Ultramar

Ultramar Inc.
P.O. Box 466
525 W. Third Street
Hanford, CA 93232-0466
(209) 582-0241

Telecopy: 209-584-6113 Credit & Wholesale
209-583-3330 Administrative
209-583-3302 Information Services
209-583-3358 Accounting

92 JAN 24 AM 10: 31

January 21, 1992

Ms. Pamela Evans
Hazardous Materials Program
Department of Environmental Health
Alameda County Health Care Services
80 Swan Way, Room 200
Oakland, CA 94612

SUBJECT: BEACON STATION NO. 721, 44 LEWELLING BLVD., SAN LORENZO, CALIFORNIA

Dear Ms. Evans:

Enclosed is a copy of the Third Quarter 1991 Monitoring Results for the above-referenced Ultramar facility. Also included is a copy of the Quarterly Status Report which describes the work performed this quarter and the work anticipated to be completed next quarter.

There are three upgradient wells at this site that have historically contain very little or no hydrocarbons. In order to keep costs down without any loss of valuable data, Ultramar Inc. (Ultramar) proposes to discontinue sampling two of these wells (MW-5 and MW-6). Ultramar proposes to collect ground-water level data from these wells but not collecting samples for analysis. Ultramar also proposes to remove MW-9 from the sampling program because MW-4 which is between the tanks and islands and MW-9 has historically contained not detected or very low concentrations.

Please call if you have any questions regarding the information included in this report.

Sincerely,

ULTRAMAR INC.

Terrence A. Fox

Terrence A. Fox
Senior Project Manager
Marketing Environmental Department

Enclosures

cc w/encl: Mr. Steven Ritchie, San Francisco Bay Region, RWQCB

cc: Mr. Doug Young, RESNA

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ENVIRONMENTAL PROJECT
QUARTERLY STATUS REPORT

DATE REPORT SUBMITTED: January 22, 1992
QUARTER ENDING: September 30, 1991

SERVICE STATION NO.: 721
ADDRESS: 44 Lewelling Blvd., San Lorenzo, CA
COUNTY: Alameda

ULTRAMAR CONTACT: Terrence A. Fox **TEL. NO:** 209-583-5545

BACKGROUND:

In April 1987, three underground gasoline storage tanks were excavated and removed. Samples collected from beneath the former tanks indicated that hydrocarbons were present in the soil. In May 1987, three monitoring wells (MW-1 through MW-3) were installed by Conoco. Hydrocarbons were detected in soil and ground-water samples collected from the wells. In December 1988, four additional wells (MW-4 through MW-7) were installed. Dissolved-phase hydrocarbons were detected in the new wells. In September 1989, two additional wells (MW-8 and MW-9) were installed. The site has been on a monitoring program since May 1987.

In July 1990, the site was purchased by Ultramar Inc. from Conoco. The monitoring program has continued. Submitted work plan for additional assessment on March 14, 1991.

SUMMARY OF THIS QUARTER'S ACTIVITIES:

Attempting to obtain access to adjacent property for installing additional wells. Two manual bailing events were performed in July and August. Approximately 0.02 gallons of product were recovered during this quarter.

RESULT OF QUARTERLY MONITORING:

Monitoring data indicates that the free product thickness has increased in MW-3 from 0.04' to 0.44'. No free product was detected in MW-1. The benzene concentration has increased in MW-7 from 23 ppb to 79 ppb. Benzene concentrations have decreased in MW-1 from 970 ppb to 490 ppb. Benzene concentrations remained not detected in wells MW-2, MW-4, MW-5, MW-6, MW-8, and MW-9.

PROPOSED ACTIVITY OR WORK FOR NEXT QUARTER:

ACTIVITY	ESTIMATED COMPLETION DATE
Obtain access to offsite property	November 30, 1991
Perform vapor and ground-water extraction tests	December 31, 1991

RECEIVED

NOV 08 91

GROUNDWATER
TECHNOLOGY, INC.
1401 Halyard Drive, Suite 140, West Sacramento, CA 95691, (916) 372-4700
FAX (916) 372-8781

November 1, 1991

Project No. 02320 1009

Mr. Terrence A. Fox
Ultramar Inc.
P.O. Box 466
Hanford, CA 93232-0466

RE: THIRD QUARTER STATUS REPORT FOR 1991
BEACON STATION #721
44 LEWELLING BOULEVARD
SAN LORENZO, CALIFORNIA

Dear Mr. Fox:

This letter is presented as a quarterly report on groundwater conditions at the Beacon gas station #721 in San Lorenzo, California for the quarter ending September 1991. Groundwater monitoring and sampling were conducted in accordance with Ultramar, Inc. Task No. 721-11-0000-F dated September 4, 1991 to determine water table elevations and the distribution of dissolved hydrocarbons in the nine site-related monitoring wells (MWs). Groundwater monitoring data and results of laboratory analyses of groundwater samples collected on September 17, 1991 are included.

WORK PERFORMED

GROUNDWATER MONITORING

Water table elevations at the site have decreased an average of 1.8 feet from levels reported the previous quarter. The potentiometric surface map constructed from data collected on September 17, 1991 (Figure 1, Attachment II) indicates that groundwater beneath the site flows to the southwest at a hydraulic gradient of approximately 0.01. Approximately 0.44-foot-thick layer of petroleum hydrocarbons was measured in MW-3. Groundwater monitoring data are summarized in Table 1 (Attachment I). Well gauging was conducted following Groundwater Technology, Inc. Standard Operating Procedure (GTI SOP, Attachment IV).

GROUNDWATER SAMPLING

Groundwater samples were collected from all but one of the site-related monitoring wells according to procedures outlined in GTI SOP (Attachment IV). MW-3 was not sampled due to the presence of separate-phase petroleum hydrocarbons. The samples were submitted under chain-of-custody to Applied Analytical Environmental Laboratories in Fremont, California. All samples were analyzed for benzene, toluene, ethylbenzene and xylene (BTEX), and total petroleum hydrocarbons-as-gasoline (TPH-G) by modified EPA methods 5030/8020/8015. Copies of the laboratory analyses reports and chain-of-custody are included in Attachment III.

GROUNDWATER ANALYTICAL RESULTS

Concentrations of TPH-G in the groundwater samples collected on September 17, 1991 ranged from below the method detection limit (<MDL) in three of the monitoring wells (MW-5, MW-6, and MW-9) to 16,000 parts per billion (ppb) in MW-1. Benzene was detected in only two of the wells sampled. MW-1 contained 490 ppb and MW-7 contained 79 ppb. Figure 2 (Attachment II) shows the distribution of dissolved benzene in groundwater for September 17, 1991. Historical and recent analytical data are summarized in Table 2 (Attachment I).

Please contact Groundwater Technology's West Sacramento office if you have any questions or comments regarding this quarterly report.

Sincerely,

GROUNDWATER TECHNOLOGY, INC.

SCOTT E. GABLE
Environmental Geologist
Project Manager

E. K. SIMONIS
California Registered
Geologist, No. 4422

EDVARDAS (ED) K. SIMONIS
No. 4422

SEG/EKS:rc

Attachments
1009QSR3.LTR

Table 1
GROUNDWATER MONITORING DATA
September 17, 1991

Project:	**BEACON STATION #721**
Location:	**SAN LORENZO, CALIFORNIA**
Operator:	**H. Merino**
Method:	**Interface Probe #46**

WELL ID	WELL DEPTH (feet)	GRADE ELEV. (feet)	DEPTH to WATER (feet)	DEPTH to PETRO (feet)	PETRO THICK (feet)	PETRO GRAV.	HYDRO EQUIV (feet)	CORR DTW (feet)	CORR WAT ELEV (feet)
MW-1	32	21.54	20.14	NA	NA		NA	20.14	1.40
MW-2	31	20.91	19.50	NA	NA		NA	19.50	1.41
MW-3	35	20.96	19.90	19.46	0.44	0.80	0.35	19.55	1.41
MW-4	24	22.52	21.15	NA	NA		NA	21.15	1.37
MW-5	20	21.66	20.23	NA	NA		NA	20.23	1.43
MW-6	28	20.37	18.89	NA	NA		NA	18.89	1.48
MW-7	24	19.40	17.99	NA	NA		NA	17.99	1.41
MW-8	23	19.13	18.81	NA	NA		NA	18.81	0.32
MW-9	24	22.82	21.49	NA	NA		NA	21.49	1.33

Notes:
NA = Not Applicable

Q2MON.WK1

Table 2
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS

Beacon Station No. 721
44 Lewelling Boulevard
San Lorenzo, California

WELL ID	DATE SAMPLED	BENZENE (ug/L)	TOLUENE (ug/L)	ETHYLBENZENE (ug/L)	XYLENES (ug/L)	TPH-G (ug/L)	COMMENTS
MW-1	29-MAY-87	490	150	930	3,790	18,050	
	14-JUL-87	560	120	950	3,270	14,750	
	17-AUG-87	630	40	320	1,130	12,860	
	01-SEP-87	558	84	562	1,942	14,269	
	10-DEC-87	200	138	273	777	14,000	
	10-MAR-88	70	40	340	940	7,300	
	14-JUN-88	290	ND(10)	330	790	34,000	
	05-DEC-88	100	16	140	310	4,000	
	08-MAR-89	670	20	580	1,200	9,100	Odor, Sheen
	22-JUN-89	1,000	20	1,200	2,200	12,000	Odor, Sheen
	27-SEP-89	960	9	260	360	6,800	Odor
	29-DEC-89	210	33	1,200	250	4,800	
	29-MAR-90	1,100	42	510	1,800	14,000	Odor
	21-JUN-90	1,400	ND(30)	160	130	7,900	
	25-SEP-90	NS	NS	NS	NS	NS	0.9' Petroleum
	18-DEC-90	NS	NS	NS	NS	NS	0.4' Petroleum
	28-MAR-91	230	75	570	2,000	26,000	Sheen
	25-JUN-91	970	35	300	610	22,000	Odor
	17-SEP-91	490	150	250	370	16,000	No Odor
MW-2	29-MAY-87	113	14	46	58	4,870	
	14-JUL-87	103	25	34	48	2,207	
	17-AUG-87	37.6	10.9	8.2	11.1	756	
	01-SEP-87	75.3	14.2	16.4	27.6	1,482.5	
	10-DEC-87	28	40.6	38.1	100.3	1,800	
	10-MAR-88	9.2	3.1	7.3	2.6	1,200	
	14-JUN-88	ND(0.9)	ND(1.0)	2.2	5.7	500	
	05-DEC-88	ND(0.3)	1.3	5.6	3.6	500	
	08-MAR-89	ND(1.0)	1.3	3.5	3.7	730	
	22-JUN-89	ND(0.4)	ND(0.4)	ND(0.5)	ND(0.8)	570	
	27-SEP-89	3.8	0.64	2.9	54	420	
	29-DEC-89	6.7	2.0	5.7	2.9	270	
	29-MAR-90	10	0.88	10	3.3	420	
	21-JUN-90	ND(1)	ND(1)	4	ND(4)	650	
	25-SEP-90	ND(0.5)	1.5	3.5	1.5	680	
	18-DEC-90	ND(0.5)	1.7	2.2	0.6	500	
	28-MAR-91	ND(0.5)	2.2	2.7	1.1	730	
	25-JUN-91	ND(0.5)	ND(0.5)	ND(0.5)	1.2	610	
	17-SEP-91	ND(0.5)	ND(0.5)	2.5	1.2	820	No Odor

Table 2 (continued)

WELL ID	DATE SAMPLED	BENZENE (ug/L)	TOLUENE (ug/L)	ETHYLBENZENE (ug/L)	XYLENES (ug/L)	TPH-G (ug/L)	COMMENTS
MW-3	29-MAY-87	5,400	3,900	1,700	5,200	40,300	
	14-JUL-87	6,880	7,080	1,580	4,770	30,320	
	17-AUG-87	5,930	4,180	1,240	3,370	25,620	
	01-SEP-87	8,540	6,660	1,020	3,740	38,210	
	10-DEC-87	4,240	2,350	890	1,860	25,000	
	10-MAR-88	3,210	950	940	950	13,400	
	14-JUN-88	5,900	7,600	450	4,600	54,000	
	05-DEC-88	4,200	2,400	1,000	3,100	19,000	Odor
	08-MAR-89	11,000	9,400	2,300	9,900	53,000	Odor, Sheen
	22-JUN-89	16,000	5,900	2,100	6,600	60,000	Odor, Sheen
	27-SEP-89	8,100	2,800	1,200	4,300	34,000	Odor
	29-DEC-89	NS	NS	NS	NS	NS	0.02' Petroleum
	29-MAR-90	NS	NS	NS	NS	NS	0.04' Petroleum
	21-JUN-90	19,000	22,000	22,000	120,000	2,100,000	
	25-SEP-90	NS	NS	NS	NS	NS	0.04' Petroleum
	18-DEC-90	NS	NS	NS	NS	NS	0.42' Petroleum
	28-MAR-91	NS	NS	NS	NS	NS	0.25' Petroleum
	25-JUN-91	NS	NS	NS	NS	NS	0.04' Petroleum
	17-SEP-91	NS	NS	NS	NS	NS	0.44' Petroleum
MW-4	05-DEC-88	ND(2.0)	ND(2.0)	2.3	6.5	4,500	
	08-MAR-89	ND(9.0)	ND(8.0)	ND(10)	ND(10)	3,900	
	22-JUN-89	ND(0.4)	ND(0.4)	ND(0.5)	ND(0.8)	1,500	
	27-SEP-89	11	ND(1)	ND(1)	ND(4)	1,200	
	29-DEC-89	ND(1)	2.1	2.3	ND(3)	920	
	29-MAR-90	ND(0.6)	ND(0.9)	8.0	ND(3)	870	
	21-JUN-90	ND(5)	ND(5)	ND(6)	ND(20)	1,500	
	25-SEP-90	ND(0.5)	11	4.6	6.0	3,100	
	18-DEC-90	ND(0.5)	4.4	15	6.3	3,600	
	28-MAR-91	8.9	4.4	4.4	2.2	2,000	
	25-JUN-91	ND(0.5)	5.4	1.7	ND	2,000	
	17-SEP-91	ND	ND	0.8	ND	2,300	No Odor
MW-5	05-DEC-88	ND(0.2)	0.78	0.23	0.92	3.9	
	08-MAR-89	2.7	6.7	2.7	15	58	
	22-JUN-89	0.91	ND(0.1)	ND(0.1)	ND(0.3)	5.0	
	27-SEP-89	1.3	ND(0.1)	ND(0.1)	ND(0.4)	5.3	
	29-DEC-89	ND(0.5)	ND(0.5)	ND(0.5)	ND(2)	ND(5)	
	29-MAR-90	ND(1)	ND(0.5)	ND(0.5)	ND(2)	ND(5)	
	21-JUN-90	ND(0.7)	ND(0.6)	ND(0.7)	ND(2)	12	
	25-SEP-90	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(20)	
	18-DEC-90	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(50)	
	28-MAR-91	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(50)	
	25-JUN-91	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(50)	
	17-SEP-91	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(50)	No Odor
MW-6	05-DEC-88	4.0	1.3	0.63	1.3	190	
	08-MAR-89	2.2	ND(0.4)	ND(0.5)	1.1	23	
	22-JUN-89	0.82	2.6	0.18	1.2	57	
	27-SEP-89	0.2	0.24	ND(0.1)	ND(0.4)	2.1	
	29-DEC-89	ND(0.5)	ND(0.5)	ND(0.5)	ND(2)	ND(5)	
	29-MAR-90	2.1	ND(0.5)	ND(0.5)	ND(2)	12	
	21-JUN-90	ND(0.7)	ND(0.6)	ND(0.7)	ND(2)	ND(5)	
	25-SEP-90	1.4	ND(0.5)	ND(0.5)	ND(0.5)	98	
	18-DEC-90	2.2	ND(0.5)	ND(0.5)	ND(0.5)	200	
	28-MAR-91	3.5	ND(0.5)	ND(0.5)	ND(0.5)	140	
	25-JUN-91	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	95	
	17-SEP-91	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(50)	No Odor

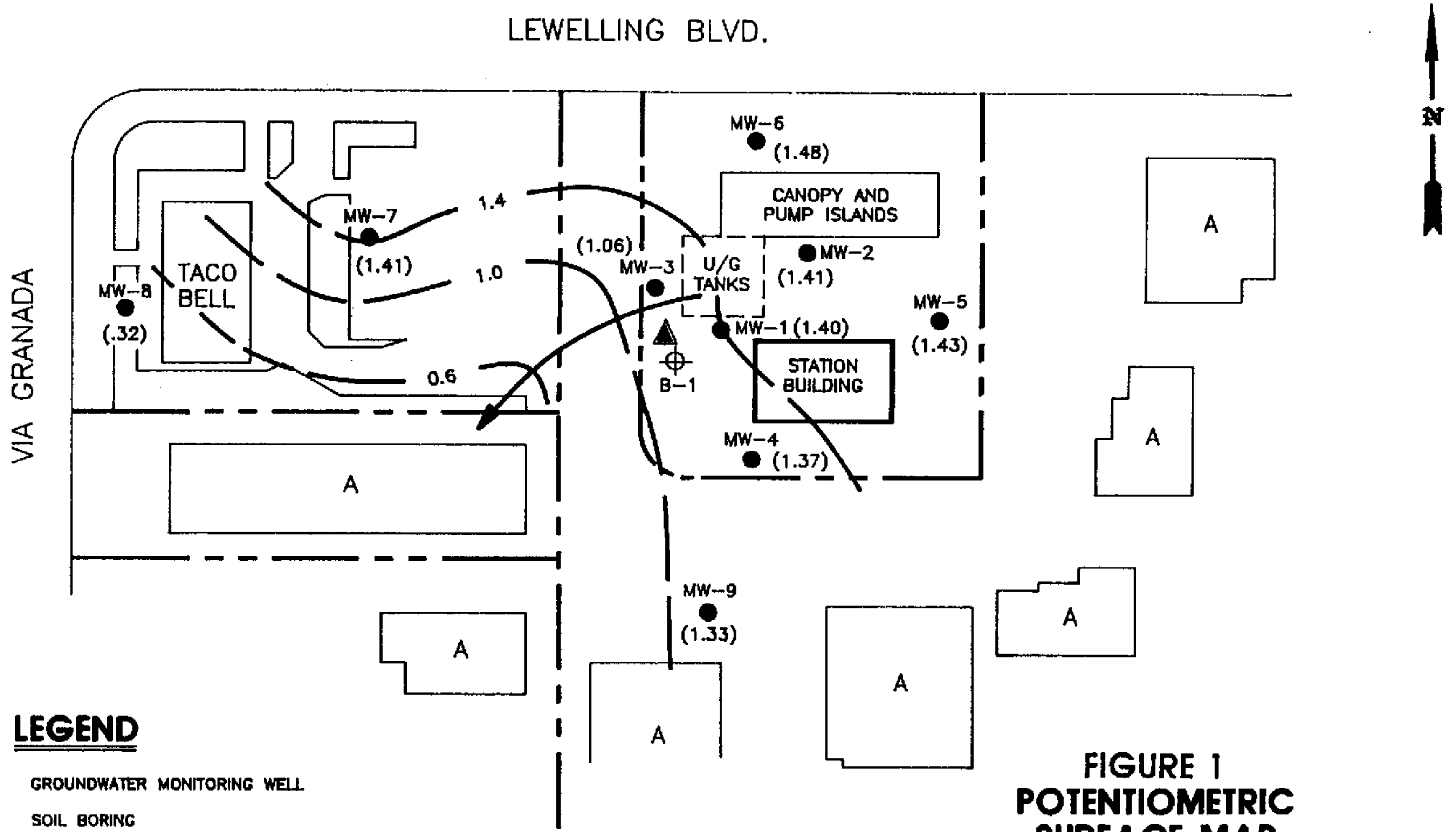
Table 2 (continued)

WELL ID	DATE SAMPLED	BENZENE (ug/L)	TOLUENE (ug/L)	ETHYLBENZENE (ug/L)	XYLENES (ug/L)	TPH-G (ug/L)	COMMENTS
MW-7	*05-DEC-88*	140	150	40	370	1,500	
	08-MAR-89	730	72	180	370	2,400	
	22-JUN-89	570	43	180	220	2,000	
	27-SEP-89	420	5.9	140	28	1,400	
	29-DEC-89	87	3.5	18	15	150	
	29-MAR-90	110	40	53	150	530	
	21-JUN-90	620	34	290	400	4,100	
	25-SEP-90	49	2.4	30	42	750	
	18-DEC-90	74	4.5	25	69	510	
	28-MAR-91	53	0.8	24	24	500	
	25-JUN-91	23	ND(0.5)	32	37	570	
	17-SEP-91	79	1.0	89	100	1400	No Odor
MW-8	*27-SEP-89*	ND(1)	ND(1)	16	ND(1)	4,200	
	29-DEC-89	ND(1)	3.2	18	ND(3)	2,800	
	29-MAR-90	ND(6)	ND(9)	19	ND(30)	2,600	
	21-JUN-90	ND(2)	ND(2)	13	ND(6)	4,600	
	25-SEP-90	2.3	22	16	26	4,500	
	18-DEC-90	0.7	6.0	9.7	2.3	1,100	
	28-MAR-91	2.6	4.6	3.2	3.1	1,600	
	25-JUN-91	ND(.5)	ND(0.5)	2.5	1.3	760	
	17-SEP-91	ND	ND	13	3.9	1900	No Odor
MW-9	*27-SEP-89*	ND(0.1)	ND(0.1)	ND(1)	ND(0.4)	25	
	29-DEC-89	ND(0.5)	ND(0.5)	ND(0.5)	2.5	11	
	29-MAR-90	ND(0.5)	ND(0.5)	ND(0.5)	ND(2)	ND(5)	
	21-JUN-90	ND(0.5)	ND(0.5)	ND(0.6)	ND(2)	ND(5)	
	25-SEP-90	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(20)	
	18-DEC-90	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	100	
	28-MAR-91	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(50)	
	25-JUN-91	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(50)	
	17-SEP-91	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(50)	No Odor

NOTES:

1) TPH-G = Total Petroleum Hydrocarbons-as-Gasoline.
2) ND = Not detected, detection limit above in parentheses.
3) Odor refers to petroleum hydrocarbon odor.
4) All results are presented in parts per billion.
5) Samples prior to December 1988 taken by Applied GeoSystems.
6) Samples from December 1988 through December 1990 taken by DuPont Environmental.
7) NS = Not Sampled.

LABDATA.WK1



LEGEND

●	GROUNDWATER MONITORING WELL
⌖	SOIL BORING
A	APARTMENT BLDGS.
▲	PROPOSED TEST WELL
(1.33)	POTENTIOMETRIC SURFACE ELEVATION (FT.)
⌒	POTENTIOMETRIC SURFACE CONTOUR; INTERVAL=0.4 FT.
→	ESTIMATED GROUNDWATER FLOW DIRECTION

FIGURE 1
POTENTIOMETRIC SURFACE MAP
(ARBITRARY DATUM)
SEPTEMBER 17, 1991
ULTRAMAR INC.
BEACON STATION #721
44 LEWELLING BLVD.
SAN LORENZO, CA.
02320-1744

REVISIONS:
DATE: 10/15/91
REVISION: FINAL DRAFT
BY: GWS

0 50'
APPROX. SCALE

GROUNDWATER TECHNOLOGY, INC.

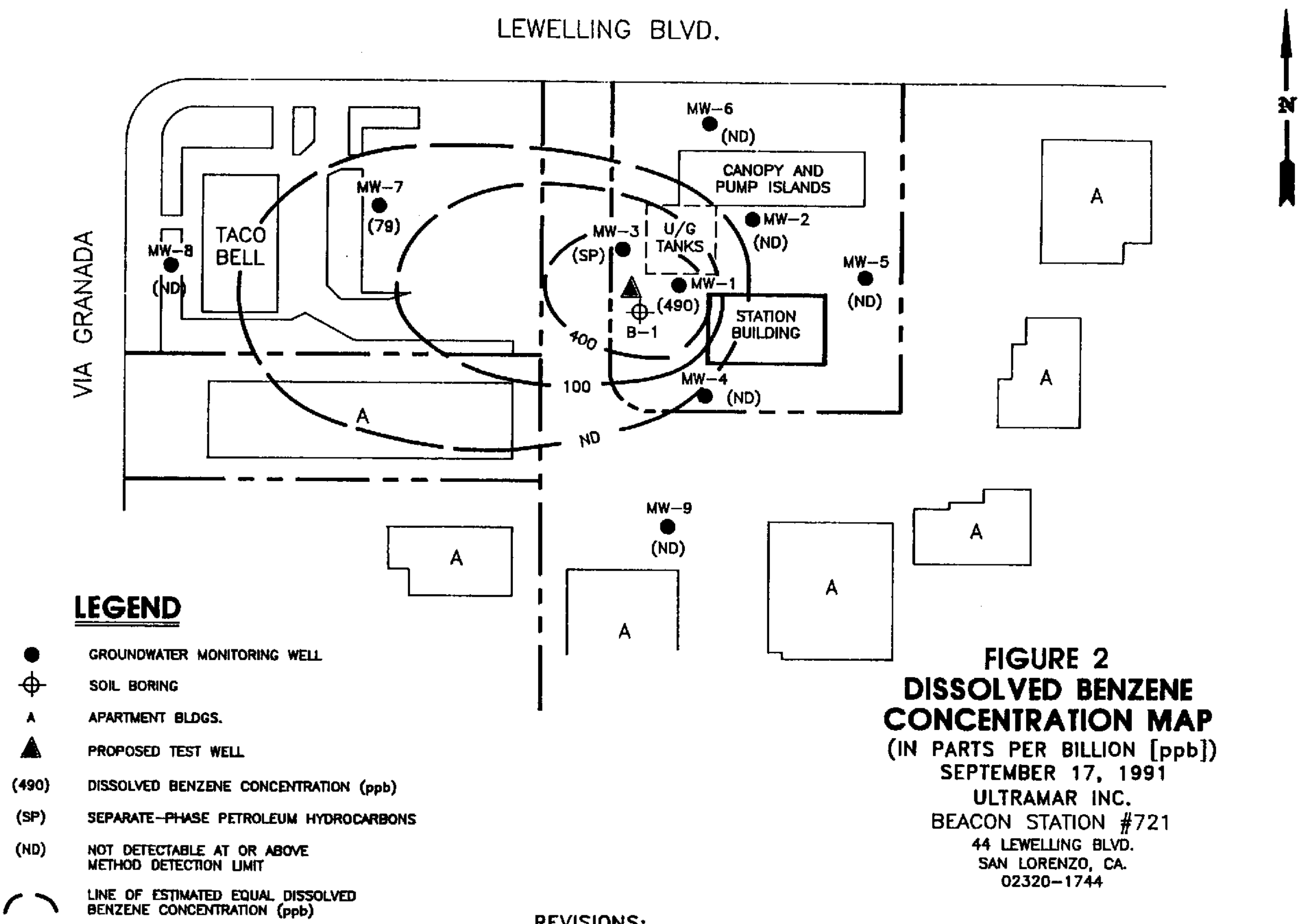


FIGURE 2
DISSOLVED BENZENE
CONCENTRATION MAP
(IN PARTS PER BILLION [ppb])
SEPTEMBER 17, 1991
ULTRAMAR INC.
BEACON STATION #721
44 LEWELLING BLVD.
SAN LORENZO, CA.
02320-1744

REVISIONS:
DATE: 10/15/91
REVISION: FINAL DRAFT
BY: GWS

0 50'
APPROX. SCALE

GROUNDWATER TECHNOLOGY, INC.

ATTACHMENT III

LABORATORY ANALYSES REPORTS

AND

CHAIN-OF-CUSTODY MANIFEST

Ultramar Inc.

CHAIN OF CUSTODY REPORT

BEACON

094020

Beacon Station No. 721	Sampler (Print Name) Hector Merino	Date 9-17-91	Form No. 1 of 2
Project No. 023201009-030504	Sampler (Signature)		
Project Location 44 Lewelling Blvd. SAN LORENZO, CA	Affiliation Groundwater Technology		

ANALYSES: gas-8015

Sample No./Identification	Date	Time	Lab No.	BTEX	TPH (gasoline)	TPH (diesel)			HOLD			No. of Containers	REMARKS
Site Blank	9-17-91								X				
RBMW-8				X	X							1	
MW-8				X	X							2	
RBMN-7,9,4,5,6,2,1		N/A							X			7	
MW-7				X	X							2	
MW-9				X	X							2	
MW-4				X	X							2	
MW-5				X	X							2	

Relinquished by: (Signature/Affiliation)	Date	Time	Received by: (Signature/Affiliation)	Date	Time
	9/18/91		Anthony Guerra - Applied Analytical	9/18/91	1100

Report To: Scott Gable
Groundwater Technology
4057 Port Chicago
CONCORD, CA 94520

Bill to: ULTRAMAR INC.
525 West Third Street
Hanford, CA 93230
Attention: Terry Fox

WHITE: Return to Client with Report YELLOW: Laboratory Copy PINK: Originator Copy

32-8003 1/90

Ultramar Inc.
CHAIN OF CUSTODY REPORT

BEACON

Beacon Station No. 721	Sampler (Print Name) Hector Merino	Date 9-17-91	Form No. 2 of 2
Project No. 023201009-030504	Sampler (Signature)		
Project Location 44 Lewelling Blvd. San Lorenzo, CA	Affiliation Groundwater Technology		

ANALYSES

Sample No./Identification	Date	Time	Lab No.	BTEX 8020	TPH (gasoline) 8015	TPH (diesel)						No. of Containers	REMARKS
MW-6	9/17/91			X	X							2	
MW-2				X	X							2	Both vials mislabeled. AE 9/18
MW-1				X	X							2	

Relinquished by: (Signature/Affiliation)	Date	Time	Received by: (Signature/Affiliation)	Date	Time
	9/18/91		Anthony Enerio Applied Analytical	9/18/91	11:00

Report To: Scott Gable
Groundwater Technology
4057 Port Chicago Hwy
Concord, CA 94520
671-2387

Bill to: ULTRAMAR INC.
525 West Third Street
Hanford, CA 93230
Attention: Terry Fox

WHITE: Return to Client with Report YELLOW: Laboratory Copy PINK: Originator Copy

32-8003 1/90

APPLIED ANALYTICAL

Environmental Laboratories
42501 Albrae St., Suite 100
Fremont, CA 94538
Bus: (415) 623-0775
Fax: (415) 651-8647

ANALYSIS REPORT

1020lab.frm

Attention: Mr. Scott Gable
Groundwater Technology
4057 Port Chicago Hwy
Concord, CA 974520
Project: AGS 19505-L,Proj #023201009-030504
Station #721, San Lorenzo

Date Sampled: 09-17-91
Date Received: 09-18-91
BTEX Analyzed: 09-28-91
TPHg Analyzed: 09-28-91
TPHd Analyzed: NR
Matrix: Water

	Benzene ppb	Toluene ppb	Ethyl-benzene ppb	Total Xylenes ppb	TPHg ppb	TPHd ppb
Detection Limit:	0.5	0.5	0.5	0.5	50	100
SAMPLE Laboratory Identification						
MW-5 W1109480	ND	ND	ND	ND	ND	NR
MW-6 W1109481	ND	ND	ND	ND	ND	NR
MW-2 W1109681	ND	ND	2.5	1.2	820	NR
MW-1 W1109682	490	150	250	370	16000	NR

ppb = parts per billion = µg/L = micrograms per liter.
ND = Not detected. Compound(s) may be present at concentrations below the detection limit.
NR = Analysis not requested.

ANALYTICAL PROCEDURES

BTEX– Benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction using EPA Method 5030 followed by analysis using EPA Method 8020/602, which utilizes a gas chromatograph (GC) equipped with a photoionization detector (PID) and a flame-ionization detector (FID) in series.

TPHg–Total petroleum hydrocarbons as gasoline (low-to-medium boiling points) are measured by extraction using EPA Method 5030, followed by analysis using modified EPA Method 8015, which utilizes a GC equipped with an FID.

TPHd–Total petroleum hydrocarbons as diesel (high boiling points) are measured by extraction using EPA Method 3550 for soils and EPA Method 3510 for water, followed by modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.

Laboratory Representative

October 1, 1991
Date Reported

APPLIED ANALYTICAL LABORATORY IS CERTIFIED BY THE STATE OF CALIFORNIA
DEPARTMENT OF HEALTH SERVICES AS A HAZARDOUS WASTE TESTING LABORATORY
(Certification No. 1211)

APPLIED ANALYTICAL
Environmental Laboratories
42501 Albrae St., Suite 100
Fremont, CA 94538
Bus: (415) 623-0775
Fax: (415) 651-8647

ANALYSIS REPORT

1020lab.frm

Attention: Mr. Scott Gable
Groundwater Technology
4057 Port Chicago Hwy
Concord, CA 974520
Project: AGS 19505-L,Proj #023201009-030504
Station #721, San Lorenzo

Date Sampled: 09-17-91
Date Received: 09-18-91
BTEX Analyzed: 09-28-91
TPHg Analyzed: 09-28-91
TPHd Analyzed: NR
Matrix: Water

	Benzene	Toluene	Ethyl-benzene	Total Xylenes	TPHg	TPHd
	ppb	ppb	ppb	ppb	ppb	ppb
Detection Limit:	0.5	0.5	0.5	0.5	50	100
SAMPLE Laboratory Identification						
RBMW-8 W1109474	ND	ND	ND	ND	ND	NR
MW-8 W1109475	ND	ND	13	3.9	1900	NR
MW-7 W1109477	79	1.0	89	100	1400	NR
MW-9 W1109478	ND	ND	ND	ND	ND	NR
MW-4 W1109479	ND	ND	0.8	ND	2300	NR

ppb = parts per billion = µg/L = micrograms per liter.
ND = Not detected. Compound(s) may be present at concentrations below the detection limit.
NR = Analysis not requested.

ANALYTICAL PROCEDURES

BTEX– Benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction using EPA Method 5030 followed by analysis using EPA Method 8020/602, which utilizes a gas chromatograph (GC) equipped with a photoionization detector (PID) and a flame-ionization detector (FID) in series.

TPHg–Total petroleum hydrocarbons as gasoline (low-to-medium boiling points) are measured by extraction using EPA Method 5030, followed by analysis using modified EPA Method 8015, which utilizes a GC equipped with an FID.

TPHd–Total petroleum hydrocarbons as diesel (high boiling points) are measured by extraction using EPA Method 3550 for soils and EPA Method 3510 for water, followed by modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.

Laboratory Representative

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ATTACHMENT IV

GROUNDWATER TECHNOLOGY, INC.

STANDARD OPERATING PROCEDURES

GROUNDWATER
TECHNOLOGY, INC.

13.0 Well Gauging with ORS Interface Probe

13.1 Purpose

Obtaining consistent and accurate well gauging data is a critical part of each project. The well gauging data collected at each site provide a long-term record of: the seasonal groundwater fluctuations at a site; the presence, location, and thickness of measurable amounts of free-phase hydrocarbons; and, the effectiveness of recovery well operations.

13.2 Equipment

- Interface probe
- Monitoring Form
- Monitoring/Sampling Record Form
- Roadway box key or channel lock wrench
- Keys
- Bailer
- Rags; probe wipers
- Alconox solution and distilled water
- Site plan
- Previous well gaugings

13.3 Procedure

13.3.1 Check the interface probe to see that it is functioning properly before departure.

13.3.2 Familiarize yourself with the way the interface probe works. A beeping tone indicates water and a solid tone indicates a fluid other than water. To avoid spark hazard, attach the E.I.P. grounding clamp to the metal casing prior to gauging.

13.3.3 At sites with free-phase petroleum, arrange to bail the petroleum from the wells 24 - 48 hours prior to gauging all of the wells. Be consistent and establish a routine. Bailing the accumulated petroleum from the wells is done in an effort to obtain an accurate measurement of the amount of petroleum in the formation surrounding the well. Dispose of the bailed petroleum following Disposal of Gasoline Procedure.

13.3.4 Inform appropriate parties (such as the station manager) of your arrival at the site and the purpose of your visit.

13.3.5 If possible, gauge cleaner wells first to avoid cross-contamination.

13.3.6 Gauging should be obtained to the surveyed point. If you do not know where that point is, ask the Project Manager. Generally, the survey point will be marked with paint or marker. If you cannot determine where the mark is, take measurements from the highest point on the well casing, the lip of the roadway box and the top of the roadway box. Make a notation as to which gaugings were taken from which reference point. (For example: DTW 10.0' from top of PVC; DTW 10.3' from top of road box lip.) It is extremely important to measure to the same point each time a well is gauged.

13.3.7 If a probe is missing any footage from the tape, make a notation on the gauging form. (For example: Subtract 1 ft. from all gaugings.) Read the measurements directly from the tape. The data will be corrected when it is entered into the computer. Record the probe I.D. number.

13.3.8 Compare current gaugings to previous gaugings.

13.3.9 Note any unusual occurrences such as bacterial buildup on equipment. At sites where recovery wells, air strippers, soil vent systems, etc. are in operation check to see that the equipment is running normally.

13.3.10 It is important to keep probes clean and free of dirt. Always clean probe tape <u>before</u> reeling it back into the housing. Use a rag and probe wiper.

13.3.11 When petroleum is detected in a well, confirm the reading with a bailer. Note the color and clarity of the petroleum on the gauging form. Bail the petroleum from the well and store the bailed petroleum in the product storage tank at the site. (Do not dispose in facility waste oil tank.)

13.3.12 If petroleum is detected in a well where petroleum has not been detected before or has not been detected in several gaugings, verify the reading with a bailer. Communicate this to the Project Manager when you call the office.

13.3.13 If a petroleum storage tank is in use at the site, gauge the DTW and DTP in the tank. Mark the gauging accordingly on the monitoring form. Notify the Project Manager when the tank is getting full.

13.3.14 WRITE DOWN EVERYTHING YOU SEE OR DO! (No matter how hard you try, you cannot remember everything you did at a site when you are back at the office.)

13.3.15 Complete all paper work (monitoring forms, monitoring/sampling record form) with all notes as to events that occurred while you were at the site. Do not forget to note the weather, temperature, operation of equipment, the number of the probe used, whether water samples were obtained and from where, etc. If you are questioned by the client or by representatives from the state and/or town where the site is located, note the name and the affiliation of the person, the questions asked, and the answers given.

13.3.16 Call the project manager prior to leaving the site. Under no circumstances leave the site without talking to someone at the office if you encounter problems such as equipment failure.

13.3.17 When you return to the office, submit all paper work to the Project Manager.

14.0 Reduction of Well Gauging Data

14.1 Purpose

To correct for the presence of hydrocarbons floating on the water table surface.

14.2 Procedure

14.2.1 See Well Monitoring Form Example.

14.2.2 See Corrected Water Table Schematic.

14.2.3 The following information is required in order to reduce the gauging data collected in the field:

- T.O.C. elevation - the survey point from which the gauging is measured
- depth to water (DTW)
- depth to petroleum (DTP)
- petroleum gravity

14.2.4 To determine the petroleum thickness, subtract DTP from DTW.
ex: 20.97 ft - 19.01 ft = 1.96 ft

14.2.5 To determine the hydraulic equivalent, multiply the petroleum thickness by the petroleum gravity.
ex. 1.96 ft x 0.88 = 1.72 ft

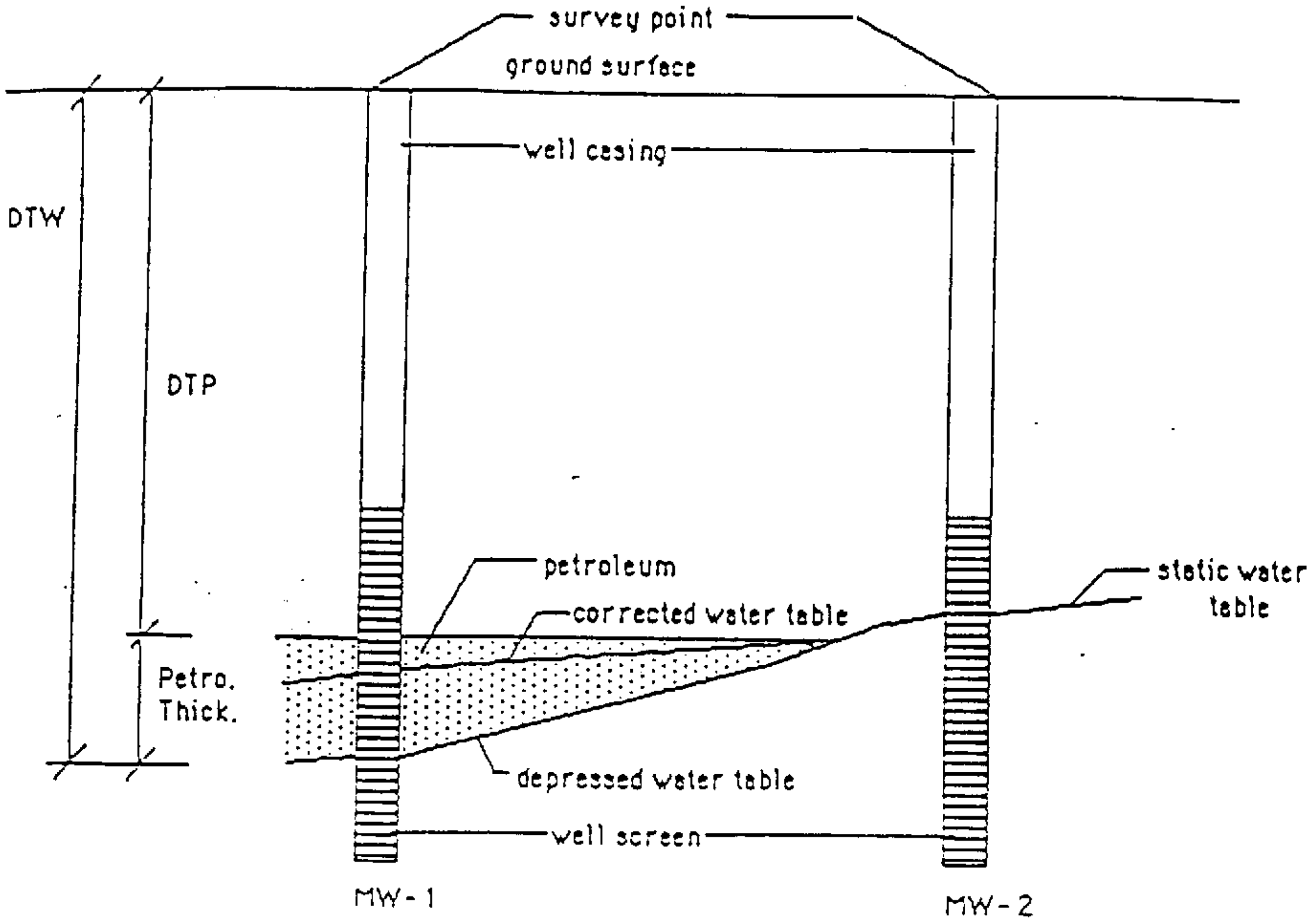
14.2.6 To determine the corrected depth to water (CDTW), subtract the hydraulic equivalent from the original DTW.
ex. 20.97 ft - 1.72 ft = 19.25 ft

14.2.7 To determine the corrected water elevation, subtract the CDTW from the T.O.C. elevation.
ex. 224.00 ft - 19.25 ft = 204.75 ft

14.2.8 Referring to the variables on the example monitoring form:

F = Petroleum thickness = D - E
H = Hydraulic Equivalent = F x G
I = Corrected DTW = D - H
J = Corrected Water Elevation = C - I

CORRECTED WATER TABLE SCHEMATIC



Petroleum Thickness = DTW - DTP

Hydro. Equiv. = Petroleum Thickness x Petroleum Gravity

Corrected DTW = DTW - Hydro. Equiv.

Corrected Water Elevation = T.O.C. - Corrected DTW

16.0 Water Quality Sampling

16.1 Purpose

Water quality samples are taken to establish the water quality at each sampling point and to obtain bacteriological information as part of a bioremediation program. Special care must be taken to ensure that the sample taken from a well is representative of the water at that location and that the sample is not altered or contaminated by the sampling and handling procedure. The procedures for obtaining and handling water quality samples differ depending on the type of analysis required. Standard water quality analyses for volatile organic compounds (VOC) are EPA Analytical Methods 601, 602, and 624. The standard analysis for semi-volatile organics is EPA Analytical Method 625. Bacterial analyses for a bioremediation program can be obtained by standard plating, membrane plating, and fermentation inoculum.

16.2 References

Driscoll, Fletcher G., Ph.D., 1986, "Groundwater and Wells", Second Edition, Johnson Division, St. Paul, Minnesota.

Scalf, Marion R., McNabb, James F., Dunlap, William J., Cosby, Roger L., Fryberger, John, 1981, "Manual of Ground-Water Sampling Procedures", Robert S. Kerr Environmental Research Laboratory, U.S. Environmental Protection Agency, Ada, Oklahoma.

U.S. EPA, 1977, "Procedures Manual for Ground Water Monitoring at Solid Waste Disposal Facilities", SW-611, U.S. EPA, Cincinnati, Ohio.

16.3 Procedure

16.3.1 Water samples should not be taken from the stagnant water in the well.

16.3.2 Water samples should be taken in triplicate.

16.3.3 Remove 3 to 5 volumes of water in the well prior to sampling. The water may be removed by bailing, submersible pump, or purge system. Wells with a slow recovery period should be bailed dry and then sampled within 1 hour or when recovered to 50%. Monitor pH, temperature and specific conductivity with each well volume to insure water quality stabilization has occurred. However, this is not necessary at every well or in all circumstances.

16.3.4 Use only Teflon, stainless steel, or glass bailers to obtain the sample. Use Teflon, only, for sampling water containing chlorinated compounds and also for bacteriological samples. PVC bailers can be used for one-time sampling for other than EPA 624 analysis. Using a bailer for a one-time sampling reduces the possibility for cross-contamination.

16.3.5 When sampling, avoid stirring up any sediments in the well.

16.3.6 All sampling equipment must be cleaned following the appropriate procedure to avoid cross contamination from site to site and sample to sample. The sampling equipment should be cleaned before each well sampling, between each sampling, and at the end of each sampling round.

16.3.7 Monitoring wells should be gauged prior to sampling.

16.3.8 If possible, the monitoring wells should be sampled starting with the cleanest well and ending with the most contaminated well.

16.3.9 Wells containing free-phase contaminants should not be sampled.

16.3.10 When filling out the chain of custody form:

- enter the samples in the order in which they were collected;
- make a note as to the cleaning fluid used to clean the sampling equipment;
- attempt to identify which samples are the most contaminated;
- complete all other requested information.

16.3.11 The laboratory sample identification label should be filled out with a waterproof pen and firmly affixed to each sample container.

Typically, identification labels require that the following information be supplied:

- job name
- job number
- sampler's name
- date
- sample identification (ex: MW-1)
- date sampled (time is sometimes requested, too)
- analysis requested

16.3.12 Acidification is required for samples that will by analyzed by the EPA 624 method. (see Acidification Procedure in this section)

16.3.13 Acidification is recommended for EPA method 601 and 602 samples to preserve them and increase their holding life. (see Acidification Procedure in this section)

16.3.14 Field blanks should be taken as part of each sampling round. A field blank consists of a sample of distilled water which has been collected by putting the distilled water into a sampling bailer after the bailer has been cleaned following the procedure used to clean that bailer during the sampling round. The field blank is stored with the samples. It is not analyzed unless requested by the Project Manager.

16.3.15 Handling of decontaminated equipment:

- Always use "pristine" gloves (latex, solvex, etc.).
- Place decontaminated bailers on clean surface (plastic).
- Do not wipe down bailer with paper towels or cloth. Follow decontamination procedure.

16.4 Cautions

16.4.1 Sample accuracy can be adversely affected by the entrainment of sediment in wells which have not been properly developed. Contaminants adhering to the sediments can be released when samples are acidified for preservation.

Therefore, when sampling for inorganics (metals), field filtering of the samples is recommended.

16.4.2 Chemical changes can take place because the sample was oxidized during sampling. It is critical to avoid oxidation of samples when sampling for VOC.

16.4.3 All samples should be <u>properly</u> and <u>promptly</u> preserved.

16.4.4 All samples should be analyzed quickly; arrangements should be made with the testing laboratory to insure prompt analysis.

16.4.5 Bailer strings that have contacted water or contaminants should be replaced between each well to avoid contamination from a bailer string which has absorbed contamination. A good practice would be to replace the strings of both the evacuation and sampling bailers at the start of each sampling round, and in some instances, between wells. <u>Caution</u>: some bailer strings are treated with a fungicide which may be detected in priority pollutant analysis.

16.4.6 Notify laboratory that samples are being shipped in advance of sampling to insure proper delivery and turnaround.

16.4.7 On Chain of Custody, note what type of decontamination or preservation fluids, chemicals were used.

16.5 Acidification Procedure

16.5.1 At the start of each sampling round, the amount of acid required to lower a sampling container of water to be sampled to a pH of less than 2 should be determined.

16.5.2 After removing 3 to 5 well volumes from the first well to be sampled, put 5-10 drops of 50% HCL into a 40 ml sample vial (larger sampling containers will require more acid) and fill the vial with water from the well; determine the pH of the water in the vial with the pH paper; if the pH is too high, repeat the procedure using 15-20 drops of acid in the vial; repeat until the pH of the water in the sample vial is a pH of less than 2 on the pH paper; note the amount of acid required to lower the pH of the volume of water in the sampling vial. (pH paper should not be placed into sampling container. Pour sample onto pH paper to check for proper pH.)

16.5.3 Discard the practice acidified sample.

16.5.4 Once the amount of acid required to reach a pH of <2 is known, the acid can be routinely added to each sample container directly; the water to be analyzed is added to vial or container containing the appropriate amount of acid.

16.5.5 Note that the amount of acid required is site specific and should be noted on the Chain of Custody form.

16.5.6 The procedure should be repeated at each site at the start of each sampling round.

16.6 EPA Analytical Methods 601, 602, and 624 Sampling Procedures

16.6.1 Equipment

- Bailer or other means to remove 3 to 5 well volumes
- Sampling bailer
- Polyethylene squirt bottle of 50% hydrochloric (HCL) acid
- Narrow range pH paper (1.0 - 2.5 pH range)
- Paper towels
- Waterproof pen
- Laboratory sample identification labels
- Cooler with ice
- Chain of custody forms
- Sample containers (usually 40 ml glass vials with teflon faced septums)
- Alconox solution and/or methanol
- Distilled water
- Safety equipment (gloves, etc.)
- Dissolved oxygen meter (sometimes used in limited biorec projects in conjunction with bacteriological testing)

- pH, temperature and conductivity meter
- Site map with well locations
- Site Sampling Plan (QAPP)

16.6.2 All sampling equipment will be cleaned by washing thoroughly with alconox solution or methanol and rinsed with distilled water; this procedure should be repeated three times. When sampling for metals, the sampling equipment should be acid washed. Other cleaning techniques may be required, depending on the testing requirements and chemicals in question (check with the Laboratory).

16.6.3 Carefully remove five bailerfulls of water from the well using the sample bailer before retaining the sample from the fifth bailer; this thoroughly rinses the sample bailer with the water to be sampled helping to insure a representative sample and to reduce cross contamination.

16.6.4 Thoroughly rinse the sample containers with the water to be sampled.

16.6.5 If the samples are to be acidified, add acid to the sample containers (EPA method 624 requires acidification).

16.6.6 Fill two sample containers with the contents of the sampling bailer.

16.6.7 BE CAREFUL not to touch the rim of the sample container or the sample container top with your fingers or with the bailer.

16.6.8 DO NOT pour the sample from the sample bailer over the bailer cord; do not allow the cord to touch the sample container.

16.6.9 Avoid aeration of the sample during transfer of the water from the bailer to the sample container in order to reduce the possibility of oxidation of the sample; gently and carefully pour the sample into the sample container in a steady stream.

16.6.10 The sample should contain no air; fill the sample container to the top so that a meniscus is formed; wait for any bubbles to rise to the surface; carefully and quickly slip the cap of the sampling container onto the container and tighten securely.

16.6.11 Invert the sample and tap it gently against the heal of your hand; look for any air bubbles; if the sample contains air bubbles, discard the sample and repeat the sampling process with new sampling containers.

16.6.12 Obtain duplicate and triplicate samples from the same well following the same procedure.

16.6.13 Affix the laboratory sample identification labels.

16.6.14 Place samples in cooler with ice.

16.6.15 Complete the chain of custody form.

16.7 EPA Analytical Method 625

16.7.1 The procedure for sampling for EPA 625 is the same as for EPA 601, 602, and 624.

16.7.2 The sample container size is a 1-liter glass sample container.

16.7.3 DO NOT acidify EPA 625 samples.

16.8 Bacteriological Sampling

16.8.1 Refer to "Handbook of Bioremediation" prepared by Groundwater Technology, Inc., Chadds Ford, PA.

16.8.2 Sampling for an initial feasibility sampling should have the goal of assessing the total water ecology of the impacted area; the following parameters should be determined:
- water temperature
- dissolved oxygen
- total dissolved solids (TDS)
- pH
- conductivity
- inorganic chemistry
- organic chemistry
- microbiology