RMT INC.®

West Coast Office
Suite 370
3250 Ocean Park Blvd.
Santa Monica, CA 90405
Phone: 213-452-5078
FAX: 213-450-5787

93 JUL 27 AM 10:08

STID 337

July 26, 1993

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

RE: Semi-Annual Groundwater Monitoring
Aratex Services, Inc., 958 28th Street, Oakland, California

Dear Ms. Hugo:

Enclosed please find the results of the semi-annual groundwater monitoring activities conducted at the referenced facility. A summary of site activities, previous chemical analyses, and product recovery well installation and operation activities are also included for your review.

As you may note, the product recovery system has not recovered any petroleum product since it was installed in March 1993. RMT, Inc., will continue to monitor the free-product recovery activities and if this trend continues, recommend appropriate system modifications.

If you have questions or comments regarding our investigation or this report, please feel free to contact me at (310) 452-5078.

Sincerely,

James W. Van Nortwick

James W. Van Nortwick, Jr., Ph.D., P.E.
Project Manager

enc: Semi-Annual Groundwater Monitoring Report

cc: Robert J. Robbins, C.P.G.
Phillip Krejci
Roger Simpson
Bea Slater
File: 728/Tanks

12012.14 ARATEX\SERVISCOcmn SAGWMN2.ltr

Section 1

SITE HISTORY AND BACKGROUND

Golden State Linen Service owns the property located at 958 28th Street in Oakland, California. Through 1986 the property was leased by Servisco Corporation (SERVISCO) and operated as an industrial dry cleaning facility. During that period, SERVISCO maintained a 500-gallon underground boiler fuel storage tank, a 1,000-gallon underground gasoline storage tank, and a 7,000-gallon underground gasoline storage tank to supply fuel for service vehicles and plant operations. In 1986, Aratex Services, Inc., (ARATEX) acquired SERVISCO, assumed the lease, and continued to conduct dry cleaning operations until vacating the property in 1988. As part of vacating the leased site, ARATEX agreed to remove the underground storage tanks from the property. In May 1988, ARATEX engaged the services of IT Corporation to supervise and document the removal of the underground storage tanks and perform soil sampling activities in accordance with the Alameda County Health Care Services Agency (ACHCSA) regulations. A site plan, showing the locations of the former underground storage tanks, is presented in Figure 1.

The results of chemical analyses performed on soil samples obtained from the floor of the 1,000-gallon gasoline storage tank excavation did not identify the presence of petroleum hydrocarbons, therefore, no additional investigation of this area was required by the ACHCSA. However, because evidence of petroleum product releases were identified during the removal of the 500-gallon boiler fuel storage tank and the 7,000-gallon gasoline storage tank, the ACHCSA requested that additional sampling activities be conducted to determine the extent of contamination in these areas. In response to this request, ARATEX engaged the services of IT Corporation to conduct a post-closure investigation. Field activities were conducted in February 1989, and included the installation of three groundwater monitoring wells (MW-A1, MW-A2, and MW-A3). The results of this investigation identified the presence of total petroleum hydrocarbons as gasoline (TPH-G), total petroleum hydrocarbons as diesel (TPH-D), benzene, toluene, ethylbenzene, or xylenes (BTEX) in the soil and groundwater in the vicinity of the former gasoline storage tank. Based on these results, in a letter dated May 8, 1989, the ACHCSA requested that ARATEX conduct additional sampling activities and initiate a groundwater monitoring program.

In June 1989, ARATEX engaged the services of RMT, Inc., (RMT) to conduct a subsurface investigation to further define the extent of contamination and develop a groundwater monitoring program. Field activities were conducted by RMT from March 1990 through November 1990 and included the advancement of several soil borings, the installation of three monitoring wells (MW-4, MW-5, and MW-6), and quarterly groundwater monitoring activities. Evidence of free-product was identified in a sandy gravel layer located in the vadose zone (unsaturated soils) during the installation of groundwater monitoring well MW-4 (monitoring well MW-4 is located along the northern property boundary approximately 70-ft from the former 1,000-gallon gasoline storage tank). The presence of petroleum hydrocarbons was also identified in the unsaturated soil samples collected from soil borings located near the former 7,000-gallon gasoline storage tank.

The results of chemical analyses performed on groundwater samples collected in March 1990, and November 1990, from monitoring wells located in the vicinity of the former 7,000-gallon tank excavation area (MW-A1, MW-A2, and MW-A3) indicated that the concentrations of TPH-G and BTEX had decreased significantly from previous sampling events. In addition, groundwater samples collected from monitoring wells MW-5 and MW-6 did not identify the presence of petroleum contamination. Based on these results, the lateral extent of soil and groundwater contamination was determined to be limited to the area immediately surrounding the former 7,000-gallon gasoline storage tank.

The results of the subsurface investigation and groundwater monitoring activities were presented to the ACHCSA in a meeting held on October 17, 1990. During this meeting, the ACHCSA requested that ARATEX investigate the potential source of free-product identified in monitoring well MW-4 and conduct groundwater monitoring activities on a semi-annual basis for a period of one year.

Additional field activities were conducted from November 1990, through November 1992, and included the installation of two additional groundwater monitoring wells (MW-4A and MW-7) to further define the extent of groundwater contamination and help determine the groundwater flow direction; the abandonment of monitoring well MW-4 to reduce the potential of free-product migration from the unsaturated zone to the groundwater; the installation of a product recovery well (R-1) to recover free-product identified in the unsaturated sandy gravel layer near monitoring well MW-4; and semi-annual groundwater sampling activities. The results of chemical analyses performed on groundwater samples collected from monitoring well MW-7 did not identify the presence of petroleum hydrocarbons, however, the presence of TPH-G and BTEX were identified in groundwater samples collected form monitoring well MW-4A. A site plan showing the locations of the groundwater monitoring wells and the recovery well is presented in Figure 2.

Section 2

GROUNDWATER MONITORING ACTIVITIES

Groundwater monitoring activities were conducted by RMT on May 12, 1993, and included obtaining static water level measurements and groundwater samples.

Static Water Level Measurement Procedures

Prior to collecting groundwater samples, the depth to groundwater was measured in each well using an electronic water level indicator. Three rounds of groundwater heights were taken to assess the variability in measurement. The details of the static water level measurement procedures are presented in Appendix A and a groundwater contour map is presented in Figure 3.

Groundwater Sample Collection

Groundwater samples were collected from monitoring wells MW-A1, MW-A2, MW-A3, MW-4A, MW-5, MW-6, and MW-7. Prior to sampling, each monitoring well was purged using an electric submersible pump until groundwater characteristics stabilized (i.e., temperature, pH, conductivity, and turbidity). A minimum of three well casing volumes (casing and sand pack volume) were extracted from each well before collecting groundwater samples. The temperature, pH, conductivity, and turbidity of the extracted groundwater was measured and recorded at least once per well casing volume. The well casing volume was determined by measuring and recording the static water level and calculating the well volume. The purging pump was decontaminated between each sampling event by rinsing with tap water to remove particulates, washing with a tri-sodium phosphate solution, and rinsing with deionized water.

After each monitoring well had recharged to within 80 percent of its pre-purge volume (approximately 30-min) groundwater samples were collected utilizing a disposable Teflon bailer equipped with a teflon stopcock, and dispensed directly into 40-mL borosilicate vials with teflon septa and screw caps. All samples were preserved using hydrochloric acid and stored on ice pending transport to a commercial independent California-certified laboratory according to USEPA protocol, including chain-of-custody procedures. Details of the groundwater sampling procedures are presented in Appendix A, groundwater sampling field logs are presented in Appendix B, and chain-of-custody documents are included in Appendix C.

Chemical Analyses of Groundwater

Groundwater samples obtained from each monitoring well was analyzed for the presence of VOC using EPA SWA-846 Method 8020 and total petroleum hydrocarbons as gasoline and diesel using the California Water Resources Board Draft Method for TPH. The results of the laboratory analyses are presented in Table 1. All laboratory analyses were conducted by GTEL Environmental Laboratory, Inc., of Concord, California, and a copy of the laboratory report is included in Appendix D.

The results of chemical analyses performed on groundwater samples collected from monitoring wells MW-A2, MW-4A, and MW-6 identified the presence of TPH-G, toluene, ethylbenzene, and xylenes. In addition, the presence of benzene was identified in groundwater samples collected from monitoring wells MW-A2, MW-6, and MW-7 in concentrations ranging from 1 μg/L to 150 μg/L.

Disposal of Purged Groundwater

Groundwater generated during sampling and the groundwater sampling activities was placed in 55-gallon DOT-approved drums, labeled with the date, site name and location, and monitoring well number, and stored in a secured area pending characterization and disposal. A copy of the waste manifest will be submitted upon disposal.

APPENDIX A
WATER LEVEL MEASUREMENTS

Precise water level measurements are required to accurately characterize the groundwater flow direction in aquifers. The use of measuring devices that will yield quick and accurate results (to 0.01-ft) are required.

Direct water level measurement using steel tapes can provide accurate results, but the number of measurements that can be taken over a short period of time is limited. When using a steel tape, a heavy weight is attached to the end. The lower two or three feet are wiped dry and coated with carpenter's chalk before making a measurement. The tape is lowered down into the well until part of the chalked section is below water. After withdrawal, the wetted line can be read to the 0.01-ft fraction on the chalked section. The height of the riser pipe (if present) is compensated for as discussed below. The disadvantages of this method are that the time needed to take the three readings is greatly increased, and that the approximate depth of water must be known so that a portion of the chalked tape will be submerged to produce a wetted line.

RMT, Inc., typically uses an electrical measuring tape for water level measurements. This instrument sounds an alarm or light when the measuring probe touches the water surface thus closing an electrical circuit. The electric cable supporting the probe is usually graduated in feet and can be read at the well site directly. The remaining fraction is measured with a steel tape graduated to 0.01-ft. If the monitoring well is not constructed flush to the ground surface, the distance between the static water level and the top of the riser pipe is measured. The height of the riser pipe above ground surface is then subtracted from the total reading to give the depth to static water. To improve the accuracy of the readings, the probe and cable should be left in the well for series of three readings, and the readings averaged. This helps to eliminate any errors from kinks or bends in the wires which may change the length slightly when the device is pulled up and let down.

The electrical wire should be checked routinely against a steel measuring tape to insure that it has not stretched. If this is found to be the case, the wire should be replaced.

GROUNDWATER SAMPLING

If immiscibles are present, the following measurement activities should be undertaken first. These measurements are made by lowering an interface probe slowly to the surface of the liquid in the well. When the audible alarm sounds, record the depth. If the alarm is continuous, an immiscible layer has been detected. To determine the thickness of this layer, continue lowering the probe until the alarm changes to an oscillating signal. The oscillating signal indicates that the probe has detected an aqueous layer. Record this depth as the depth to water. Determine the thickness, and then the volume, of the immiscible layer as the difference in the two recorded depths. Continue lowering the probe into the well to determine if dense phase immiscibles (sinkers) are present. If the alarm signal changes from oscillating to a continuous sound, a heavier immiscible layer has been detected; record this depth. Continue lowering the probe to the bottom of the well, record the depth, calculate the sinker thickness volume and total water volume in the well. A chart is provided in Table A-1 to assist in these calculations.

Determination of Purging Volume. If a determination of the presence of floaters or sinkers is not a requirement of the program, a sounder or similar device must be used to determine depth to water and total depth of the well. The operation of such a device must follow manufacturer's operating procedures and the device selected must meet the sensitivity requirements defined by the program objectives. In general, sounding devices must be constructed of inert materials, must be properly decontaminated between uses, and must be lowered into the well so as to give an accurate measurement. Be aware that some sounders are not designated to be submerged, therefore, they cannot be used to determine total depth. In these cases, a weighted steel tape or stainless steel cable should be used. Once these measurements have been made and recorded, use Table A-1 to calculate the total volume of water in the well. Multiply this volume by the purging factor to determine purging volume. The project-specific standard purging factor is three (three casing volumes), but may be superseded by site-specific program requirements and by individual well yield characteristics.

TABLE A-1

Liquid Volume in a One-Foot Section of Well Casing

Inside Casing Diameter	Volume $V=5.22(ID)^2$	Gallons $V=0.0408(ID)^2$	Milliliters $V=154.4(ID)^2$
1	5.22	0.04	154.4
1.5	11.74	0.09	347.3
2	20.88	0.16	617.5
3	46.98	0.37	1389.4
4	83.52	0.65	2470.0

PURGING THE WELL

Currently, project specific standards allow for six options for purging wells. They are:

- Teflon bailers
- Stainless steel bailers
- Teflon bladder pumps
- Stainless-steel submersible (non-oil bearing) pumps
- Existing dedicated equipment - Use of these devices must be approved by on-site client representatives (e.g., EPA on-site coordinator)
- Peristaltic pumps - Use of these devices are for shallow wells only and must be approved by the on-site client representative.

As previously stated, the project-specific purging volume standard is three casing volumes. The exception to this standard (other than program requirements) is in the case of low yield wells. When purging low yield wells, pump the well once to dryness. Samples should be collected as soon as the well recovers. When full recovery exceeds three hours, samples should be collected as soon as sufficient volume is available.

At no time during purging should the evacuation rate be high enough to cause the groundwater to cascade back into the well thus causing excessive aeration and potential stripping of volatile constituents.

The actual volume of purged water can be measured by several acceptable methods:

- When the bailers are used to purge, the actual volume of each bailer's contents can be measured using a calibrated bucket.
- An alternate method when using a bailer, is to use Table A-2 to determine the bailer volume and to count the number of times the bailer is emptied. In most instances, the second method is preferred.
- If a pump is used for purging, the pump rate can be determined by using a bucket and stopwatch, and the duration of pumping timed until the necessary volume is purged.

TABLE A-2

Bailer Sample Volumes Per One-Foot Section of Bailer

ID (Inches)	Volume $V=5.22(ID)^2$	Gallons $V=0.0408(ID)^2$	Milliliters $V=154.4(ID)^2$
0.5	1.31	0.01	38.6
0.75	2.95	0.02	86.9
1.0	5.22	0.04	154.4
1.25	8.16	0.06	241.3
1.5	11.74	0.09	347.3

SAMPLE COLLECTION

The technique used to withdraw a groundwater sample from a well should be selected based on a consideration of the parameters which will be analyzed. To ensure the groundwater samples are representative samples, it is important to avoid physically altering or chemically contaminating the sample during collection, withdrawal, and containerization.

The preferred sampling device for all parameters are double check valve stainless-steel or Teflon bailers. An acceptable alternative is a Teflon bladder pump.

In general, no sampling device constructed or containing neoprene, PVC, Tygon, silicone, polyethylene, or Viton will be used to collect groundwater samples.

In some cases, it may become necessary to use equipment already in the well to collect samples. This is particularly true of high volume, deep wells (>150-ft) where bladder pumps are ineffective, and bailing is impractical.

If existing equipment must be used, determine the make and model of the pump and check with the manufacturer concerning component construction materials. General project-specific sampling procedures include the following:

- Lower sampling equipment slowly into the well to avoid degassing of the water and damage to the equipment.
- Clean sampling equipment should not be placed directly on the ground. Use a drop cloth or feed line from clean reels. If reels are used, never place contaminated lines back on reels.
- Check the operation of bailer check valve assemblies to confirm free operation.

Collection of Volatile Organics Samples (VOA). VOA should be collected from the first bailer removed from the well after purging. The most effective means of controlled preparation of the sample is by employing two people. One person should retrieve the bailer from the well, and place the bottom over a 250-mL Pyrex beaker (Level 1 decontaminated) held by the second person. The second person should insert the Teflon bottom emptying device, and tilt the beaker to approximately 60° from the vertical.

Delivery of the sample from the bailer down the edge of the beaker is accomplished when the person holding the bailer slowly opens the top check valve with a Teflon insert. As the beaker is filled, the second person should return the beaker to the vertical position.

Pour the beaker contents into the appropriate number of VOA vials using the tilting technique described above until the vials are just overflowing. Cap the vial and invert. If a bubble exists, discard and repeat. Do not reopen the vial and add additional sample.

Always prepare VOA splits from a single beaker. If the beaker is refilled, samples are not duplicates.

Client Number: RMT01RMT01
Consultant Project Number: 12012.11
Work Order Number: C3-05-0249

Table 1

ANALYTICAL RESULTS

Aromatic Volatile Organics and Total Petroleum Hydrocarbons as Gasoline in Water

EPA Methods 5030, 8020, and Modified 8015[a]

GTEL Sample Number		01	02	03	04
Client Identification		MW-1A	MW-2A	MW-3A	MW-4A
Date Sampled		05/12/93	05/12/93	05/12/93	05/12/93
Date Analyzed		05/22/93	05/22/93	05/22/93	05/22/93
Analyte	Detection Limit, ug/L	Concentration, ug/L			
Benzene	0.3	1	140	<0.3	190
Toluene	0.3	<0.3	5	<0.3	8
Ethylbenzene	0.3	<0.3	8	<0.3	69
Xylene, total	0.5	0.6	8	<0.5	42
BTEX, total	--	2	160	--	310
TPH as Gasoline	10	<10	480	<10	1300
Detection Limit Multiplier		1	1	1	1
BFB surrogate, % recovery		90.9	91.3	93.3	98.7

[a] Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986. Modification for TPH as gasoline as per California State Water Resources Control Board LUFT Manual protocols, May 1988 revision. Bromofluorobenzene surrogate recovery acceptability limits are 70-130%.

Client Number: RMT01RMT01
Consultant Project Number: 12012.11
Work Order Number: C3-05-0249

Table 1 (continued)

ANALYTICAL RESULTS

Aromatic Volatile Organics and Total Petroleum Hydrocarbons as Gasoline in Water

EPA Methods 5030, 8020, and Modified 8015[a]

GTEL Sample Number		05	06	07	08
Client Identification		MW-5	MW-6	MW-7	TRIP BLANK
Date Sampled		05/12/93	05/12/93	05/12/93	05/12/93
Date Analyzed		05/23/93	05/23/93	05/23/93	05/23/93
Analyte	Detection Limit, ug/L	Concentration, ug/L			
Benzene	0.3	0.4	16	2	<0.3
Toluene	0.3	<0.3	0.6	<0.3	<0.3
Ethylbenzene	0.3	<0.3	3	<0.3	<0.3
Xylene, total	0.5	<0.5	2	<0.5	<0.5
BTEX, total	--	0.4	22	2	--
TPH as Gasoline	10	<10	180	<10*	<10
Detection Limit Multiplier		1	1	1	1
BFB surrogate, % recovery		89.5	90.8	90.2	90.3

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a. Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986. Modification for TPH as gasoline as per California State Water Resources Control Board LUFT Manual protocols, May 1988 revision. Bromofluorobenzene surrogate recovery acceptability limits are 70-130%.

* Uncategorized compounds are not included in gasoline hydrocarbon total.

RMT

LOG OF TEST BORING

F-203 (R 01-87)

BORING NO. R-1
SHEET NO. 2 OF 2
PROJECT NAME ARATEX - SERVISCO
PROJECT NO. 12012.13
LOCATION OAKLAND, CA
INSTALLATION
CONTRACTOR WEST HAZMAT DRILLING
SURFACE ELEV.
DRILLING METHOD HOLLOW STEM AUGER
BOREHOLE DIA. 10 IN.

SAMPLING NOTES					
INTERVAL		RECOVERY		MOISTURE	
NO.	TYPE	N	%		DEPTH
8	SS	48	100	M	
					▽
9	SS	12	66	M	
10	SS	13	66	M	15
11	SS	38	100		
12	SS	38	100		
13	SS	18	100		
					20

VISUAL CLASSIFICATION AND GENERAL OBSERVATIONS

CLAYEY SANDY GRAVEL (GP)
Fine - coarse, angular sand and gravel, little clay (decreasing w/ depth), very dense, lt. to mod. brown with variegated gravel, sl. mottled, tr. petroleum odor.

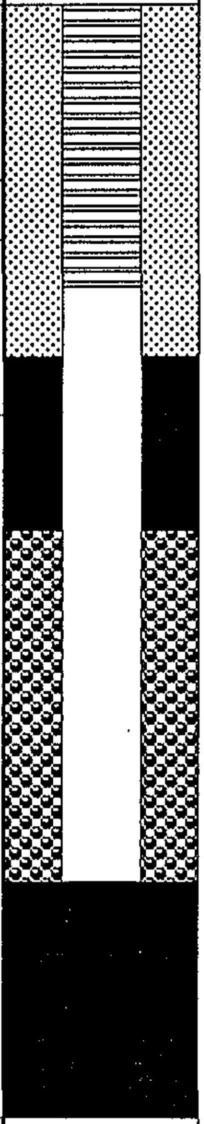
SANDY CLAY (CL)
clay with little fine Sand, hard, lt. brown.

GRAVELLY SAND (SW)
Sand, fine - coarse, some gravel, fine - coarse, angular, well graded, tr. clay, medium dense, lt. olive gray.

SILTY SANDY CLAY (CL)
Little silt and very fine sand, tr. gravel, medium dense to dense, low plasticity, alternating lt. brown and pale olive.

Total depth = 20.5 ft.

GENERAL WELL CONSTRUCT.



RMT

LOG OF TEST BORING

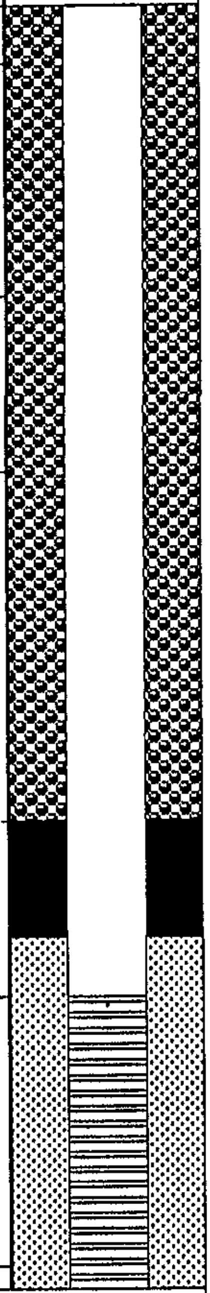
F-203 (R 01-87)

PROJECT NAME ARATEX - SERVISCO
LOCATION OAKLAND, CA
CONTRACTOR WEST HAZMAT DRILLING
DRILLING METHOD HOLLOW STEM AUGER

BORING NO. R-1
SHEET NO. 1 OF 2
PROJECT NO. 12012.13
INSTALLATION
SURFACE ELEV.
BOREHOLE DIA. 10 IN.

SAMPLING NOTES						VISUAL CLASSIFICATION AND GENERAL OBSERVATIONS
INTERVAL		RECOVERY		MOISTURE		
NO.	TYPE	N	%		DEPTH	
						ASPHALT 4 - 6 IN.
1	SS	23	100	W		SILTY CLAY (CL) Some silt, very stiff, mod. plasticity, dusky brown, roots.
2	SS	20	100	SM		CLAY (CL-CH) Trace silt, very stiff, mod. plastic, pale yellowish brown to dark yellowish brown.
3	SS	50	100	SM		SANDY SILTY CLAY (CL) Some sand and silt, trace gravel, hard, mod. yellowish brown.
					5	
4	SS	50	100	SM		
						Increasing silt and sand.
5	SS	50	100	M		SILTY SAND (SM) Some silt, little clay and gravel, gradational upper contact, very dense, mod. yellowish brown, stained lt. olive gray lower 6 in., mottling and oxidation lower 6 in.
6	SS	30	100	M		GRAVELLY SAND (SW) Fine - coarse sand, fine gravel, trace silt, well graded, dense, angular, stained olive gray, strong petroleum odor.
7	SS	50	100	M	10	

GENERAL WELL CONSTRUCT.

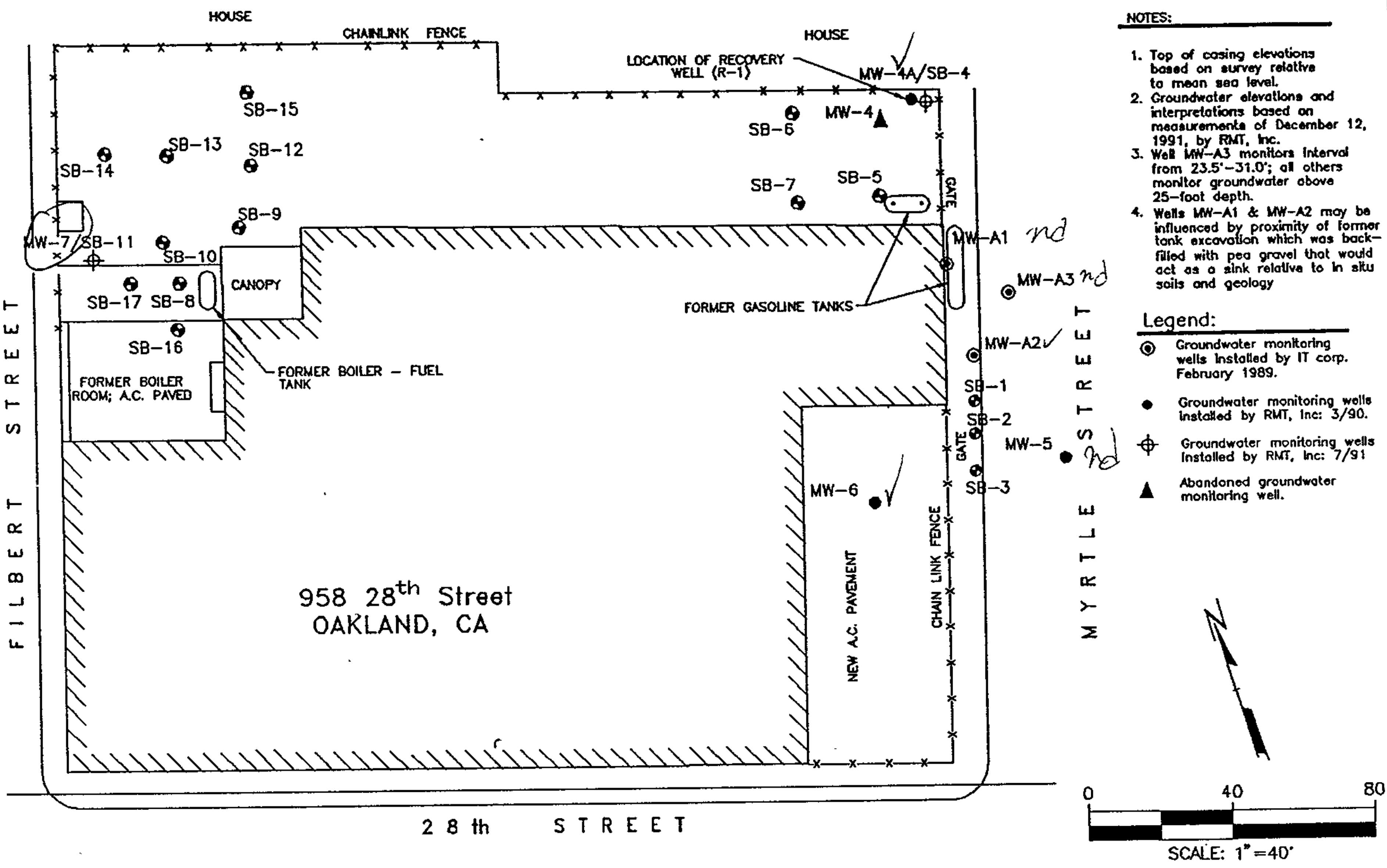


GENERAL NOTES

DATE STARTED 22 MAR 93
DATE COMPLETED 22 MAR 93
RIG CME-53
CREW CHIEF
LOGGED T. DAVIS CHECKED

WATER LEVEL OBSERVATIONS

WHILE DRILLING ▽ 12.5
AT COMPLETION ▼
AFTER DRILLING
CAVE-IN: DATE/TIME DEPTH
WATER: DATE/TIME DEPTH



NOTES:

1. Top of casing elevations based on survey relative to mean sea level.
2. Groundwater elevations and interpretations based on measurements of December 12, 1991, by RMT, Inc.
3. Well MW-A3 monitors interval from 23.5'–31.0'; all others monitor groundwater above 25-foot depth.
4. Wells MW-A1 & MW-A2 may be influenced by proximity of former tank excavation which was back-filled with pea gravel that would act as a sink relative to in situ soils and geology

Legend:

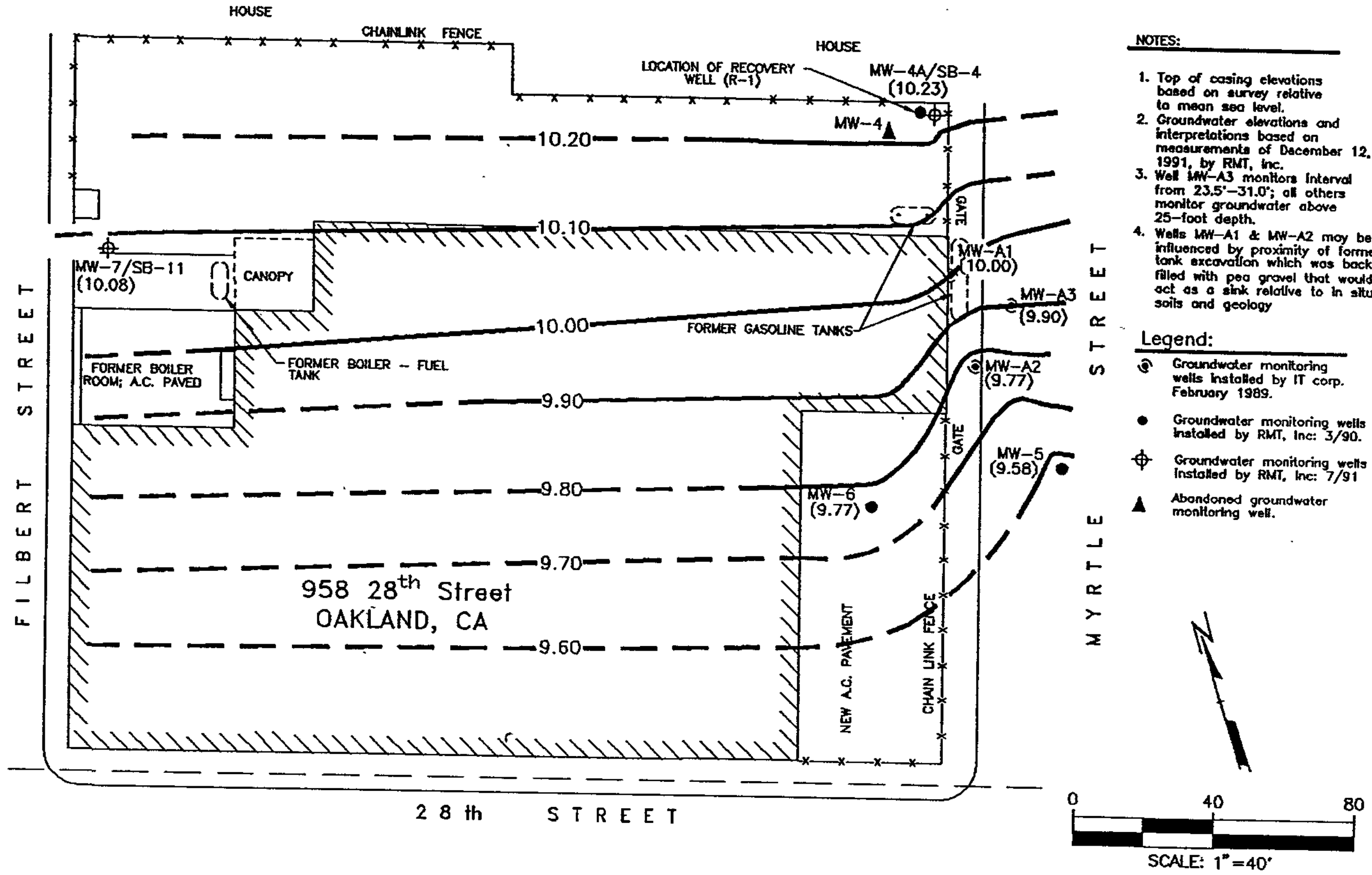
◎	Groundwater monitoring wells installed by IT corp. February 1989.
●	Groundwater monitoring wells installed by RMT, Inc: 3/90.
⊕	Groundwater monitoring wells installed by RMT, Inc: 7/91
▲	Abandoned groundwater monitoring well.

ARATEX SERVISCO MONITORING WELL LOCATIONS

RMT INC.

DWN. BY: RAS
DATE: JUNE, 1993
PROJ.# 12012.13
FILE # 12012134

FIGURE 2



NOTES:

1. Top of casing elevations based on survey relative to mean sea level.
2. Groundwater elevations and interpretations based on measurements of December 12, 1991, by RMT, Inc.
3. Well MW-A3 monitors interval from 23.5'-31.0'; all others monitor groundwater above 25-foot depth.
4. Wells MW-A1 & MW-A2 may be influenced by proximity of former tank excavation which was back-filled with pea gravel that would act as a sink relative to in situ soils and geology

Legend:

- ◎ Groundwater monitoring wells installed by IT corp. February 1989.
- ● Groundwater monitoring wells installed by RMT, Inc: 3/90.
- ⌖ Groundwater monitoring wells installed by RMT, Inc: 7/91
- ▲ Abandoned groundwater monitoring well.

ARATEX SERVISCO
GROUNDWATER CONTOUR MAP

RMT INC.

DWN. BY:	RAS
DATE:	JUNE, 1993
PROJ.#	12012.13
FILE #	12012135

FIGURE 3