Ultramar

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July 16, 1991

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 addendum to the Work Plan dated March 13, 1991 for the above-referenced Ultramar facility prepared by Groundwater Technology, Inc. The addendum addresses the proposed change from a steel cased test well to a PVC cased well. The construction details are presented in the addendum.

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

Sincerely,

ULTRAMAR INC.

Terrence A. Fox
Senior Project Manager
Marketing Environmental Department

Enclosure: Work Plan Addendum

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

91 JUL 22 PM 2:38

GROUNDWATER TECHNOLOGY, INC.

1401 Halyard Drive, Suite 140, West Sacramento, CA 95691, (916) 372-4700
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WORK PLAN
CONTINUING SUBSURFACE ENVIRONMENTAL INVESTIGATION
AT
BEACON STATION NO. 721
44 LEWELLING BOULEVARD
SAN LORENZO, CALIFORNIA

March 13, 1991

Prepared for:

Mr. Terrence A. Fox
Ultramar, Inc.
525 West Third Street
Hanford, CA 93232

Prepared by:

GROUNDWATER TECHNOLOGY, INC.
1401 Halyard Drive, Suite 140
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202/899-7072

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APPENDICES

1.0 INTRODUCTION

This work plan describes the work steps for continuing quarterly groundwater monitoring, sampling, and separate-phase hydrocarbon (SP) remediation. Also described is additional work needed for assessment of the hydrocarbon plume in the downgradient direction from the subject site (Figures 1 and 2, Appendix A). This work plan was prepared by Groundwater Technology, Inc. in response to a request dated January 17, 1991 by the Alameda County Department of Environmental Health to Ultramar Inc.

The proposed work includes the following tasks:

1) Performing one year of quarterly groundwater monitoring and sampling (Q2-1991 through Q1-1992), and preparing quarterly reports.

2) Performing six months of SP remediation (Q2-1991 through Q3-1991), including twice-monthly site visits to monitor SP thicknesses and to pump SP from the wells, and preparing a monthly letter report detailing the findings.

3) Conducting additional site assessment of the hydrocarbon plume in the downgradient direction.

The proposed additional site assessment work includes drilling three borings to a depth of approximately 30 feet. Two 2-inch diameter groundwater monitoring wells will be installed in the off site borings. An 8-inch diameter steel-cased test well will be installed on-site (Figure 2, Appendix A). Soil samples will be collected from the soil borings at 5-foot intervals, or at obvious lithologic contacts, and selected samples will be analyzed for total petroleum hydrocarbons as gasoline (TPH-G), and benzene, toluene, ethylbenzene, and total xylenes (BTEX). The proposed wells will be developed, purged, and sampled. The water samples will be analyzed in a State-approved laboratory for TPH-G and BTEX. A pump test will be conducted to determine pertinent aquifer characteristics. A report documenting field methodology and presenting findings, conclusions, and recommendations for remedial action, if necessary, will then be prepared under the direction of a California Registered Geologist.

2.0 BACKGROUND AND PREVIOUS WORK

2.1 LOCATION

Beacon Service Station #721 is located in San Lorenzo, California, about 200 feet east of the intersection of Lewelling Boulevard, and Via Granada (Figures 1 and 2, Appendix A). Residential dwellings are located south and east of the site, and commercial properties are north and west of the site.

The site elevation is approximately 40 feet above mean sea level. Approximately 200 feet south of the site, San Lorenzo Creek flows westward and discharges to San Francisco Bay, located approximately 3 miles west of the site.

2.2 BACKGROUND

The site was previously operated by Kayo Oil Company (later Conoco Inc.) as Econo Gasoline Station (later Jet Gas Station). On April 28, 1987, two 10,000-gallon tanks and one 7,500-gallon tank were excavated and removed during an upgrading of the site. Volatile hydrocarbons were found during analysis of soil samples collected from the bottom of the tank pit.

Three new 10,000-gallon underground storage tanks were installed in the western portion of the site in 1987. The property was transferred from Conoco Inc. to Ultramar Inc. in 1990 and is currently operating as Beacon Station #721.

2.3 PREVIOUS WORK

Subsequent to the underground tank replacement in April-May 1987, Applied GeoSystems installed three, 2-inch-diameter groundwater monitoring wells (MW-1, MW-2, and MW-3) near the underground fuel tanks. Hydrocarbon-impacted soil and water were encountered in the three borings/monitoring wells. Applied GeoSystems described the results of their subsurface investigation in a report prepared for Kayo Oil Company, dated June 23, 1987.

In December 1988, Du Pont Environmental Services (Du Pont) installed four additional monitoring wells (MW-4 through MW-7), and drilled one soil boring (B-1) to a depth of 37 feet. In September 1989, Du Pont installed two more monitoring wells (MW-8 and MW-9), south and west of the site. In the boreholes drilled by Du Pont, adsorbed hydrocarbons in soils above the water table were found only in B-1, located approximately 20 feet southwest of the tank pit. Results of the subsurface investigations are summarized in a Problem Assessment Report prepared by Du Pont for Conoco Inc., dated November 22, 1989.

Quarterly groundwater monitoring and sampling results, for the period between March 1987 and December 1990, are summarized in the latest quarterly report prepared by Du Pont for Ultramar Inc., dated January 25, 1991. A table from that report (Summary of Groundwater Analytical Results) is included as Appendix B. The data show that the dissolved hydrocarbon plume is reasonably well delineated to the north (MW-6), west (MW-5), and south (MW-9). Concentrations of dissolved TPH-G and BTEX in these three monitoring wells have fluctuated between relatively low and non-detectable levels. However, to the west and southwest, in the direction of estimated groundwater flow direction, the dissolved TPH-G plume is not delineated.

2.4 GEOLOGY AND HYDROGEOLOGY

The site is situated on Quaternary Alluvium, west of the Diablo Range, on the eastern edge of the San Francisco Bay structural basin. The alluvium is approximately 500 feet thick and unconformably overlies Cretaceous to Late Jurassic marine sandstone, siltstone, shale and conglomerate, and the Franciscan Complex composed of highly deformed and metamorphosed sedimentary and igneous rocks.

Subsurface materials, penetrated to a depth of approximately 37 feet in the borings drilled at the site, are dominantly silty sands and sandy silts with relatively thin beds of clay and lenses of gravel.

Hydrogeologically, the site is located within the Alameda County Groundwater Basin. The nearest major source of groundwater recharge is San Lorenzo Creek, approximately 200 feet south of the site.

Depth to water at the site is approximately 20 feet below grade or 20 feet above mean sea level. Groundwater gradient, estimated from groundwater monitoring data at the site, is to the southwest.

3.0 PROPOSED WORK STEPS

As summarized in Section 1.0, the proposed work includes the following tasks:

1) Performing one year of quarterly groundwater monitoring, sampling and reporting to evaluate petroleum hydrocarbon concentrations in groundwater.

2) Performing six months of SP remediation, including twice-monthly site visits to monitor SP thicknesses and pump SP from the wells and preparation of a monthly report detailing the findings. Twice-monthly pumping of SP is proposed as a means of removing separate-phase petroleum and inhibiting further migration.

3) Performing additional site assessment of the hydrocarbon plume in the downgradient direction.

3.1 QUARTERLY GROUNDWATER MONITORING AND SAMPLING

During each quarterly site visit, beginning in March 1991, the following work steps will be performed:

1) Gauge depth to water and depth to SP with an ORS Environmental Equipment (ORS) Interface Probe™ Well Monitoring System in all site-related monitoring wells.

2) Purge and collect groundwater samples from all site-related monitoring wells. The samples will be analyzed for TPH-G and BTEX using EPA-approved and LUFT Guideline methodologies (602 and modified 8015).

3) Prepare a quarterly report summarizing field and laboratory procedures, findings, interpretations, and conclusions.

3.1.1 Groundwater Monitoring

During each quarterly site visit, depth from the top of casing to water and to SP will be gauged using an ORS Interface Probe™ Well Monitoring System. In wells containing SP, a clear acrylic bailer will be used to confirm SP thickness.

3.1.2 Groundwater Sampling

If separate-phase petroleum is encountered in the well, the well will not be purged or sampled. If no floating product is observed in the well, the well will be purged of a minimum of four well volumes of water and/or until temperature, Ph, and conductivity readings stabilize. Water samples will be collected using a Teflon bailer cleaned with Alconox and rinsed with distilled water.

The water samples will be sealed in laboratory-cleaned, 40-milliliter glass vials with Teflon-septum lids. The samples will then be labeled and immediately placed in iced storage. A chain-of-custody record will be initiated by the field geologist or technician and will accompany the samples to a laboratory certified in the State of California for the analyses requested. A copy of the chain-of-custody record will be included in each quarterly report.

3.1.3 Laboratory Analyses

Water samples will be analyzed by EPA-approved method (602) and LUFT Guideline methodologies (modified method 8015). Detection limits suitable for the water tests requested and concentrations present will be stated on the laboratory reports. Copies of the laboratory reports will be included in each quarterly report.

3.1.4 Report Preparation

A report prepared by Groundwater Technology, Inc. summarizing the field and laboratory procedures, analytical results, and groundwater gradient evaluation, will be presented to Ultramar approximately 30 days after field work is completed.

3.2 RECOVERY OF SEPARATE-PHASE HYDROCARBONS

The site will be visited twice per month for six months to pump SP from the monitoring wells. The following tasks will be performed for this phase of work:

1) Amend the current Site Safety Plan to conform to the precautions and protective equipment required for the proposed work at the site.

2) Acquire necessary permission from the local Fire Department to store SP on site.

3) Install container approved by local Fire Department for storage of SP.

4) During each site visit, monitor SP thickness in the monitoring wells.

5) Pump SP from the monitoring wells and record volume pumped. Transfer the SP to the on-site storage tank.

6) Prepare a monthly letter report documenting the volume of SP removed.

3.2.1 Site Safety Plan

Field work performed at the site will be conducted in accordance with a Site Safety Plan. This safety plan will describe the basic safety requirements for the subsurface environmental investigation, drilling soil borings, and installation of monitoring wells at the site. The Site Safety Plan is applicable to personnel and

subcontractors of Groundwater Technology, Inc. All personnel scheduled to perform work at the site will be briefed on the contents of the Site Safety Plan before work begins. A copy of the Site Safety Plan will be kept at the site and will be available for reference by appropriate parties during work at the site. A Site Safety Officer will be appointed for the duration of the subject work at the site.

3.2.2 Permitting and Installation of Product Storage

Eden Consolidated Fire Department will be consulted regarding permitting and installation of a container for temporary storage of the product pumped from the monitoring wells.

3.2.3 Product Thickness Monitoring and Product Recovery

On each site visit, depth to SP and depth to water in the monitoring wells will be monitored using an ORS Interface Probe™ Well Monitoring System. SP thickness will be confirmed with a clear acrylic bailer.

A peristaltic pump will be used to remove SP from the monitoring wells. The SP will be transferred to the temporary storage tank. SP thickness before and after pumping, and volume of SP removed from each well will be recorded for each site visit.

3.2.4 Report Preparation

A letter report summarizing the product monitoring and recovery results will be presented to Ultramar approximately 15 days after month end.

3.3 Additional Site Assessment

Because the dissolved hydrocarbon plume is not delineated west and southwest of the site, it is proposed that the additional assessment work include installation of two additional off-site groundwater monitoring wells and one on-site test well (Figure 2, Appendix A). A pump test will be conducted utilizing the on-site test well to determine aquifer parameters appropriate to future remedial design. Also, historical use of the property west of the site (currently Taco Bell) will to be investigated for possible contribution of hydrocarbons to the groundwater. The following work steps are proposed for this phase of site assessment:

1) Perform a file search for historical use of the current Taco Bell property.

2) Obtain permission for drilling and installing two monitoring wells southwest of the site on private property.

3) Acquire soil boring and monitoring well installation permits from Alameda County.

4) Drill two 8-inch-diameter soil borings off-site to a depth of approximately 30 feet. Drill one 12-inch diameter borehole on-site to a depth of approximately 35 feet.

5) Collect and classify relatively undisturbed soil samples at 5-foot intervals (or obvious lithologic contacts) from the ground surface to the total depth of each off-site soil boring. A photoionization detector will be used in the field to subjectively evaluate the potential concentration of hydrocarbons in the soil samples collected.

6) Analyze at least two soil samples from each off-site borehole. These samples will correspond to areas of hydrocarbon contamination as detected by the photoionization detector. A sample will be collected from immediately above the vadose zone/saturation zone interface. The soil samples will be analyzed for TPH-G and BTEX using EPA approved and LUFT Guideline methodologies (602 and modified 8015). Analyze a minimum of two soil samples from the on-site borehole for grain size distribution.

7) Construct and develop a 2-inch diameter, polyvinyl chloride (PVC)-cased monitoring well in each off-site boring. The newly-constructed wells will be purged of a minimum of 4 well volumes of water, or until temperature, conductivity, and Ph have stabilized.

8) Construct and develop an 8-inch diameter, steel-cased test well in the on-site borehole. The well construction will include a wire-wrapped screen sized to accommodate on-site lithology. This well will be developed using surge and pump techniques.

9) Purge and collect groundwater samples from all site-related monitoring wells. The samples will be analyzed for TPH-G and BTEX using EPA approved and LUFT Guideline methodologies (602 and modified 8015).

10) Survey the well heads to a Mean Sea Level benchmark. This data, in conjunction with depth to water data, will than be used to prepare a groundwater potentiometric surface map.

11) Conduct a minimum 12-hour pump test to determine values for pertinent aquifer parameters. These parameters will be utilized in the future design of separate-phase petroleum recovery and groundwater extraction systems.

12) Prepare a report summarizing field and laboratory procedures, findings, interpretations, conclusions, and recommendations.

3.3.1 Drilling and Soil Sampling

The soil borings for both the off-site monitoring wells and the on-site test well will be drilled using continuous-flight, hollow-stem augers and a Mobile B-61 (or similar) truck-mounted drill rig. The soil borings for the monitoring wells will be drilled using 3-3/4 inch ID (8-inch OD) augers. The borehole for the on-site test well will be drilled using 12-inch ID (18-inch OD) augers. The auger flights will be steam-cleaned prior to use to minimize the possibility of cross-contamination. Drilling will be performed under the guidance of

a field geologist or engineer, and the earth materials in the boring will be logged as drilled. Soil samples will be logged using the unified Soil Classification System. Drilling will be stopped if any unsaturated clay layer (aquitard) greater then 5 feet thick is encountered below the groundwater surface.

Appropriate permits will be acquired prior to commencement of drilling. Underground Service Alert will be contacted prior to drilling to delineate public utility lines. Initially, the borehole will be hand-augered and probed to a minimum depth of 5 feet.

During drilling, soil samples from the boring will be collected at approximately 5-foot intervals (or obvious lithologic contacts) using a California-modified, split-spoon sampler equipped with clean brass sleeves. The samples will be collected by advancing each boring to a point immediately above the sampling depth, then driving the sampler into the native soil through the hollow center of the auger. The sampler will be driven 18 inches with a standard 140-pound hammer dropped 30 inches.

The number of blows required to drive the samples each successive 6 inches will be counted and recorded to give an indication of soil consistency. A soil sample from each recovered sample interval will be analyzed in the field with a photoionization detector or a similar instrument. The data will be recorded on the boring log.

Soil samples selected for chemical analysis will be sealed with aluminum foil, plastic end caps, and airtight tape. The samples will then be labeled and immediately placed in iced storage for transport to a laboratory that is certified by the State of California to perform the required chemical analyses. A chain-of-custody record will be initiated in the field and will accompany the samples to the laboratory. A copy of the chain-of-custody record will be included in the final report.

3.3.2 Construction of Monitoring Wells

A groundwater monitoring well constructed of flush thread-jointed, 2-inch-inside-diameter, Schedule 40 PVC casing will be installed in each off-site boring. No chemical cements, glues, or solvents will be used in well construction. The screened portion of each well will consist of factory-perforated casing with 0.020-inch-wide slots. The well screen will extend from the total depth of the well to a depth of approximately 5 feet above measured groundwater level to allow monitoring throughout the year despite expected seasonal fluctuations of groundwater. The annulus of the well will be packed with #3 Monterey sand (or equivalent) to approximately 2 feet above the screened interval. A 1- to 2-foot-thick bentonite plug will be placed above the sand as a seal against cement entering the sand pack. The remaining annulus will be backfilled with a slurry of water, neat cement, and 5 percent bentonite to a few inches below grade. The well will be

developed before collecting water samples by swabbing, surge-pumping, or another suitable method until the discharge is relatively clean and free of suspended sediment.

A locking well cap and padlock will be installed on the well head, and a traffic-rated, cast-aluminum utility box with a PVC apron will be placed over each well and set with concrete flush with surrounding grade. The box has a watertight seal to protect against surface-water infiltration and requires a specially designed wrench to open. This design discourages vandalism and reduces the possibility of accidental disturbance of the well.

3.3.3 Construction of Test Well

A aquifer test well constructed of welded-joint, 8-inch inside-diameter, low-carbon steel casing will be installed in the on-site borehole. No chemical cements, glues, or solvents will be used in well construction. The screened portion of the test well will consist of Johnson HI-CAP™ (or equivalent) non-galvanized low carbon steel screen with V-shaped wire wrap. The test well screen-size will be determined based on grain size analysis of aquifer materials. The well screen will extend from approximately 35 to 15-feet below grade. The annulus of the well will be packed with an appropriately sized sand to approximately 2 feet above the screened interval. A 1- to 2-foot-thick bentonite plug will be placed above the sand as a seal against cement entering the sand pack. The remaining annulus will be backfilled with a slurry of water, neat cement, and 5 percent bentonite to a few inches below grade. The well will be developed before collecting water samples by surge-pumping until the discharge is relatively clean and free of suspended sediment.

A locking well cap and padlock will be installed on the well head, and a traffic-rated, cast-aluminum utility box with a PVC apron will be placed over each well and set with concrete flush with surrounding grade. The box has a watertight seal to protect against surface-water infiltration and requires a specially designed wrench to open. This design discourages vandalism and reduces the possibility of accidental disturbance of the well.

3.3.4 Groundwater Monitoring, Sampling, and Laboratory Analyses

Groundwater monitoring, sampling, and analytical procedures will be the same as described in Section 3.1.1, 3.1.2, and 3.1.3.

3.3.5 Laboratory Analyses of Soil Samples

A minimum of two soil samples will be collected from each borehole (e.g., the samples associated with elevated photoionization readings and/or those obtained immediately above the vadose zone/saturation zone interface) will be selected for laboratory analysis, if warranted. The selected samples will be analyzed

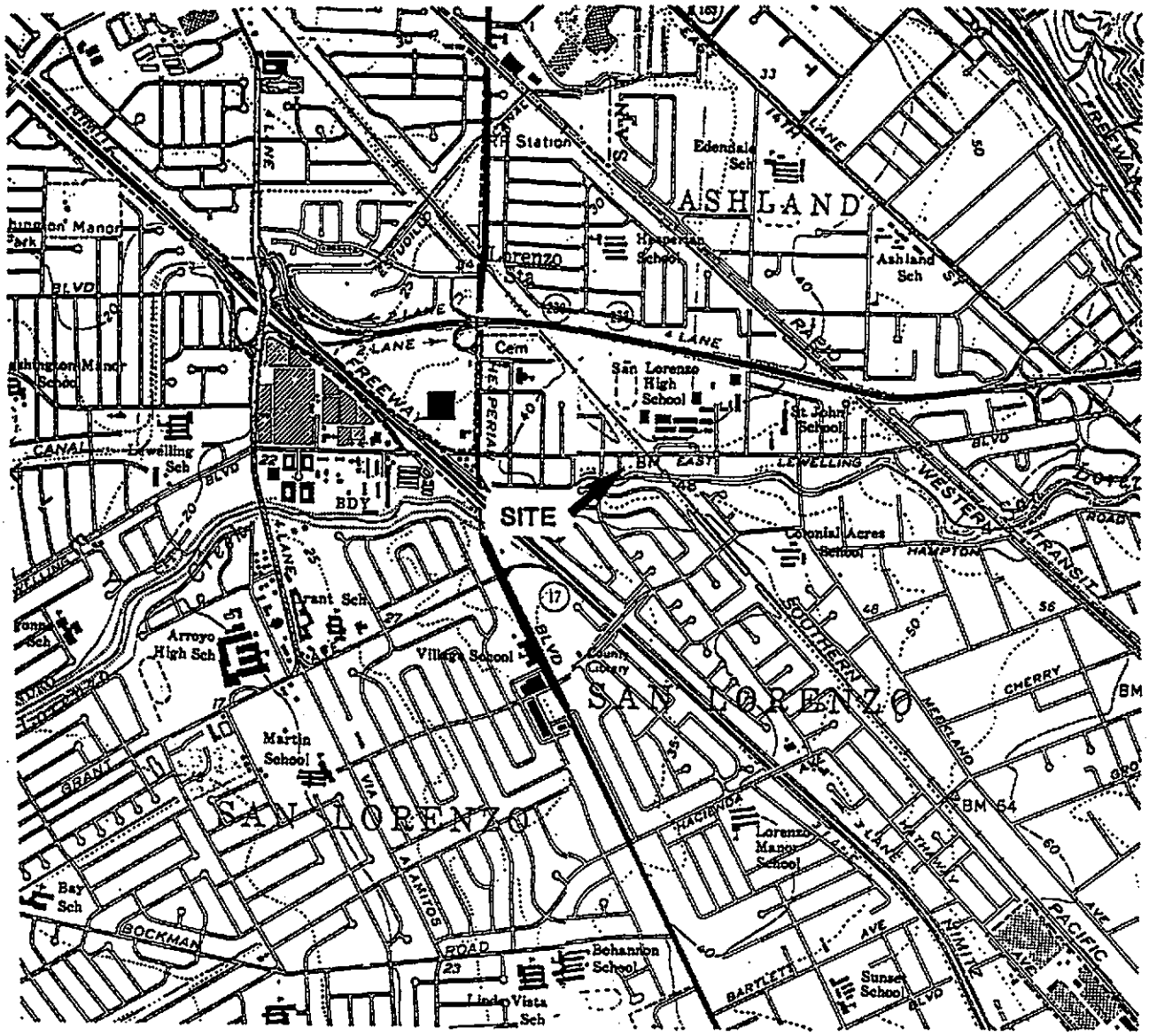
in the laboratory for BTEX and TPH-G using EPA approved (method 8020) and LUFT Guideline methodologies (modified method 8015).

3.3.6 Aquifer Testing

An minimum 12-hour aquifer test will be conducted to determine aquifer parameters pertinent to future remedial design. The purpose of the test is to provide an in situ measure of aquifer characteristics around each measuring point, the test well efficiency, the radius of influence of the test well (cone of depression) and the capture zone of the test well. The test will be conducted by pumping from the test well at a constant flow rate and measuring the depression of the water table in the test well and adjacent monitoring wells. The rate of water table depression determines the transmissivity (a measure of the ability of water to flow through the aquifer) and storativity (the amount of water released from storage per volume of aquifer) of the aquifer. Direct measurement of water table depression in the monitoring wells determines the radius of influence of the test well. The measured transmissivity of the aquifer and natural groundwater flow direction allows prediction of a "capture zone" of the test well, or the zone of the aquifer within which the flow direction will be directed towards the well. The data collected will be analyzed by graphical and numerical methods to determine the above-mentioned aquifer parameters.

3.3.7 Report Preparation

A report prepared by Groundwater Technology, Inc. summarizing the soil stratigraphy, field and laboratory procedures, well construction details, analytical results, groundwater gradient evaluation, and recommendations for further work (if needed) will be presented to Ultramar approximately 40 days after field work is completed. After Ultramar's review, the report will be forwarded to Alameda County Department of Environmental Health and the California Regional Water Quality Control Board.



U.S.G.S. 7.5 MIN. HAYWARD, CA.
QUADRANGLE

FIGURE 1
SITE LOCATION MAP

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202/899-7072
ULTRAMAR INC.
44 LEWELLING BLVD.
SAN LORENZO, CA. 2/25/91

0 MILES 1

GROUNDWATER TECHNOLOGY, INC.

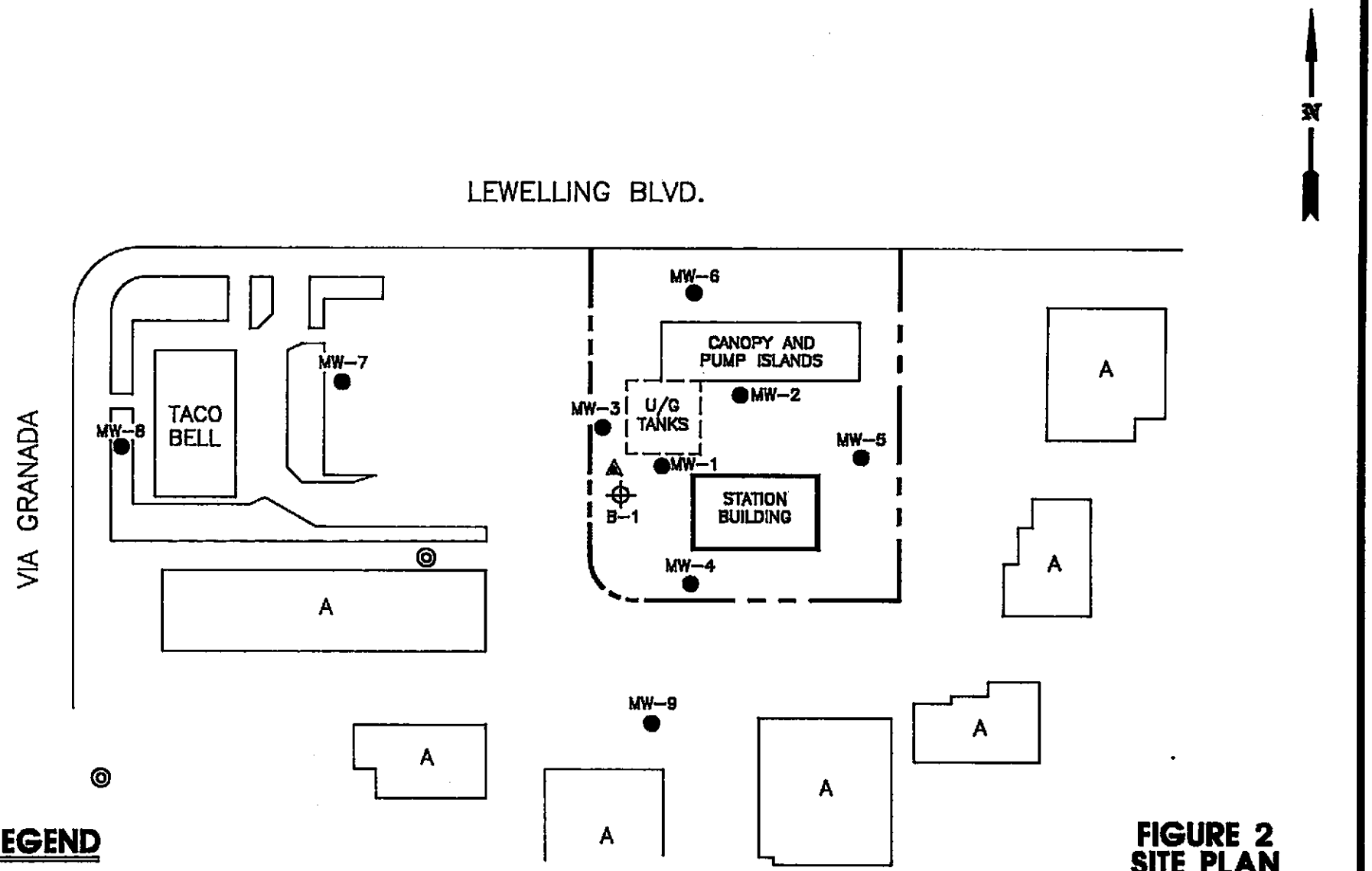

FIGURE 2
SITE PLAN
ULTRAMAR INC.
BEACON STATION #721
44 LEWELLING BLVD.
SAN LORENZO, CA.
202/899-7072

GROUNDWATER TECHNOLOGY, INC.

APPENDIX B

SUMMARY OF GROUNDWATER ANALYTICAL RESULTS

TABLE B
SUMMARY OF GROUND-WATER ANALYTICAL RESULTS

BEACON STATION 721
44 LEWELLING BOULEVARD
SAN LORENZO, CALIFORNIA

WELL ID	DATE SAMPLED	BENZENE (ug/L)	ETHYLBENZENE (ug/L)	TOLUENE (ug/L)	XYLENES (ug/L)	TPHg (ug/L)	COMMENTS
MW-1	29-MAY-87	490	930	150	3790	18050	
	14-JUL-87	560	950	120	3270	14750	
	17-AUG-87	630	320	40	1130	12860	
	01-SEP-87	558	562	84	1942	14269	
	10-DEC-87	200	273	138	777	14000	
	10-MAR-88	70	340	40	940	7300	
	14-JUN-88	290	330	ND(10)	790	34000	
	05-DEC-88	100	140	16	310	4000	
	08-MAR-89	670	580	20	1200	9100	Odor, Sheen
	22-JUN-89	1000	1200	20	2200	12000	Odor, Sheen
	27-SEP-89	960	260	9	360	6800	Odor
	29-DEC-90	210	1200	33	250	4800	
	29-MAR-90	1100	510	42	1800	14000	Odor
	21-JUN-90	1400	160	ND(30)	130	7900	
	25-SEP-90	NS	NS	NS	NS	NS	0.9' Free-Product
	18-DEC-90	NS	NS	NS	NS	NS	0.4' Free-Product
MW-2	29-MAY-87	113	46	14	58	4870	
	14-JUL-87	103	34	25	48	2207	
	17-AUG-87	37.6	8.2	10.9	11.1	756	
	01-SEP-87	75.3	16.4	14.2	27.6	1482.5	
	10-DEC-87	28	38.1	40.6	100.3	1800	
	10-MAR-88	9.2	7.3	3.1	2.6	1200	
	14-JUN-88	ND(0.9)	2.2	ND(1.0)	5.7	500	
	05-DEC-88	ND(0.3)	5.6	1.3	3.6	500	
	08-MAR-89	ND(1.0)	3.5	1.3	3.7	730	
	22-JUN-89	ND(0.4)	ND(0.5)	ND(0.4)	ND(0.8)	570	
	27-SEP-89	3.8	2.9	0.64	54	420	
	29-DEC-89	6.7	5.7	2.0	2.9	270	
	29-MAR-90	10	10	0.88	3.3	420	
	21-JUN-90	ND(1)	4	ND(1)	ND(4)	650	
	25-SEP-90	ND(0.5)	3.5	1.5	1.5	680	
	18-DEC-90	ND(0.5)	2.2	1.7	0.6	500	
MW-3	29-MAY-87	5400	1700	3900	5200	40300	
	14-JUL-87	6880	1580	7080	4770	30320	
	17-AUG-87	5930	1240	4180	3370	25620	
	01-SEP-87	8540	1020	6660	3740	38210	
	10-DEC-87	4240	890	2350	1860	25000	
	10-MAR-88	3210	940	950	950	13400	
	14-JUN-88	5900	450	7600	4600	54000	
	05-DEC-88	4200	1000	2400	3100	19000	Odor
	08-MAR-89	11000	2300	9400	9900	53000	Odor, Sheen
	22-JUN-89	16000	2100	5900	6600	60000	Odor, Sheen
	27-SEP-89	8100	1200	2800	4300	34000	Odor
	29-DEC-89	NS	NS	NS	NS	NS	0.02' Free Product
	29-MAR-90	NS	NS	NS	NS	NS	0.04' Free Product
	21-JUN-90	19000	22000	22000	120000	2100000	
	25-SEP-90	NS	NS	NS	NS	NS	0.04' Free Product
	18-DEC-90	NS	NS	NS	NS	NS	0.42' Free Product

TABLE B

(continued)

WELL ID	DATE SAMPLED	BENZENE (ug/L)	ETHYLBENZENE (ug/L)	TOLUENE (ug/L)	XYLENES (ug/L)	TPHg (ug/L)	COMMENTS
MW-4	05-DEC-88	ND(2.0)	2.3	ND(2.0)	6.5	4500	
	08-MAR-89	ND(9.0)	ND(10)	ND(8.0)	ND(10)	3900	
	22-JUN-89	ND(0.4)	ND(0.5)	ND(0.4)	ND(0.8)	1500	
	27-SEP-89	11	ND(1)	ND(1)	ND(4)	1200	
	29-DEC-89	ND(1)	2.3	2.1	ND(3)	920	
	29-MAR-90	ND(0.6)	8.0	ND(0.9)	ND(3)	870	
	21-JUN-90	ND(5)	ND(6)	ND(5)	ND(20)	1500	
	25-SEP-90	ND(0.5)	4.6	11	6.0	3100	
	18-DEC-90	ND(0.5)	15	4.4	6.3	3600	
MW-5	05-DEC-88	ND(0.2)	0.23	0.78	0.92	3.9	
	08-MAR-89	2.7	2.7	6.7	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(0.7)	ND(0.6)	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)	
MW-6	05-DEC-88	4.0	0.63	1.3	1.3	190	
	08-MAR-89	2.2	ND(0.5)	ND(0.4)	1.1	23	
	22-JUN-89	0.82	0.18	2.6	1.2	57	
	27-SEP-89	0.2	ND(0.1)	0.24	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(0.7)	ND(0.6)	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	
MW-7	05-DEC-88	140	40	150	370	1500	
	08-MAR-89	730	180	72	370	2400	
	22-JUN-89	570	180	43	220	2000	
	27-SEP-89	420	140	5.9	28	1400	
	29-DEC-89	87	18	3.5	15	150	
	29-MAR-90	110	53	40	150	530	
	21-JUN-90	620	290	34	400	4100	
	25-SEP-90	49	30	2.4	42	750	
	18-DEC-90	74	25	4.5	69	510	
MW-8	27-SEP-89	ND(1)	16	ND(1)	ND(1)	4200	
	29-DEC-89	ND(1)	18	3.2	ND(3)	2800	
	29-MAR-90	ND(6)	19	ND(9)	ND(30)	2600	
	21-JUN-90	ND(2)	13	ND(2)	ND(6)	4600	
	25-SEP-90	2.3	16	22	26	4500	
	18-DEC-90	0.7	9.7	6.0	2.3	1100	
MW-9	27-SEP-89	ND(0.1)	ND(0.1)	ND(0.1)	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(0.6)	ND(0.5)	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	

NOTES:
1) TPHg = Total Petroleum Hydrocarbons (as gasoline).
2) ND = Not Detected, detection limit shown 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) NS = Not Sampled.