

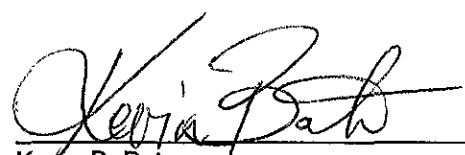
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**SUBSURFACE INVESTIGATION WORKPLAN  
FOR  
ARATEX SERVICES, INC.  
958 28th STREET  
OAKLAND, CA**

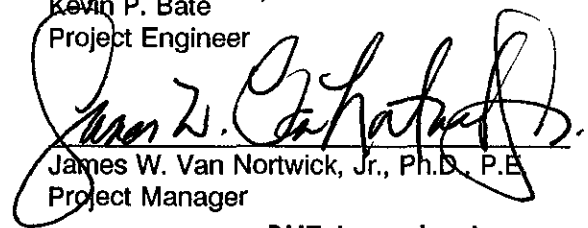
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**MAY 1994**



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Section 1  
INTRODUCTION

1.1 Background

Aratex Services, Inc., (ARATEX) formerly maintained two underground gasoline storage tanks (1,000 and 7,000-gallon capacities) and an underground boiler fuel storage tank (500-gallon capacity) at the property located at 958 28th Street, in Oakland, California. All three storage tanks were removed from the site in 1988, however, evidence of a release was identified in the vicinity of the 7,000-gallon gasoline storage tank and the boiler fuel storage tank during the tank removal activities. Soil samples collected from the 1,000-gallon gasoline storage tank excavation did not identify the presence of petroleum hydrocarbons at concentrations above the method detection limit. Approximately 7-yd<sup>3</sup> of petroleum hydrocarbon-impacted soil was removed from the boiler fuel storage tank excavation during the tank removal activities.

In response to the observations noted during the tank removal activities, a preliminary subsurface investigation was conducted in February 1989, and included the installation of three groundwater monitoring wells (MW-A1, MW-A2, and MW-A3) in the vicinity of the former 7,000-gallon gasoline storage tank. Based on the results of the investigation, additional subsurface sampling activities were conducted to further define the extent of petroleum hydrocarbon-impacted soil and groundwater. Field activities were conducted during the period March 1990, through March 1993, and included the advancement of seventeen soil borings (SB-1 through SB-17), the installation of five additional groundwater monitoring wells (MW-4, MW-4A, MW-5, MW-6, and MW-7) and a product recovery well (R-1), the abandonment of monitoring well MW-4, the advancement of eight Geoprobe borings (GP-1 through GP-8), and the excavation of approximately 40-yd<sup>3</sup> of soil in the vicinity of the former boiler fuel storage tank. The soil borings and groundwater monitoring wells are located in the vicinity of the former gasoline and boiler fuel storage tanks, the recovery well is located along the northern property boundary, and the Geoprobe borings are located off-site along the northeast section of the former ARATEX property. The locations of the soil borings, groundwater monitoring wells, product recovery well, Geoprobe borings, and the former underground storage tanks are presented in Figure 1.

The results of the subsurface investigations indicate that the extent of petroleum hydrocarbon-impacted soil appears to be confined to the area immediately surrounding the former 7,000-gallon gasoline storage tank and the northeast corner of the facility, while the extent of petroleum hydrocarbon-impacted groundwater is limited to the area immediately downgradient of the 7,000-gallon gasoline storage tank formerly located along the eastern edge of the existing facility.

In July 1993, ARATEX engaged the services of RMT, Inc., (RMT) to prepare a soil vapor extraction (SVE) pilot-scale test workplan to determine the feasibility of *in-situ* volatilization for the remediation of the petroleum hydrocarbon-impacted soil underlying the northeast section of the former ARATEX property. The workplan was submitted to the Alameda County Health Care Services Agency (ACHCSA) in September 1993, and approved in a letter dated January 27, 1994. In addition, based on a review of the reports in the case file for the former ARATEX facility, the ACHCSA requested that a groundwater monitoring well be installed in the vicinity of the former boiler fuel storage tank and that additional sampling activities be conducted to investigate the source of the free-product identified during the advancement of the off-site Geoprobe borings. In response to the request from the ACHCSA, ARATEX engaged the services of RMT to 1) conduct a SVE pilot-scale test; 2) install a groundwater monitoring well downgradient and within 10-ft of the former underground boiler fuel storage tank, and 3) prepare a subsurface investigation workplan to determine the concentration of petroleum hydrocarbons currently present in the soils and confirm that no free-product is present underlying the former ARATEX facility.

## **1.2 Purpose and Scope**

The purpose of this report is to present the methods and procedures utilized during the SVE pilot-scale test and the monitoring well installation and groundwater sampling activities, and the proposed subsurface investigation workplan. The scope of work included the following:

- SVE pilot-scale testing activities,
- Installation and sampling of groundwater monitoring well MW-8, and
- Data evaluation and preparation of a subsurface investigation workplan.

## Section 2 SVE PILOT-SCALE TEST RESULTS

SVE pilot-scale testing activities were conducted in February 1994 and included *in-situ* permeability testing and soil-gas sampling activities. The pilot-scale test was conducted using recovery well R-1 and SVE observation wells SVW-1 through SVW-4. The locations of the extraction well and the observation well are presented in Figure 2. The following subsections describe the procedures and methods used to conduct the SVE pilot-scale test.

### 2.1 SVE Pilot-Scale Testing Procedure

*In-situ* soil permeability tests were conducted in February 1994, by recovering soil-gas from extraction well R-1 using an internal combustion (IC) engine operating at a flow rate of approximately 45 scfm with a vacuum of approximately 60 inches water column (w.c.). The SVE recovery and observation wells are screened in the unsaturated zone at a depth of approximately 8 to 14-ft below ground surface (bgs). The observation wells are located at distances of 10-ft (SVW-1), 25-ft (SVW-2), 50-ft (SVW-3), and 75-ft (SVW-4) from extraction well R-1. Magnahelic gauges were installed in the observation wells to provide measurements of the *in-situ* soil pressures and well-head vacuum readings. In addition, the volatile organic compound (VOC) content of the extracted soil-gas was monitored throughout the SVE pilot-scale test using a HNu Photoionization Detector (PID). The blower was operated for approximately 145 min and *in-situ* soil pressures and well-head (system) vacuums were measured at regular intervals during that period. The pilot-scale operating conditions and PID measurements are presented in Table 1.

### 2.2 In-situ Permeability Testing Results

The field data generated during execution of the *in-situ* permeability testing is presented in Table 2. *In-situ* soil pressures measured in the observation wells were erratic during the first 40-minutes of operation and undetectable (not measurable using the Magnahelic gauge) throughout the remainder of the test period. The results suggest that channelling may be occurring, whereby the soil vapor is only extracted from preferential flow paths. The results also indicate that the sandy gravel layer is most likely not continuous throughout the northeast section of the site. It should be noted that because the *in-situ* soil pressures were erratic and quickly approached atmospheric conditions, it is not possible to determine the *in-situ* permeability and radius of influence.

Table 1

SVE Pilot-Scale Operating Conditions

Time	Static Pressure (inches w.c.)	Differential Pressure (inches w.c.)	Soil-Gas Temperature (°F)	Extraction Flow Rate (scfm)	PID Reading (ppmv)
12:10	25	0.45	53	23	26
12:20	40	0.60	53	29	206
12:25 <sup>a</sup>	60	0.75	52	40	280
12:55	60	0.85	53	43	220
13:10	60	0.84	53	43	176
13:25	60	0.85	54	43	215
13:40	61	0.85	53	43	457
14:00	60	0.85	53	43	88
14:20	60	0.85	53	43	56
14:35 <sup>a</sup>	60	0.85	53	43	620

a = Soil-gas samples collected and submitted for chemical analyses

Table 2

In-Situ Soil Pressure Measurements (Q = 43 scfm)

Time	In-Situ Soil Pressure (Inches w.c.)			
	SWW-1 (10-ft)	SWW-2 (25-ft)	SWW-3 (50-ft)	SWW-4 (75-ft)
12:15	0.020	0	0	0
12:25	0.040	0.010	0	0
12:30	0.050	0.010	0	0
12:45	0.020	0.005	0	0
12:55	0.020	0	0	0
13:10	0	0	0	0
13:40	0	0	0	0
13:55	0	0	0	0
14:10	0	0	0	0
14:25	0	0	0	0
14:35	0	0	0	0

**2.3 Chemical Analyses of Soil-Gas**

Two soil-gas samples were collected and chemically analyzed for the presence of VOCs, including benzene, toluene, ethylbenzene, and xylenes (BTEX) using EPA SW-846 Method ARB ADDL004. One sample was collected at the point of maximum concentration during the initial 10 to 20-minutes of operation, based on the data collected using the PID, and an additional soil-gas sample was collected just before terminating the pilot-scale test. The PID measurements observed during the pilot-scale test were erratic (as were the *in-situ* soil pressures) and are most likely attributed to fluctuating soil-gas flow paths through the soil (channelling). The results of the chemical analyses are summarized in Table 3 and a copy of the laboratory report is included in Appendix A. All chemical analyses were performed by Enseco-CRL Laboratories, Inc., of City of Industry, California.

**Table 3**  
**Chemical Analyses of Soil-Gas Samples (ppmv)**

Sample ID	TPH (as Hexane)	Benzene	Toluene	Ethylbenzene	Xylenes
Start-Up	200 ( $4.5 \times 10^{-5}$ )	2.0 ( $4.1 \times 10^{-7}$ )	1.8 ( $4.3 \times 10^{-7}$ )	<0.020 ( $<5.5 \times 10^{-9}$ )	0.44 ( $1.2 \times 10^{-7}$ )
Termination	1,600 ( $3.6 \times 10^{-4}$ )	25 ( $5.1 \times 10^{-6}$ )	10 ( $2.4 \times 10^{-6}$ )	<0.080 ( $<2.2 \times 10^{-8}$ )	2.2 ( $6.0 \times 10^{-7}$ )

Note: Units in parenthesis are lb/ft<sup>3</sup>

**2.4 Summary**

The results of the pilot-scale test suggest that channelling may be occurring and that the sandy gravel layer is most likely not continuous throughout the northeast section of the site. In addition, although the results of the chemical analyses performed on the soil-gas samples identified the presence of low concentrations of TPH and BTEX, based on the *in-situ* soil pressure measurements it is unlikely that the petroleum hydrocarbon-impacted soil-gas originated from the former ARATEX property. Therefore, based on the results of the pilot-scale test and sampling activities, SVE is not recommended for the remediation of the unsaturated soil underlying the former ARATEX property. ?

**Section 3**  
**MONITORING WELL INSTALLATION ACTIVITIES**

In response to a request from the ACHCSA, monitoring well MW-8 was installed approximately 10-ft downgradient of the former boiler fuel storage tank. The location of the newly installed monitoring well and the groundwater contour map are presented in Figure 3. Monitoring well installation and groundwater sampling procedures and the results of the chemical analyses are presented in the following sections.

**3.1 Monitoring Well Installation Procedures**

Soil boring and monitoring well installation activities were conducted in February 1994. Soil boring MW-8 was advanced to a depth of approximately 25-ft bgs using 10 inch diameter continuous-flight truck-mounted, hollow-stem auger equipment. Soil samples were collected at 5-foot intervals through-the-auger using a California modified split-spoon sampler. Each sample was described visually in the field by the on-site engineer for the following characteristics: soil name (based on the Unified Soil Classification System), grain size, color, and plasticity. The soil boring log is presented in Appendix B.

The monitoring well was installed to a depth of approximately 25-ft bgs and constructed of flush-joint threaded 2-inch inside-diameter Schedule 40 PVC riser pipes, and factory-slotted Schedule 40 PVC screens with 0.010-inch slots. The monitoring well screen interval was extended from 10 to 25-ft bgs. Washed silica sand was used as a filter pack around the monitoring well screen and was extended approximately 2-ft above the top of the screen to prevent infiltration of bentonite into the screened zone and a 3-ft thick bentonite pellet seal was placed on top of the sand to prevent the infiltration of the overlying cement/bentonite grout into the filter pack. Cement-bentonite grout was pumped through a tremie pipe to backfill the annular space to the ground surface. The monitoring well was fitted with a locking cap and a protective casing that was cemented into the grout below the ground surface. Once monitoring well installation activities had been completed, the monitoring well was developed by bailing 10 well casing volumes. Monitoring well installation activities were performed by West Hazmat Drilling Corporation, of Newark, California, and surveying activities were performed by Kier and Wright Civil Engineers, of Pleasanton, California. Monitoring well construction details are shown in Appendix B.

**3.2 Groundwater Sampling Procedures**

Prior to sampling, monitoring well MW-8 was purged using a disposable teflon bailer. A minimum of three well casing volumes (casing and sand pack volume) were extracted from the monitoring 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. After the 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 California-certified laboratory according to USEPA protocol, including chain-of-custody procedures.

**3.3 Chemical Analyses of Groundwater**

Groundwater samples collected from MW-8 were analyzed for the presence of total volatile petroleum hydrocarbons (TVH) and benzene, toluene, ethylbenzene, and xylene using EPA Method 8015M/8020. The results of the chemical analyses are summarized in Table 2 and a copy of the laboratory report is included in Appendix D. All laboratory analyses were performed by Curtis & Tompkins, Ltd., of Berkeley, California.

**Table 4**  
**Chemical Analyses of Groundwater**

Monitoring Well Location	Sampling Date	EPA SW-846 Method 8020 (µg/L)				TPH-G (mg/L)	TPH-D (mg/L)
		Benzene	Toluene	Ethylbenzene	Xylene		
MW-A1	03-08-89	120	150	60	2100	7.2	12
	05-31-89	250	57	11	210	5.8	5.07
	09-13-89	16	12	8.9	37	2.7	1.0
	12-05-89	3.6	<0.2	4.7	24.3	0.5	<0.5
	03-21-90	3.6	<0.2	4.7	24.3	1.3	<0.5
	11-13-90	1.3	<0.5	<0.5	35.3	0.296	--
	07-18-91	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05
	12-11-91	0.3	<0.3	<0.3	1	0.092	<0.01
	11-04-92	<0.3	<0.3	<0.3	<0.5	<0.01	<0.01
	05-12-93	1.0	<0.3	<0.3	0.6	<0.01	--
	11-12-93	<0.5	<0.5	<0.5	<0.5	<0.05	--
MW-A2	03-08-89	380	200	<0.3	10	5.2	7.7
	05-31-89	150	4	<0.3	11	<0.5	<0.5
	09-13-89	56	4.4	4.8	11	1.9	0.6
	12-05-89	63	10	21	2.9	3.5	<0.5
	03-21-90	35	2.4	<0.2	18.9	1.1	<0.5
	11-13-90	32.5	2.4	<0.5	3.4	0.719	--
	07-18-91	28	<0.5	<0.5	<0.5	<0.05	<0.05
	12-11-91	90	3	2	2	0.44	<0.01
	11-04-92	150	6	10	9	0.41	<0.01
	05-12-93	140	5	8	8	0.480	--
	11-12-93	19	<0.5	0.7	<0.5	0.075	--

Table 4 (Continued)  
Chemical Analyses of Groundwater

Monitoring Well Location	Sampling Date	EPA SW-846 Method 8020 (µg/L)				TPH-G (mg/L)	TPH-D (mg/L)
		Benzene	Toluene	Ethylbenzene	Total Xylene		
MW-A3	05-31-89	<0.3	<0.3	<0.3	<0.3	<0.5	0.93
	09-13-89	<0.3	<0.3	<0.3	<0.3	<0.5	<0.5
	12-05-89	<0.3	<0.3	<0.3	<0.3	<0.5	<0.5
	03-21-90	<0.2	<0.2	<0.2	<1.0	<0.5	<0.5
	11-13-90	<0.5	<0.5	<0.5	<0.5	<0.05	--
	07-18-91	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05
	12-11-91	<0.3	<0.3	<0.3	<0.5	<0.01	<0.01
	11-04-92	<0.3	<0.3	<0.3	<0.5	<0.01	<0.01
	05-12-93	<0.3	<0.3	<0.3	<0.5	<0.01	--
	11-12-93	<0.5	<0.5	<0.5	<0.5	<0.05	--
MW-4A	07-19-91	68	3.0	8.0	31	2.60	<0.05
	12-11-91	2	<0.3	<0.3	<0.5	0.29	<0.01
	11-04-92	<0.3	0.5	0.5	1	0.59	<0.01
	05-12-93	190	8	6.9	42	1.30	--
	11-12-93	0.9	<0.5	2.6	1.4	<0.590	--
MW-5	03-22-90	<0.2	<0.2	<0.2	<1.0	<0.5	<0.5
	11-13-90	<0.5	<0.5	<0.5	<0.5	<0.05	--
	07-19-91	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05
	12-11-91	<0.3	<0.3	<0.3	<0.5	<0.01	<0.01
	11-05-92	<0.3	<0.3	<0.3	<0.5	<0.01	<0.01
	05-12-93	0.4	<0.3	<0.3	<0.5	<0.01	--
	11-12-93	<0.5	<0.5	<0.5	<0.5	<0.05	--
MW-6	03-22-90	<0.2	<0.2	<0.2	<1.0	<0.5	<0.5
	11-13-90	7.9	<0.5	<0.5	1.8	0.07	--
	07-19-91	42	1.0	3.0	9.0	0.30	<0.05
	12-11-91	8	<0.3	<0.3	<0.5	0.16	<0.01
	11-04-92	8	<0.3	2	1	0.11	<0.01
	05-12-93	16	0.6	3	2	0.18	--
	11-12-93	9.8	<0.5	3.1	1.1	0.13	--
MW-7	07-19-91	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05
	12-11-91	<0.3	<0.3	<0.3	<0.5	0.18	<0.01
	11-04-92	1	<0.3	<0.3	<0.5	<0.01	<0.01
	05-12-93	2	<0.3	<0.3	<0.5	<0.01	<0.01
	11-12-93	0.7	<0.5	<0.5	<0.5	<0.05	--
MW-8	02-22-94	3.2	<0.5	0.6	0.6	--	0.27

**Section 4**  
**SUBSURFACE INVESTIGATION WORKPLAN**

The results of subsurface sampling activities conducted at the former ARATEX facility indicate that the extent of petroleum hydrocarbon-impacted soil and groundwater is confined to the immediate vicinity of the former 7,000-gallon gasoline storage tank. In addition, during the advancement of recovery well R-1 and soil borings GP-3 and GP-8, the presence of free product was identified in the northeast section of the site. In January 1994, the ACHCSA requested that ARATEX address the status of the soil and groundwater investigation and investigate the source of free product identified in the northeast section of the property. In response to the request from the ACHCSA, ARATEX engaged the services of RMT to investigate whether free product is still present in the unsaturated soil underlying the property, determine the current concentration of petroleum hydrocarbons in the soil and groundwater, ascertain the effect of natural attenuation, and evaluate potential adverse effects on groundwater quality. The proposed activities designed to accomplish these tasks are described in the following sections.

**4.1 Free Product Investigation**

The results of the subsurface investigations conducted at the former ARATEX facility indicate that the extent of free-product was limited to the northeast corner of the property. However, neither the sandy gravel layer nor the presence of petroleum hydrocarbon-impacted soil or free-product were identified during the recent installation of the SVE observation wells located in the northeast section of the property (February 1994). Although the source of the free product has not been identified, the results of the subsurface investigations indicate that it was most likely due to an off-site release unrelated to the former gasoline storage tanks maintained by ARATEX. To confirm that no free product is present in the unsaturated soil, it is proposed that four (4) soil borings be advanced in the northeast section of the property (Figure 4). Each soil boring will be advanced to a depth of approximately 12-ft bgs using hand augering techniques. Soil samples will be collected from the borings at 5-ft intervals beginning at 1-ft bgs. Each soil sample will be visually inspected for evidence of free product and the presence of VOCs will be monitored using a PID.

**4.2 Soil Investigation**

The results of the soil sampling activities indicate that the extent of petroleum hydrocarbon-impacted soil is limited to the area immediately surrounding the former 7,000-gallon gasoline storage tank and the northeast corner of the property. However, because petroleum hydrocarbons are readily biodegradable, it is likely that concentrations of TPH in the unsaturated soils have been significantly reduced with no

potential of adversely impacting the groundwater quality. In addition to the proposed soil borings located in the northeast section of the property, it is recommended that four (4) soil borings be advanced in the vicinity of the former storage tank (Figure 5) to determine the concentration of petroleum hydrocarbons currently present in the soil. The soil borings will also be advanced to a depth of approximately 14-ft bgs using hand augering techniques.

Soil samples will be collected from the borings at 5-ft intervals beginning at 1-ft bgs using a stainless steel sampler. Soil sampling equipment will be decontaminated thoroughly between soil sample intervals and between borings to minimize the possibility of cross-contamination. The equipment will be washed in trisodium phosphate, rinsed with de-ionized water, and placed on plastic sheeting or aluminum foil to air dry prior to reuse. Decontamination water will be contained in 55-gallon DOT approved drums and stored on-site pending chemical analyses and disposal.

Each soil sample will be monitored with a field PID to provide a field estimate of degree of soil impact and for health-and-safety monitoring. The samples will be prepared for headspace analysis by scraping away one inch of soil from one end of the sampler, sealing both ends of the liner with aluminum foil and tape, and setting the sample aside for one to two hours to allow VOCs from soil pores to volatilize into the headspace. The presence of VOCs in the headspace will be monitored using a PID. Select soil samples will be analyzed for the presence of TPH-G and BTEX using EPA SW-846 Methods 8015 and 8020, respectively. Each soil sample will be sealed with Teflon film, secured by plastic caps, labeled with the boring number, sample depth and date, sealed with tape, placed in a resealable bag, and placed in a chilled cooler for preservation pending delivery to the laboratory.

#### **4.3 Groundwater Investigation**

The results of groundwater monitoring activities conducted during the past 1½-yrs indicate that TPH and BTEX concentrations have not increased over time indicating that groundwater quality has not been significantly affected as a result of residual petroleum hydrocarbons present in the soil. Isoconcentration contour maps generated using the results of the groundwater sampling activities (November 1992, May 1993, November 1993, and May 1994) are presented in Figure 5. As evidenced by the isoconcentration contours, little or no migration has occurred. In addition, the results of chemical analyses of groundwater samples collected from monitoring wells MW-A1, MW-A3, and MW-5 indicate that BTEX concentrations have been consistently below regulatory limits. Based on these trends, it is proposed that monitoring wells MW-A2, MW-4A, MW-6, and MW-8 be sampled on a **semi-annual** basis, monitoring wells MW-A1,

MW-5, and MW-7 be sampled on an **annual** basis, and monitoring well MW-A3 be eliminated from the groundwater monitoring network. All groundwater samples will be analyzed by a state certified analytical laboratory for the presence of TPH-G, TPH-D, and BTEX using EPA SW-846 Methods 8015M and 8020. It is anticipated that the proposed sampling program will provide sufficient data to characterize the water quality and hydrogeology of the site. Once contaminant concentrations approach non-detectable levels, groundwater monitoring activities will be conducted on a quarterly basis until four quarters of non-detectable levels are achieved.

APPENDIX A  
LABORATORY REPORT (SOIL-GAS SAMPLES)

Enseco - Air Toxics Laboratory

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March 7, 1994

RMT, INC.  
4640 Admiralty Way, Suite 301  
Marina del Rey, CA 90292-6621  
ATTN: Dr. James W. Van Nortwick Jr., P.E.

ANALYSIS NO.: 104553-0001/0002  
ANALYSES: Total Hydrocarbons as Hexane  
(ASTM D3416), BTXE (ARB-ADDL004)  
DATE SAMPLED: 02/22/94  
DATE SAMPLE REC'D: 02/23/94

PROJECT: ARATEX SERVISCO

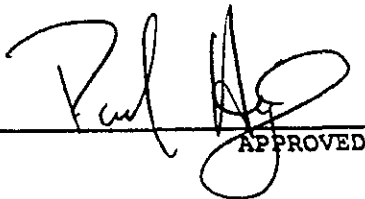
PROJECT NO.: 12012-16

Enclosed with this letter is the report on the chemical and physical analyses for the samples from ANALYSIS NO.: 104553-0001/0002-SA as shown above.

The samples were received by Enseco-Air Toxics Laboratory, intact and with the chain-of-custody record attached.

Please note that ND means not detected at the reporting limits expressed.

The preliminary results were faxed to Dr. James Van Nortwick at 7:37 a.m. on March 1, 1994.

  
\_\_\_\_\_  
APPROVED

3-9-94  
\_\_\_\_\_  
DATE

The Report Cover Letter is an integral part of this report.

SAMPLE DESCRIPTION INFORMATION  
for  
RMT, Inc.

Lab ID	Client ID	Matrix	Sampled Date	Time	Received Date
104553-0001-SA	INITIAL VAPOR SAMPLE	AIR	22 FEB 94	12:10	23 FEB 94
104553-0002-SA	EQUILIBRIUM SAMPLE	AIR	22 FEB 94	12:55	23 FEB 94



**Total Hydrocarbons as Hexane**

Method ASTM D3416

Client Name: RMT, Inc.  
Client ID: INITIAL VAPOR SAMPLE  
Lab ID: 104553-0001-SA  
Matrix: AIR  
Authorized: 23 FEB 94

Sampled: 22 FEB 94  
Prepared: NA

Received: 23 FEB 94  
Analyzed: 23 FEB 94

Parameter	Result	Units	Reporting Limit
Total Hydrocarbons as Hexane	200	ppm (v/v)	5.0

ND = Not detected  
NA = Not applicable

Reported By: Maria Jones

Approved By: Val Mallari

**Total Hydrocarbons as Hexane**

Method ASTM D3416

Client Name: RMT, Inc.  
Client ID: EQUILIBRIUM SAMPLE  
Lab ID: 104553-0002-SA  
Matrix: AIR  
Authorized: 23 FEB 94

Sampled: 22 FEB 94  
Prepared: NA

Received: 23 FEB 94  
Analyzed: 23 FEB 94

Parameter	Result	Units	Reporting Limit
Total Hydrocarbons as Hexane	1600	ppm (v/v)	1000

ND = Not detected  
NA = Not applicable

Reported By: Maria Jones

Approved By: Val Mallari

Benzene, Toluene, Ethylbenzene, Xylenes  
Method ARB-ADDL004

Client Name: RMT, Inc.  
Client ID: INITIAL VAPOR SAMPLE  
Lab ID: 104553-0001-SA  
Matrix: AIR                      Sampled: 22 FEB 94                      Received: 23 FEB 94  
Authorized: 23 FEB 94                      Prepared: NA                      Analyzed: 24 FEB 94

Parameter	Result	Units	Reporting Limit
Benzene	2.0	ppm (v/v)	0.020
Toluene	1.8	ppm (v/v)	0.020
Ethylbenzene	ND	ppm (v/v)	0.020
Xylenes (total)	0.44	ppm (v/v)	0.020

ND = Not detected  
NA = Not applicable

Reported By: Maria Jones

Approved By: Val Mallari

Benzene, Toluene, Ethylbenzene, Xylenes  
Method ARB-ADDL004Client Name: RMT, Inc.  
Client ID: EQUILIBRIUM SAMPLE  
Lab ID: 104553-0002-SA  
Matrix: AIR  
Authorized: 23 FEB 94Sampled: 22 FEB 94  
Prepared: NAReceived: 23 FEB 94  
Analyzed: 24 FEB 94

Parameter	Result	Units	Reporting Limit
Benzene	25	ppm (v/v)	0.080
Toluene	10	ppm (v/v)	0.080
Ethylbenzene	ND	ppm (v/v)	0.080
Xylenes (total)	2.2	ppm (v/v)	0.080

ND = Not detected  
NA = Not applicable

Reported By: Maria Jones

Approved By: Val Mallari

QC LOT ASSIGNMENT REPORT - MS QC  
Air Toxics

Laboratory Sample Number	QC Matrix	QC Category	QC Lot Number (DCS)	QC Run Number (SCS/BLANK/LCS)	MS QC Run Number (SA,MS,SD,DU)
104553-0001-SA	AIR	D-3416-H	23 FEB 94-A1	23 FEB 94-C1	
104553-0001-SA	AIR	ARB-BTEX-G	24 FEB 94-A2	24 FEB 94-A2	
104553-0002-SA	AIR	D-3416-H	23 FEB 94-A1	23 FEB 94-C1	
104553-0002-SA	AIR	ARB-BTEX-G	24 FEB 94-A2	24 FEB 94-A2	



LABORATORIES

F-268 (R2/92)  
(Use Black Ink Only)

Madison, WI 53717  
744 Heartland Trail  
Phone (608) 831-4444  
FAX (608) 831-7530

Santa Monica, CA  
Atlanta, GA  
Baton Rouge, LA  
Troy, MI

Grand Ledge, MI  
Nashville, TN

Greenville, SC  
Schaumburg, IL

Colum, OH  
Waukesha, WI

045142

### CHAIN OF CUSTODY RECORD

Bottles Prepared by: \_\_\_\_\_ Date/Time: 2/22/94

Project No. 13012-16 Client: ARATEX SERVISCO

Total Number Of Containers

Container Inventory										Filtered (Yes/No)	Preserved (Code)
BTX TPH-G										Code: A - None B - HNO3 C - H <sub>2</sub> SO4 D - NaOH E - HCl F - _____	
MATRIX										Comments:	
1	✓	✓									TEDLAR BAGS
1	✓	✓									TEDLAR BAGS
NOTE: 2 DAY HOLD TIME ONLY											
Contact: Kevin Bale 310 578-1241											

SAMPLER Relinquished by (Sig.) ① <i>[Signature]</i>	Date/Time 5:30 2/22/94	Received by (Sig.) ② <i>[Signature]</i>	Date/Time
Relinquished by (Sig.) ③ <i>SIPPED VIA FED EX</i>	Date/Time	Received by (Sig.) ④	Date/Time
Relinquished by (Sig.) ⑤	Date/Time	Received by (Sig.) ⑥	Date/Time

HAZARDS ASSOCIATED WITH SAMPLES

(For Lab Use Only)

Receipt Temp \_\_\_\_\_ Receipt pH \_\_\_\_\_

Custody Seal Present/Absent Seal Intact/Not Intact Seal #'s

APPENDIX B  
BORING LOG/MONITORING WELL CONSTRUCTION DETAILS



# LOG OF TEST BORING

F-203 (R 01-87)

BORING NO. MW-8  
 SHEET NO. 1 OF 1  
 PROJECT NO. 12012.16  
 INSTALLATION \_\_\_\_\_  
 SURFACE ELEV. \_\_\_\_\_  
 BOREHOLE DIA. 8 IN.

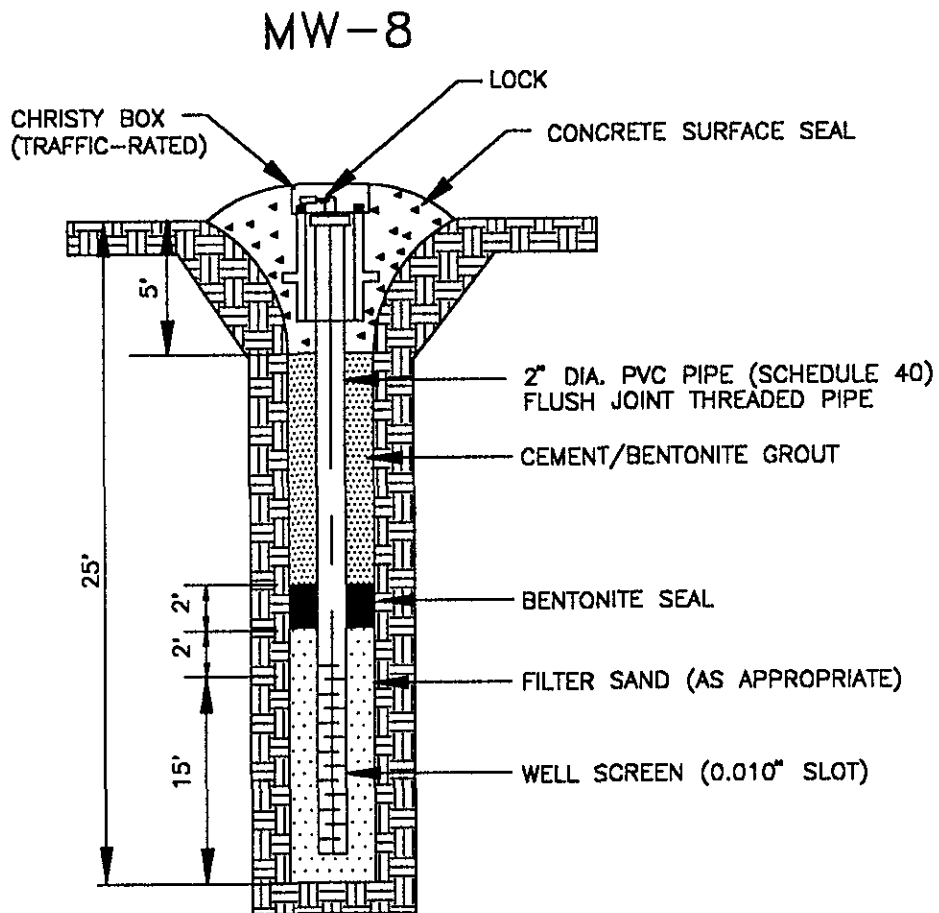
PROJECT NAME ARATEX SERVICES  
 LOCATION SERVISCO  
 CONTRACTOR WEST HAZMAT DRILLING  
 DRILLING METHOD HOLLOW STEM AUGER

SAMPLING NOTES					VISUAL CLASSIFICATION AND GENERAL OBSERVATIONS
INTERVAL		RECOVERY	MOISTURE	DEPTH	
NO.	TYPE	N	%		
1	SS	19 20 23		5	SILTY Clay (CL), slight W
2	SS	5 7 8		10	SILTY Clay (CL), no odor.
3	SS	15 20 26		15	SILTY CLAY (CL), no odor.
4	SS	12 15 24		20	SILTY CLAY (CL), no odor, wet.
5	SS	20 37 45		25	SILTY CLAY (CL), no odor, wet.

**GENERAL NOTES**  
 DATE STARTED 21 FEB 94  
 DATE COMPLETED 21 FEB 94  
 RIG CME-75  
 CREW CHIEF JOHN M.  
 LOGGED K. BATE CHECKED \_\_\_\_\_

**WATER LEVEL OBSERVATIONS**  
 WHILE DRILLING  $\nabla$  17.0  
 AT COMPLETION  $\nabla$  \_\_\_\_\_  
 AFTER DRILLING \_\_\_\_\_  
 CAVE-IN: DATE/TIME \_\_\_\_\_ DEPTH \_\_\_\_\_  
 WATER: DATE/TIME \_\_\_\_\_ DEPTH \_\_\_\_\_





## GROUND WATER MONITORING WELL MW-8 CONSTRUCTION DETAIL

NOT TO SCALE

	DWN. BY: RAS
	APPROVED BY: JVN
	DATE: APRIL, 1994
	PROJ. # 12012.16
	FILE # 1607

Monitoring Well MW-8 Installation Data

Parameter	Measurement
Elevation to Top of Well Box	22.73-ft MSL
Elevation to Top of Well Casing	22.23-ft MSL
Depth to Groundwater	14.23-ft below the top of the casing
Groundwater Elevation	8.00-ft MSL

**APPENDIX C**  
**LABORATORY REPORT (GROUNDWATER SAMPLES)**



Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878

2323 Fifth Street, Berkeley, CA 94710, Phone (510) 486-0900

ANALYTICAL REPORT

Prepared for:

RMT, Inc.  
4640 Admiralty Way  
Suite 301  
Marina Del Rey, CA 90292

Date: 03-MAR-94  
Lab Job Number: 114479  
Project ID: 12012.16  
Location: Servisco

SERVISCO  
RED STAR  
115409 }  
115408 }

Reviewed by: Teresa K Morrison

Reviewed by: [Signature]

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Curtis &amp; Tompkins, Ltd.

LABORATORY NUMBER: 114479  
 CLIENT: RMT, INC.  
 PROJECT ID: 12012.16  
 LOCATION: SERVISCO

DATE SAMPLED: 02/22/94  
 DATE RECEIVED: 02/22/94  
 DATE ANALYZED: 03/02/94  
 DATE REPORTED: 03/03/94

Total Volatile Hydrocarbons with BTXE in Aqueous Solutions  
 TVH by California DOHS Method/LUFT Manual October 1989  
 BTXE by EPA 5030/8020

LAB ID	SAMPLE ID	TVH AS GASOLINE (ug/L)	BENZENE (ug/L)	TOLUENE (ug/L)	ETHYL BENZENE (ug/L)	TOTAL XYLENES (ug/L)
114479-6	MW8	270	3.2	ND(0.5)	0.6	0.9

ND = Not detected at or above reporting limit; Reporting limit indicated in parentheses.

QA/QC SUMMARY

RPD, %  
 RECOVERY, %

3  
 94

Name: **RM T** Phone #: **310 578 1241**  
 Address: **40 Admiralty** FAX #: **310 821 3280**  
 Manager: **Northwick** Site location: **Services**  
 Client Project ID: (#) **12012.16**  
 (NAME) **in Van Northwick**  
 that the proper field sampling procedures were used during the collection of samples.

STX/602  8020/IC  8020/IC with MTBE   
 BTEX/Gas Hydrocarbons PID/FID  with MTBE   
 Hydrocarbons GC/FID Gas  Diesel  Screen   
 Hydrocarbon Profile (SIMDIS)   
 Oil and Grease 413.1  413.2  SM 503   
 TPH/R 418.1  SM 503   
 EDB by 504  DBCP by 504   
 EPA 503.1  EPA 502.2   
 EPA 601  EPA 8010   
 EPA 602  EPA 8020   
 EPA 608  8080  PCB only   
 EPA 624/PPL  8240/TAL  NBS (+15)   
 EPA 625/PPL  8270/TAL  NBS (+25)   
 EPA 610  8310   
 EP TOX Metals  Pesticides  Herbicides   
 TCLP Metals  VOA  Semi-VOA  Pest  Herb   
 EPA Metals - Priority Pollutant  TAL  RCRA   
 CAM Metals TLIC  STLC   
 Lead 239.2  200.7  7420  7421  6010   
 Organic Lead   
 Corrosivity  Flash Point  Reactivity

Field Sample ID	GTEL Lab # (Lab use only)	# Containers	Matrix						Method Preserved					Sampling		DATE	TIME	REMARKS
			WATER	SOIL	AIR	SLUDGE	PRODUCT	OTHER	HCl	HNO <sub>3</sub>	H <sub>2</sub> SO <sub>4</sub>	ICE	UNPRESERVED	OTHER SPECIFY	DATE			
M 8-5	114479-1	1	✓													2/21		
M 8-10	-2	1	✓													2/21		
M 8-15	-3	1	✓													2/21		
M 8-20	-4	1	✓													2/21		
M 8-25	-5	1	✓													2/21		
MWB	-6	3	✓													2/22		
old block	-7	3	✓													2/22		

Special Handling  
 Standard (24 hr)  
 Jiled (48 hr)  
 Business Days  
 5-7 Days  
 CLP  OTHER \_\_\_\_\_

SPECIAL DETECTION LIMITS  
 SPECIAL REPORTING REQUIREMENTS  
 FAX

REMARKS  
 Contacted Jim Van Northwick about analysis requested: **TVH/BTKF on MW-8 only**  
 Lab Use Only Lot # \_\_\_\_\_ Storage Location: \_\_\_\_\_  
 Work Order # \_\_\_\_\_  
 Received by: *[Signature]*

**RECEIPT AND CUSTODY RECORD**

Relinquished by Sampler: <i>[Signature]</i>	Date: 2/22	Time: 4:10	Received by: <i>[Signature]</i>
Relinquished by:	Date:	Time:	Received by:
Relinquished by:	Date:	Time:	Received by Laboratory:
Waybill # _____			