer Disp.
REMARKS: WELL PUMP DRY AT 27 GALLONS

WELL ID: ____ TD ____ - DTW ____ X Gal. (Linear Ft.) ____ X Casing (Volume) ____ - Calculated (Purge) ____

DATE PURGED: ____ START (2400 HR): ____ END (2400 HR) ____
DATE SAMPLED: ____ TIME (2400 HR): ____ DTW: ____

TIME (2400 HR)	VOLUME (GAL)	pH (UNITS)	(E.C. X 1,000) (UMHOS/CM@25 C)	TEMP. (F)	COLOR (VISUAL)

Total purge:
PURGING EQUIP.: Centrifugal Pump Bailer Disp. SAMPLING EQUIP: Bailer Disp.
REMARKS:

PRINT NAME: Francisco Arriaga SIGNATURE: Francisco Arriaga

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:

AGE 3 OF 3 DATE: 8-2-94 CLIENT/STATION #: Arco 374 ADDRESS: 6407 Telegraph Ave. Oak.

WELL ID: MW-1 TD 27.0 − DTW 8.02 × 0.66 Gal. Linear Ft. × 3 Casing Volume = 37.58 Calculated Purge

DATE PURGED: 8-2-94 START (2400 HR): 1702 END (2400 HR) 1711
DATE SAMPLED: 8-2-94 TIME (2400 HR): 1712 DTW: 23.9

TIME (2400 HR)	VOLUME (GAL)	pH (UNITS)	(E.C. X 1,000) (UMHOS/CM@25 C)	TEMP. (F)	COLOR (VISUAL)
1703	2	7.37	0.49	68.9	clear
1705	19	7.36	0.43	68.3	clear
1708	27	7.34	0.45	66.9	clear
1711	37	7.33	0.44	66.2	clear

Total purge: 37
PURGING EQUIP.: Centrifugal Pump Bailer Disp. SAMPLING EQUIP: Bailer Disp.
REMARKS:

WELL ID: MW-4 TD 27.80 − DTW 8.69 × 0.66 Gal. Linear Ft. × 3 Casing Volume = 37.83 Calculated Purge

DATE PURGED: 8-2-94 START (2400 HR): 1716 END (2400 HR) 1730
DATE SAMPLED: 8-2-94 TIME (2400 HR): 1733 DTW: 22.8

TIME (2400 HR)	VOLUME (GAL)	pH (UNITS)	(E.C. X 1,000) (UMHOS/CM@25 C)	TEMP. (F)	COLOR (VISUAL)
1718	3	7.31	0.38	70.6	clear
1720	19	7.30	0.28	68.7	clear
1724	28	7.29	0.29	66.9	clear
1730	37	7.28	0.28	66.5	clear

Total purge: 37
PURGING EQUIP.: Centrifugal Pump Bailer Disp. SAMPLING EQUIP: Bailer Disp.
REMARKS:

WELL ID: MW-2 TD 26.80 − DTW 8.31 × 0.66 Gal. Linear Ft. × 3 Casing Volume = 36.61 Calculated Purge

DATE PURGED: 8-2-94 START (2400 HR): 1739 END (2400 HR) 1746
DATE SAMPLED: 8-2-94 TIME (2400 HR): 1750 DTW: 22.1

TIME (2400 HR)	VOLUME (GAL)	pH (UNITS)	(E.C. X 1,000) (UMHOS/CM@25 C)	TEMP. (F)	COLOR (VISUAL)
1740	2	7.39	0.27	71.2	clear
1742	18	7.43	0.28	70.4	clear
1744	29	7.36	0.29	69.6	clear
1746	36	7.35	0.30	69.3	clear

Total purge 36
PURGING EQUIP.: Centrifugal Pump Bailer Disp SAMPLING EQUIP: Bailer Disp.
REMARKS:

WELL ID: ____ TD ____ − DTW ____ × Gal. Linear Ft. ____ × Casing Volume ____ = Calculated Purge ____

DATE PURGED: ____ START (2400 HR): ____ END (2400 HR) ____
DATE SAMPLED: ____ TIME (2400 HR): ____ DTW: ____

TIME (2400 HR)	VOLUME (GAL)	pH (UNITS)	(E.C. X 1,000) (UMHOS/CM@25 C)	TEMP. (F)	COLOR (VISUAL)

Total purge: ____
PURGING EQUIP.: Centrifugal Pump Bailer Disp. SAMPLING EQUIP: Bailer Disp.
REMARKS:

PRINT NAME: Vince Valdez SIGNATURE: Vince Valdez

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:

Columbia Analytical Services, Inc.

August 17, 1994

Service Request No. S940869

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

Re: **ARCO Facility No. 374**

Dear Ms. Austin/Mr. DeLon:

Attached are the results of the water samples submitted to our lab on August 5, 1994. For your reference, these analyses have been assigned our service request number S940869.

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/ajb

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
Project: ARCO Facility No. 374
Sample Matrix: Water

Service Request: S940869
Date Collected: 8/2/94
Date Received: 8/5/94
Date Extracted: 8/15/94
Date Analyzed: 8/15/94

TPH as Diesel
EPA Method 3510/California DHS LUFT Method
Units: ug/L (ppb)

Sample Name	Lab Code	MRL	Result
MW-4 (22.8)	S940869-005	50	ND
Method Blank	S940815-WB	50	ND

Approved By: _____ Date: August 17, 1994

LAMRL/060194

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	IWM	**Service Request:**	S940869
Project:	ARCO Facility No. 374	**Date Collected:**	8/2/94
Sample Matrix:	Water	**Date Received:**	8/5/94
		Date Extracted:	NA
		Date Analyzed:	8/9/94

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

Analyte:	TPH as Gasoline	Benzene	Toluene	Ethyl-benzene	Xylenes, Total
Units:	ug/L (ppb)	ug/L (ppb)	ug/L (ppb)	ug/L (ppb)	ug/L (ppb)
Method Reporting Limit:	50	0.5	0.5	0.5	0.5
Sample Name	**Lab Code**				
MW-1 (23.9)	S940869-002	ND	ND	ND	ND	ND
MW-2 (22.1)	S940869-003	ND	ND	ND	ND	ND
MW-3 (24.7)	S940869-004	220	25	1.7	7.6	8.3
MW-4 (22.8)	S940869-005	52	5.7	ND	1.2	1.9
MW-5 (20.1)	S940869-006	ND	ND	ND	ND	ND
MW-6 (11.1)	S940869-007	ND	ND	ND	ND	ND
Method Blank	S940809-WB	ND	ND	ND	ND	ND

Approved By: _____ Date: August 17, 1994

5ABTXGAS/061694

APPENDIX A

LABORATORY QC RESULTS

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: IWM
Project: ARCO Facility No. 374
Sample Matrix: Water

Service Request: S940869
Date Collected: 8/2/94
Date Received: 8/5/94
Date Extracted: 8/15/94
Date Analyzed: 8/15/94

Surrogate Recovery Summary
TPH as Diesel
EPA Method 3510/California DHS LUFT Method

Sample Name	Lab Code	Percent Recovery p-Terphenyl
MW-4 (22.8)	S940869-005	97
MS	S940874-011MS	90
DMS	S940874-011DMS	76
Method Blank	S940815-WB	93

CAS Acceptance Limits: 66-123

Approved By: Kevin P. Murphy Date August 17, 1994

SUR1/062994

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: IWM
Project: ARCO Facility No. 374

Service Request: S940869
Date Analyzed: 8/15/94

Initial Calibration Verification (ICV) Summary
TPH as Diesel
California DHS LUFT Method
Units: ppm

Analyte	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits
TPH as Diesel	500	471	94	90-110

Approved By: _____ Date: August 17, 1994

ICV25AL/060194

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: IWM
Project: ARCO Facility No. 374
Sample Matrix: Water

Service Request: S940869
Date Collected: 8/2/94
Date Received: 8/5/94
Date Extracted: 8/15/94
Date Analyzed: 8/15/94

Matrix Spike/Duplicate Matrix Spike Summary
TPH as Diesel
EPA Method 3510/California DHS LUFT Method
Units: ug/L (ppb)

Sample Name: Batch QC
Lab Code: S940874-011

	Spike Level		Sample	Spike Result		Percent Recovery		CAS Acceptance	Relative Percent
Analyte	MS	DMS	**Result**	MS	DMS	MS	DMS	Limits	**Difference**
TPH as Diesel	4,000	4,000	ND	4,360	4,390	109	110	61-141	<1

Approved By: Robert A Murphy Date: August 17, 1994

DMSIS/060194

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: IWM
Project: ARCO Facility No. 374
Sample Matrix: Water

Service Request: S940869
Date Collected: 8/2/94
Date Received: 8/5/94
Date Extracted: NA
Date Analyzed: 8/9/94

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

Sample Name	Lab Code	Percent Recovery α,α,α-Trifluorotoluene
MW-1 (23.9)	S940869-002	98
MW-2 (22.1)	S940869-003	96
MW-3 (24.7)	S940869-004	99
MW-4 (22.8)	S940869-005	98
MW-5 (20.1)	S940869-006	98
MW-6 (11.1)	S940869-007	95
MW-1 (23.9) MS	S940869-002MS	101
MW-1 (23.9) DMS	S940869-002DMS	102
Method Blank	S940809-WB	95

CAS Acceptance Limits: 69-116

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

SUR1/062994

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: IWM
Project: ARCO Facility No. 374

Service Request: S940869
Date Analyzed: 8/9/94

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

Analyte	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits
Benzene	25	27.8	111	85-115
Toluene	25	26.2	105	85-115
Ethylbenzene	25	26.4	106	85-115
Xylenes, Total	75	76.6	102	85-115
Gasoline	250	247	99	90-110

Approved By: Robert A Murphy Date. August 17, 1994

ICV25AL/060194

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: IWM
Project: ARCO Facility No. 374
Sample Matrix: Water

Service Request: S940869
Date Collected: 8/2/94
Date Received: 8/5/94
Date Extracted: NA
Date Analyzed: 8/9/94

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

Sample Name: MW-1 (23.9)
Lab Code: S940869-002

Analyte	Spike Level MS	Spike Level DMS	Sample Result	Spike Result MS	Spike Result DMS	Percent Recovery MS	Percent Recovery DMS	CAS Acceptance Limits	Relative Percent Difference
Gasoline	250	250	ND	224	233	90	93	67-121	4

Approved By: K. E. M. A. Murphy Date: August 17, 1994

DMS1S/060194

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 DeSon	Laboratory name Columbia
ARCO engineer M.W	Telephone no. (ARCO) 415 571 2434	Telephone no. (Consultant) 408/942 8955	Fax no. (Consultant) 408/942 1499	Contract number 77077
Consultant name IWM	Address (Consultant) 950 Ames ave. Milp. CA 95035		Method of shipment CAS COURIER

Sample I.D.	Lab no.	Container no.	Matrix: Soil	Matrix: Water	Matrix: Other	Preservation: Ice	Preservation: Acid HCl	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH EPA M602/8020/8015	TPH Modified 8015 Gas ☐ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Metals ☐ Semi VOA ☐ VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐	TPH Diesel
FB-1	1	2		✓		✓	✓	8-2-94	1615		✓	✓									
MW-1	2	2		✓		✓	✓		1712		✓	✓									
MW-2	3	2		✓		✓	✓		1750		✓	✓									
MW-3	4	2		✓		✓	✓		1723		✓	✓									
MW-4	5	2		✓		✓	✓		1733		✓	✓									✓
MW-5	6	2		✓		✓	✓		1736		✓	✓									
MW-6	7	2		✓		✓	✓		1700		✓	✓									

Special detection Limit/reporting

Special QA/QC

Remarks: Hold on FB-1

Lab number 5940869

Turnaround time

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

Condition of sample: Okay

Temperature received: Cool

Relinquished by sampler	Date 8/5/94	Time 1400	Received by
Relinquished by	Date	Time	Received by
Relinquished by	Date	Time	Received by laboratory: Date 8/8/94 Time 1400

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

APPC-3292 (2-91)

ATTACHMENT B

GROUNDWATER SAMPLING PROCEDURES

FIELD PROCEDURES: GROUNDWATER SAMPLING

PRELIMINARY: SITE SAFETY

IWM SAFETY PRACTICES APPLY AT ALL TIMES! OBSERVE ALL STANDARD PROCEDURES WITH SPECIAL ATTENTION TO THESE HAZARDS:

- **Vehicular traffic: Insure visibility of yourself and your equipment**
- **Pedestrian activity: Anticipate and prevent tripping hazards**

A. WATER-LEVEL MEASUREMENTS

GENERAL

1. Water-level measurements must be taken before disturbing the water in the well in any way. The water in the well should be in an undisturbed state for a minimum of 24 hours before performing this task.
2. To insure consistency in date from event-to-event, the measurement must be taken from the same point on the well top casing. As a general rule, take the measurement from the highest point of the casing. Typically, there is a notch in the casing for this purpose. If no such mark is visible, place one at the highest point of the casing, take measurements from that point, and make a note of this in the field notes.
3. Always work from the cleanest wells (based on past data) to the dirtiest.
4. Keep your equipment CLEAN! Between wells clean the probes, lines and associated attachments with a clean cloth soaked in water containing Alconox (or like cleaning agent). Thoroughly rinse in tap water in a 5 gallon bucket. After each rinsing, empty the bucket into a 55 gallon drum or other purge water containment vessel.
5. Take measurements to the nearest .01 foot.

PROCEDURE (NO FREE PRODUCT ANTICIPATED)

1. Inspect the wellhead for the following: damage of any kind, indications of possible leakage into the well at the wellhead, damaged or missing locks, etc. Remove any standing water in or around the well head. Note all irregularities.
2. Lower the (CLEAN!) water-level indicator slowly down the well until the indicator sounds.
3. Continue lowering the indicator about 2 inches more before very slowly raising the indicator until the sound stops.
4. Take the measurement at the casing.
5. Repeat this procedure. If the next reading is within .01 foot of the first, then record the first measurement. If not, repeat this procedure until two consecutive measurements are within .01 foot.
6. Remove and CLEAN the equipment (probe and tape) before proceding to the next well.

PROCEDURE (FREE PRODUCT ANTICIPATED)

1. Inspect the wellhead for the following: damage of any kind, indications of possible leakage into the well at the wellhead, damaged or missing locks, etc. Remove any standing water in or around the well head. Note all irregularities.
2. Lower the (CLEAN!) oil-water interface probe slowly down the well until the indicator sounds. The presence of product is indicated by a steady sound; its absence by a broken sound. (If there is no evidence of product, follow procedure for water-level measurements where no product is anticipated.)
3. If the presence of product is indicated, lower the probe very slowly until the signal changes to broken pattern.
4. Continue lowering the indicator about 2 inches more before very slowly raising the indicator until the sound becomes steady; note this measurement at the casing as the depth to water. Continue raising the probe until the sound stops; note this measurement at the casing as the depth to product.
5. Repeat this procedure. If the next readings are within .01 foot of the first set, then record the first measurements. If not, repeat this entire procedure until two consecutive measurements sets are within .01 foot.
6. Remove and CLEAN the equipment before using in another well.

B. SUBJECTIVE ANALYSIS

GENERAL

1. Always work from the cleanest wells (based on past data) to the dirtiest.
2. Follow this procedure for cleaning the bailer between wells:
a. Fill and empty the bailer once using tap water.
b. Refill bailer approximately two-thirds full with a mixture of water and Alconox (or like cleaning agent).
c. Clean bailer inside and out with a bottle brush.
d. Empty the bailer then repeat this process at least three times.
e. After each cleaning, empty the cleaning liquids into a 55 gallon drum or other purge water containment vessel.
3. Clean the lines (or wire) and associated attachments with a clean cloth soaked in water containing Alconox (or like cleaning agent). Thoroughly rinse in tap water in a 5 gallon bucket. After each rinsing, empty the bucket into a 55 gallon drum or other purge water containment vessel.

PROCEDURE

1. Gently lower the (CLEAN) bailer into the well until it reaches the water surface.
2. Lower the bailer further about half its length.
3. Remove the bailer and examine the water therein for the following:
a. Presence of Free Product: Note and record thickness to the nearest eighth of an inch.
b. Sheen: Note visual indications of sheen as follows: "Heavy", "Moderate" or "Llight".
c. Emulsion: Record presence of emulsion as "Heavy", "Moderate", or "Light".
d. Color: Record if floating product is present.

C. WELL PURGING: GENERAL

GENERAL

1. To minimize any risk of cross contamination, whenever possible use surface pumps and disposable tubing.
2. If another alternative is used for purging (bailers, submersible pumps, bladder pumps, etc.), follow cleaning procedures outlined for bailers and equipment above.

PROCEDURE

1. **Determine the volume of water in the well.**
2. **If the well recharges, remove three well volumes. If the well doesn't recharge, or does so slowly, continue purging until the recharge water stabilizes with regard to pH, temperature and conductivity, or until the well is empty.**
3. **Contain purged water in labeled 55 gallon drums or other provided containment.**

D. WATER SAMPLE COLLECTION

GENERAL

1. **In general, use disposable bailers for all sampling.**
2. **If a teflon bailer is reused, follow this procedure for cleaning the bailer between wells:**

a. Fill and empty the bailer once using tap water.
b. Refill bailer approximately two-thirds full with a mixture of water and Alconox (or like cleaning agent).
c. Clean bailer inside and out with a bottle brush.
d. Empty the bailer then repeat this process at least three times.
e. After each cleaning, empty the cleaning liquids into a 55 gallon drum or other purge water containment vessel.

3. **Clean the lines (or wire) and associated attachments with a clean cloth soaked in water containing Alconox (or like cleaning agent). Thoroughly rinse in tap water in a 5 gallon bucket. After each rinsing, empty the bucket into a 55 gallon drum or other purge water containment vessel.**
4. **Always work from the cleanest wells (based on past data) to the dirtiest.**
5. **Always keep your samples chilled.**

PROCEDURE

1. **If well recharges, sample may be obtained immediately after purging. If during the course of the sampling day a well does not recharge sufficiently to half fill the bailer, return the next morning to take the sample.**
2. **Review the sampling list to determine which analysis(es) is(are) required for each well during this sampling event. Note any special handling requirements (addition of preservatives, etc.). Complete the sample labels with the following: sample ID number, project ID number and date. Attach the labels to the sample**

containers. Always prepare duplicate samples for analysis and indicate the number of containers on the Chain of Custody. Also, label two sample containers with the project ID number, date and the words "Field Blank"; fill these two containers with distilled water and place in the holders provided for transport (see 5. below).

3. Lower a new disposable bailer into the well and take a sample from below the water's surface. Minimize agitation while removing the bailer.

4. Using the valve at the bottom of the bailer, fill the sample vial very slowly to minimize agitation of the liquid. Cap the vial tightly, then tap it and invert it to check for any air. Top off the vial if there is any air present.

5. Place all sample vials in the holders provided for transport. Place holders inside a cooler containing enough ice to keep the sample temperature below 4 degrees Centigrade. However, do not permit the samples to freeze.

6. After sampling is complete, lock cooler if possible; if not, seal with tape and sign across tape so that any tampering will be evident.

7. Enter the information concerning the collected samples on the field notes and on the Chain of Custody.

8. Before resealing each wellhead, replace any lock or cap, as required.

E. CHAIN OF CUSTODY PROCEDURE

GENERAL

1. Only list on the Chain of Custody those samples that will go to the lab; samples to be held for possible future analysis should only be noted on the field notes.

2. Fill out the Chain of Custody in ink.

PROCEDURE

1. Fill out as much of the form as possible before beginning work on the site.

2. Provide the following:

a. Your name, signature and phone number.

b. The Project Manager's name and phone number.

c. The laboratory.

d. The turnaround time.

3. For each sample, provide the sample ID number, site ID, sample date and analysis(es) requested.
4. After the samples are taken, note the sample condition.
5. The completed Chain of Custody must accompany the shipping container to the laboratory; keep a copy for the Project Manager.
6. Each time the samples change custody the date and time are directely noted on the Chain of Custody which is signed by both the transferor and the transferee.
7. The laboratory will make the final entry upon receipt of the samples. Sample condition will be noted on the Chain of Custody. The original Chain of Custody will be returned with the sample results and a copy will be kept by the laboratory.