WORK PLAN

ADDITIONAL INVESTIGATIONS
958 - 28th STREET
OAKLAND, CALIFORNIA

June 91

PREPARED

FOR

ARATEX TECHNICAL SERVICES

SCHAUMBURG, ILLINOIS

BY

RMT, INC.

SANTA MONICA, CALIFORNIA

JUNE 1991

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1. INTRODUCTION

This Work Plan has been prepared for Aratex Services, Inc. (ARATEX) of Schaumburg, Illinois in response to past regulatory requirements and recent site findings. The Plan covers three work elements. The first element is a continuation of the semiannual ground water monitoring initiated in November of 1990. The second element focusses on investigating the extent of hydrocarbon contamination in the former "Storage Yard" lot [monitoring well MW-4] area. The third work element is a thorough investigation of the former "Loading Dock" area where recent construction activities have encountered fuel range and aromatic hydrocarbons in the near surface soils.

1.1 Site Location And Setting

The site is located, as shown on Figure 1, in southwestern Alameda County at 958-28th Street, Oakland. From the U.S.G.S. Oakland West Quadrangle (7.5 minute series) the site area is relatively flat; approximate site elevation is estimated to be about 20 feet above mean sea level and the site area grades toward San Francisco Bay at approximately 0.5%. The site is in an older section of the city that is zoned for mixed use. Present local use is predominantly residential with a few small commercial and industrial facilities interspersed. There is a public school on the south side of 28th Street and a meat packing facility, which does not appear to be operational, on the east side of Myrtle Street.

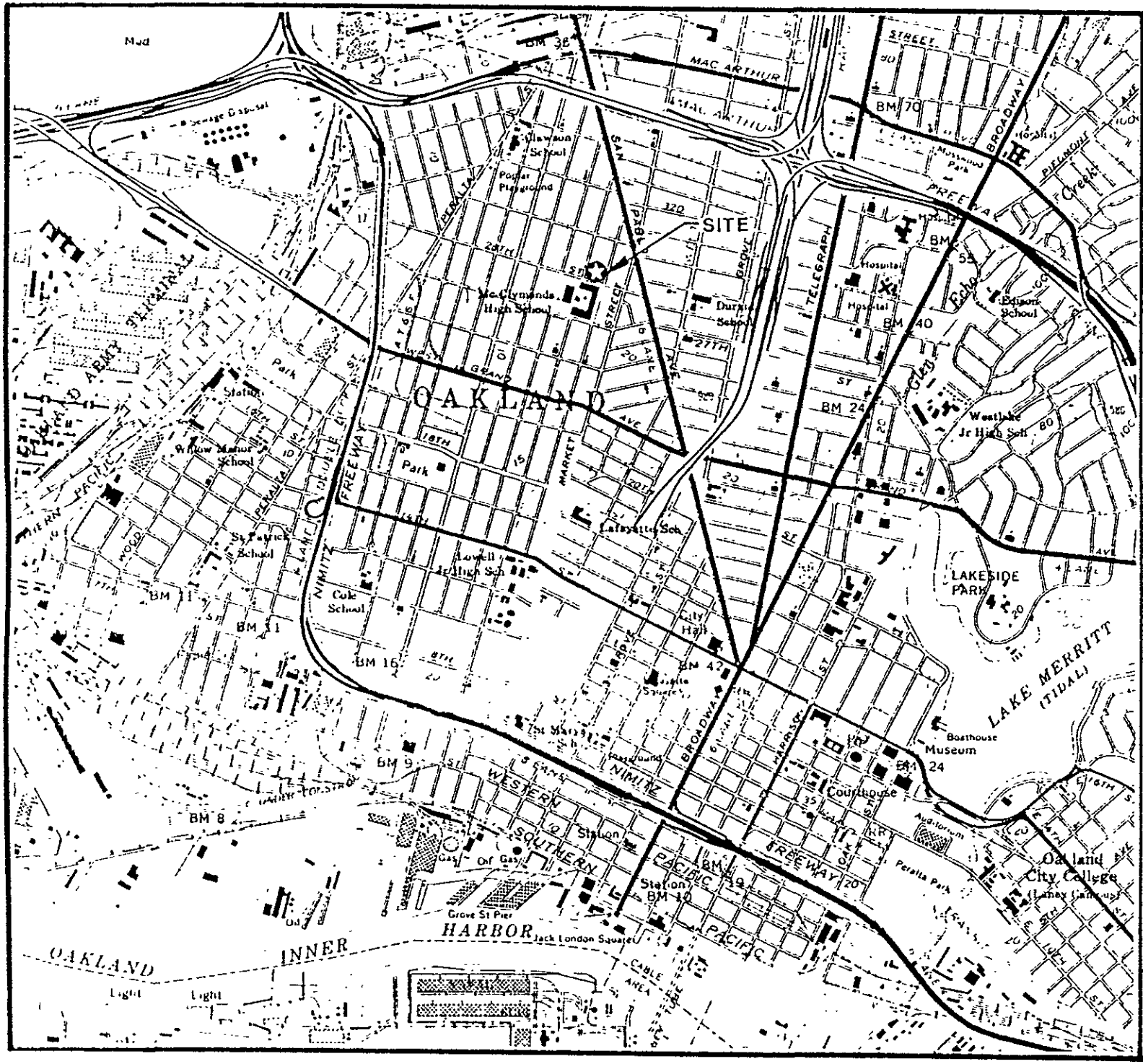
Local geology is mapped in the U.S.G.S. report Areal and Engineering Geology Of The Oakland West Quadrangle, California by Dorothy H. Radbruch (Map I-239) as Pleistocene-aged Temascal Formation underlain by the Alameda Formation. Hickenbottom and Muir (June 1988) map the site area as Quartenary-aged Older Alluvium of the Pleistocene Epoch. Ms. Radbruch characterized the Temescal as irregularly shaped and discontinuous "interfingering layers of moderate yellowish-brown clayey gravel, sandy silty, clay, and various clay-silt-sand mixtures;" with a gravel layer at the base where the formation is exposed. Further, "In some places the gravel grades upward into sand and then clay within a few feet...several similar sequences of gravel grading upward into clay may overlie the first sequence." The surficial two to four feet are typically, dark clayey soil. The Temascal formation is estimated to be about five feet thick along the bank of the Bay and up to 25 feet thick at its eastern boundary along Temascal Creek.

Ms. Radbruch characterizes the underlying Alameda Formation as several hundred feet thick and sedimentary in origin. Radbruch describes it:

> "Upper exposed part is clay, sandy, silty, with few pebbles...Olive gray to moderate-yellowish. Consolidation increases with depth, except that the upper portion has been preconsolidated [desiccation]...in places an old soil is exposed at the top of the formation. Overlain by Temascal formation, Merrit sand, or bay mud."

Hickenbottom and Muir (June, 1988) characterize Older Alluvium as "layers of poorly consolidated to unconsolidated clay, silt, sand and gravel."

Observations made during on-site investigations are consistent with both descriptions. The surficial 15 to 20 feet consists of interbedded sands, silts, and clays with occasional gravels. The underlying materials and to the approximately 35-foot depth explored appear to be predominantly clays with occasional gravel zones.



CALIF

QUADRANGLE LOCATION

FIGURE 1

SITE VICINITY MAP OF FORMER SERVISCO SITE OAKLAND, CA FOR ARATEX SERVICES, INC. SCHAUMBERG, IL

SOURCE: USGS OAKLAND WEST QUADRANGLE MAP, 7.5 MIN. SERIES.

NORTH

SCALE: 1"=2000'

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Hydrogeologically, the site is located in the East Bay Plain Area of Alameda County. First ground water within the East Bay Plain is located near the ground surface and typically not used for domestic water supply (Hickenbottom and Muir, June 1988). Ground water occurs under both confined and unconfined conditions. Recharge to the reservoir occurs from infiltration [rain and stream flows] and subsurface inflow from adjacent areas. Hickenbottom and Muir (June 1988) identified less than a dozen ground water wells within a mile radius of the site. Further, they determined that well density in the general area, which has long been urbanized, to be less than five per square mile.

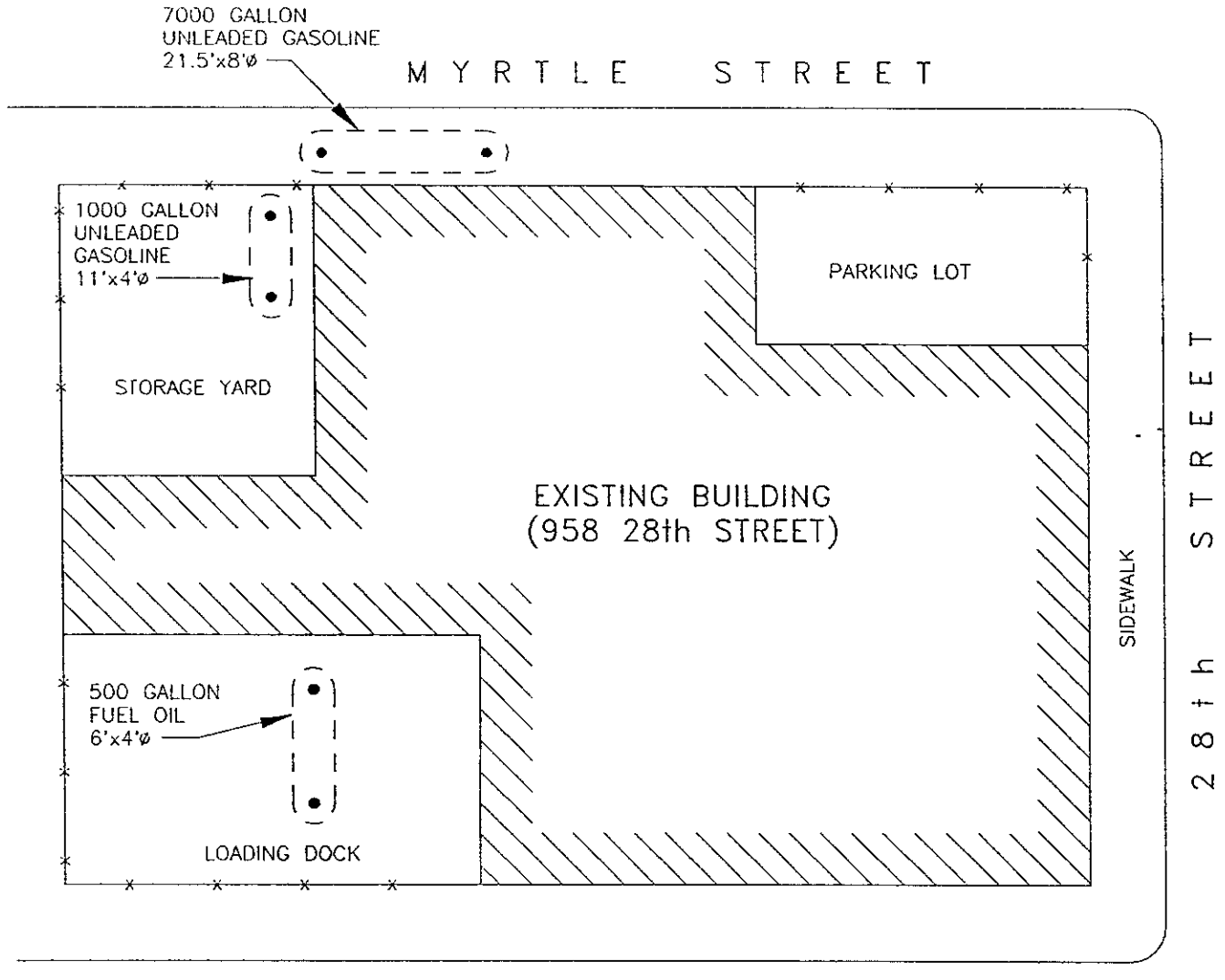
Subsurface conditions at the site have been investigated by at least ten borings and six ground water monitoring wells. Specific details on the investigations are contained in the investigative reports completed to date by International Technology Corporation (IT Corp.) dated July 1988 and March 1989, and by RMT, Inc dated July 1990 and January 1991. Based on the logs developed from drilling and sampling at the site, the near surface lithology consists of interbedded clays, silts, sands, and occasional thin gravel zones. First ground water at the site occurs at a depth of about 15 feet.

1.2 Background

Development and operations history of the site is limited. Through 1986, Servisco leased the site at 958-28th Street in Oakland, California from Golden State Linen, the property owner of record. Servisco operated an industrial laundry at the site. Available information is that vehicle maintenance was performed at the facility and that there were three underground storage tanks (UST) as shown approximately on Figure 2. It is not known when the facility began operations, the date when Servisco began operations, or the date(s) of UST installation(s). ARATEX acquired Servisco in 1986 and continued site operations until vacating in 1988. As part of vacating the leased site, ARATEX had the three UST removed in May of 1988 (IT Corp.; July 5, 1988). In 1989, the owner leased portions of the site for mixed commercial and light industrial use, including automotive repair/rebuilding. We are not aware of how the site is presently being used. However, it is known that resurfacing of some undeveloped site areas has begun and that the "Loading Dock" area at the northwest corner of the property is one of these . A chronologic summary of known site investigations is summarized in the following paragraphs. Sources of more detailed information are referenced.

1.3 Previous Investigations

The 1988 tank closure(s) were reported to Alameda County, Department of Hazardous Material Division (AC-DHMD) and observed, at least in part, by an AC-DHMD representative (IT Corp.; July 5, 1988). The testing performed for closure certification detected high boiling point hydrocarbons in the subgrade at the east end of the 500 gallon fuel oil UST. Benzene, toluene and low boiling point hydrocarbons were detected in the excavation subgrade of the 7,000 gallon gasoline UST. The AC-DHMD requested soil and ground water investigations to determine the extent of hydrocarbons detected in the subgrade during closure (IT Corp.; March 29, 1989). The initial post-closure investigations are detailed in IT Corp.'s report dated March 29, 1989.



NOTES:
1 Reproduced from IT Corp. report dated March 29, 1989 and titled "Ground Water Monitoring Well Installation".

2. Depths to tank inverts or amount of soil cover not indicated.

3 Tanks were removed on May 19, 1988 by IT Corp.

NOT TO SCALE

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FILE #	1660502

FIGURE 2

The 98 mg/kg of high boiling point hydrocarbons detected in the subgrade of the 500 gallon tank excavation was investigated by one boring extending to two feet below the excavation depth. The soil sample, which was obtained over the interval of 16.5 to 17 feet, was analyzed for high boiling point hydrocarbons and aromatic volatile organic compounds (AVOCs) hydrocarbons. [It is not known if the sample was from below the ground water table]. Only benzene was detected and this at a concentration of 80μg/kg (IT Corp.; March 1989). There is no indication in the available records that any additional/follow up investigations of this area were required.

The former 7,000 gallon tank area was investigated at three locations as shown on Figure 3. All three locations were completed as ground water monitoring wells. Ground water samples and selected soil samples were analyzed for hydrocarbon contamination. Low boiling point hydrocarbons (TPH-G), high boiling point hydrocarbons (TPH-D), and AVOCs were detected in both soil and ground water. The Alameda County Health Care Services Administration (AC-HCSA) [and the Regional Water Quality Control Board, San Francisco Region (RWQCB)] required ground water monitoring (AC-HCSA; May 8, 1989) and additional subsurface investigations (AC-HCSA; August 17, 1989) to further evaluate site conditions. ARATEX retained RMT, Inc (RMT) to perform the additional site work required: 1) one year of quarterly monitoring of the existing three [post-closure] ground water wells, 2) construction of additional wells to better define site ground water conditions, and 3) additional investigations south of the former tank's location to evaluate the lateral extent of contaminated soil.

The results of the four, quarterly ground water monitorings and supplementary investigation are presented in Supplementary Subsurface Investigation, Former Servisco Facility (RMT, July 1990). The supplementary investigation locations along with the existing on-site ground water monitoring wells are shown on Figure 3. Well construction details are summarized at the end of this subsection. Key findings and conclusions of the supplementary investigation and quarterly ground water monitoring were:

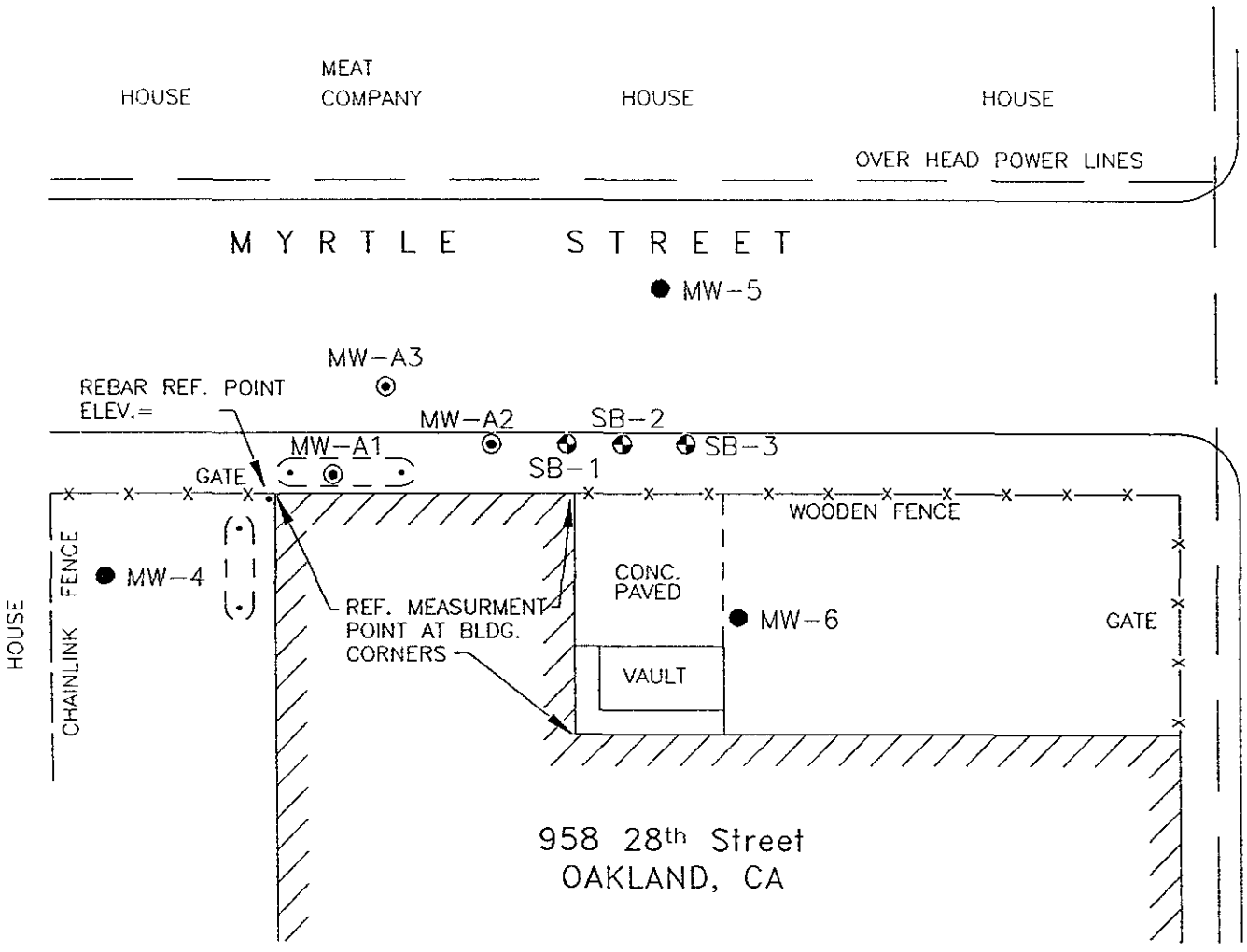
1. Petroleum hydrocarbons were not detected in vadose samples from boring SB-3, which was about 30 feet south of MW-A2. No petroleum hydrocarbons were detected in vadose zone samples obtained from locations MW-5 and MW-6, which are about 60 feet to the east and 60 feet to the southwest of the 7000 gallon tank's excavation.

2. Gasoline range hydrocarbons and AVOCs were detected in soils samples from location MW-4. Free product that accumulated in well MW-4 in the two weeks following well development and the initial sampling was characterized [by laboratory testing] as gasoline. Well MW-4 is located just inside of the "Storage Yard", approximately 70 feet northwest of the former 7000 gallon tank and about 20 feet north of the former 1,000 gallon gasoline tank's locations.

3. The ground water flow direction computed from all ground water monitorings completed to date has generally been to the south by southwest at a gradient of approximately 1%.

4. Ground water analyses/monitoring results for the three initial wells show a significant decrease over time in both hydrocarbons and aromatics concentrations.

5. Neither fuel range hydrocarbons nor AVOCs were detected in the initial [March 1990] ground water analyses of samples from wells MW-5 and MW-6. Analyses results for the subsequent monitoring of November 1990 was non-detect for well MW-5 and nearly 8μg/l of benzene and 70 μg/l of TPH-G for the MW-6. There is not sufficient data to determine any trend for the quality of ground water in either of these two wells.



Legend:

- ⊙ Ground water monitoring wells installed by IT corp. February 1989
- ● Ground water monitoring wells installed by RMT; March 1990.
- ◐ Soil borings installed by RMT, March 1990.

[14.40] Top of well casing elevation

NOTES:
1. Well and soil boring plan locations determined by precission tape measure relative to fixed site points.

Scale: 1"=30'

Previously Completed
Site Investigations

RMT INC.

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FILE #	12012103

FIGURE 3

6. Based on the ground water analyses results, the former 7,000 gallon tank does not appear to have affected ground water outside the immediate area of its former location.

A meeting was convened on October 17, 1990, in the AC-HCSA, Oakland office to review the findings and conclusions of the Supplementary Subsurface Investigation report (RMT, July 1990) and discuss project direction. Mr. Dennis Byrne of AC-HCSA, ARATEX representatives, Ms. Beatrice Slater of Golden State Linen, and RMT's project engineer attended the meeting. The discussions and agreements of the meeting are summarized in Ms. Whitsett's [Armbruster] letter to AC-HCSA dated October 19, 1990. Most notably, it was agreed to 1) continue ground water monitoring for the next year at frequency of six months between readings and 2) separately, investigate the potential source of free product detected in MW-4.

TABLE 1

MONITORING WELLS CONSTRUCTION SUMMARY

SUPPLEMENTARY SUBSURFACE INVESTIGATION

958-28th STREET; OAKLAND, CALIFORNIA

	MW-A1	MW-A2	MW-A3	MW-4	MW-5	MW-6
CNSTR BY:	IT Corp.	IT Corp.	IT Corp.	RMT	RMT	RMT
DATE:	2-17-89	2-17-89	2-17-89	3-05-90	3-06-90	3-05-90
WELL DIA:	4-inch	4-inch	4-inch	2-inch	4-inch	4-inch
FILTER:	#3 Sand	#3 Sand	#3 Sand	#1C Sand	#1C Sand	#1C Sand
From	16-ft	16.5-ft	23.5-ft	8-ft	8-ft	8-ft
To	28-ft	28-ft	34.5-ft	25-ft	30-ft	30-ft
SCREEN:	0.02-inch	0.02-inch	0.02-inch	0.01-inch	0.01-inch	0.01-inch
From	16.5-ft	18-ft	24.5-ft	10-ft	10-ft	10-ft
To	26.5-ft	28-ft	34.5-ft	25-ft	30-ft	30-ft
T.O.C.:	15.03 ft	14.40 ft	14.48 ft	15.65 ft	14.40 ft	14.46 ft

NOTES:

1. International Technology Corporation: March 29, 1989; Ground Water Monitoring Well Installation [958-28th Street; Oakland, California]; by John P. McGuire.

2. Details of well construction for wells installed by IT Corp. obtained from Boring Logs included in above 1.

3. Well top of casing (T.O.C.) surveyed by RMT on March 21, 1990. Reference datum established bolt at northeast building corner having reference elevation 15.95 feet.

1.4 Owner's Development Investigation

Subsurface Consultants, Inc. (SCI) of Oakland, California was retained by the owner to investigate the "petroleum odors" encountered on site during construction of new parking lots in early 1991. SCI obtained three samples from a depth of approximately 0.5 feet. Sampling locations were indicated to be in the general area of the former 500 gallon fuel tank that had been located [at depth] in the unloading dock area at the northwest corner of the property. Two of the samples were analyzed as indicated below with the following findings (SCI; May 23, 1991).

Monitoring Wells Construction Summary

TEST	METHOD	SAMPLE 1	SAMPLE 2
Total Extractable Hydrocarbons	EPA 8015	1,600 mg/kg	ND
Total Oil and Grease	SWM 17:5520 E&F	4,900 mg/kg	370 mg/kg
Benzene	EPA 8020	300 ug/kg	ND
Toluene	"	89 ug/kg	ND
Ethylbenzene	"	910 ug/kg	5,300 ug/kg
Xylenes	"	3,400 ug/kg	15,000 ug/kg

These levels of heavy hydrocarbons and aromatic compounds require further investigation.

1.5 Purpose and Scope

The semiannual ground water monitoring will be continued as before. The source and extent of low boiling point hydrocarbons in the "Storage Yard"/MW-4 area will be investigated by at least four and up to eight soil borings. Additionally, the 2-inch well MW-4 will be abandoned and replaced by a 4-inch well which is screened over a more finite interval. The recent discovery of hydrocarbons and AVOCs in the near surface of the "Loading Dock" area will be investigated by up to eight borings extending down to the top of ground water. One of the borings will be extended to 15 feet below groundwater and be completed as a 4-inch diameter groundwater monitoring well. Soil samples will be screened in the field for volatile organic emissions and noticeable indications of hydrocarbon contamination. Field observations and screening will be used to decide if "optional" investigation locations are warranted. Selected samples will be analyzed for fuel range hydrocarbons and aromatic compounds. The results will be analyzed individually and collectively to address:

- Trends in ground water quality.
- The sources of organic hydrocarbon contamination in the former "Storage Yard" area.
- The extent of organic hydrocarbon contamination in both the former "Storage Yard" and former "Loading Dock" areas.

Comprehensive reports will be prepared to document the investigations and present the findings. Work will be performed under the direction of a California-registered engineer or geologist.

2. PROPOSED WORK SCOPE

The three proposed work elements comprising this Work Plan are described below. Field and analyses procedures are detailed in Sections 3 and 4, respectively. A Hazard Assessment and Health-and-Safety Plan (HA/H&S) have been prepared for this project based on all available information. The HA/H&S Plan has been prepared for RMT's employees working [in which they may come into contact with field generated materials] on any aspect of this project . It is included as Attachment A.

2.1 Ground Water Monitoring

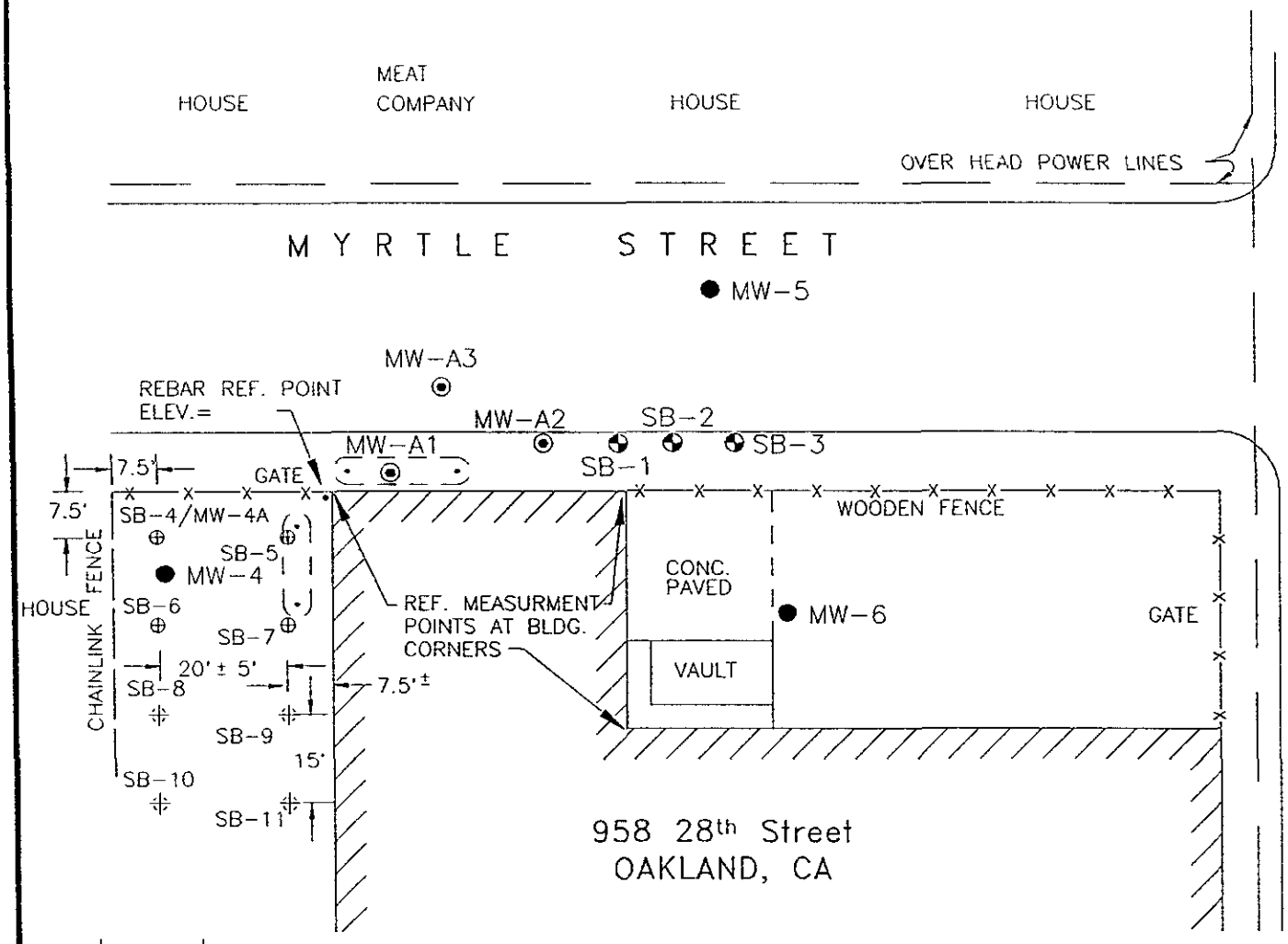
The semiannual ground water monitoring initiated in November of 1990, will be continued as before. Replacement well MW-4A, which will be installed as part of this work plan, will also be included in this and subsequent monitoring. All six ground water monitoring wells will be sampled as described in Section 3 and analyzed as before. All collected ground water samples will be analyzed for low boiling point hydrocarbons (TPH-G) and dissolved aromatic volatile organic compounds (AVOCs) by TMA/NorCAL, who has performed most of RMT's previous testing and is California DHS-certified to perform the proposed testing.

2.2 MW-4/Storage Yard Area

A geometric pattern of up to eight borings are proposed to investigate the extent and source of the TPH-G accumulating in existing well MW-4. These borings will be numbered in sequence with previously completed vadose zone investigation borings. Proposed boring locations are designed to step out incrementally away from MW-4.

Borings SB-4 and through SB-7 will ring existing well MW-4 as shown on Figure 4. The dimensions indicated are approximate only and will depend on accessibility in the field. SB-5 and SB-7 will be drilled as close to the building as practicable and at the approximate ends of the former tank location, which is estimated to be about 15 feet. Borings SB-4 and SB-6 will be drilled directly across from SB-5 and SB-7 and as close to the fence along the northern property limit as practicable. Boring pairs SB-8 and SB-9, and SB-10 and SB-11 will also be completed if there is evidence in either preceding borings pair of VOCs.

Boring SB-4, which will be completed as a ground water monitoring well [replacement for MW-4], will extend down to about 22 feet as shown on Figure 5. All other borings in this area will extend down to the top of ground water, which is estimated to be at about 14-foot depth at this time of year. Sampling will be continuous below 5-foot depth to completion. A sample will also be collected from within 1-foot of the surface. Below ground water, the frequency of sampling in SB-4 will be decreased to not less than every 2.5 feet . SB-4 will be completed as [4-inch diameter] ground water monitoring well MW-4A. The filter pack/screen interval be limited to no more than 15 feet in length. Additionally and as practicable, the filter pack/screened interval will be constructed as to isolate any overlying hydrocarbon contaminated vadose zone areas from the ground water table.



NOTES

1. Well and soil boring plan locations determined by precission tape measure relative to fixed site points.
2. SB-4 to be drilled and sampled to 22 feet and completed as ground water monitoring well MW-4A. (Screened below sand layer observed at 10 foot depth in boring MW-4.)
3. All other borings (SB-5 thru SB-11) will be drilled to top of ground water (approximately 15). Sample continuously from five feet through completion.
4. Optional borings SB-8 through SB-11 will be drilled if OVM screening of samples from easterly boring detects organic vapors in excess of 100 ppm for any of the samples.
5. All borings will be grouted from the bottom up to the surface with "6 sack" mix or as required by Alameda County Flood Control and Water Conservation District.

Legend:

- ◉ Ground water monitoring wells installed by IT corp February 1989.
- ● Ground water monitoring wells installed by RMT; March 1990.
- ◒ Soil borings installed by RMT, March 1990.
- ⊕ Proposed soil boring location
- ⌖ Optional soil boring

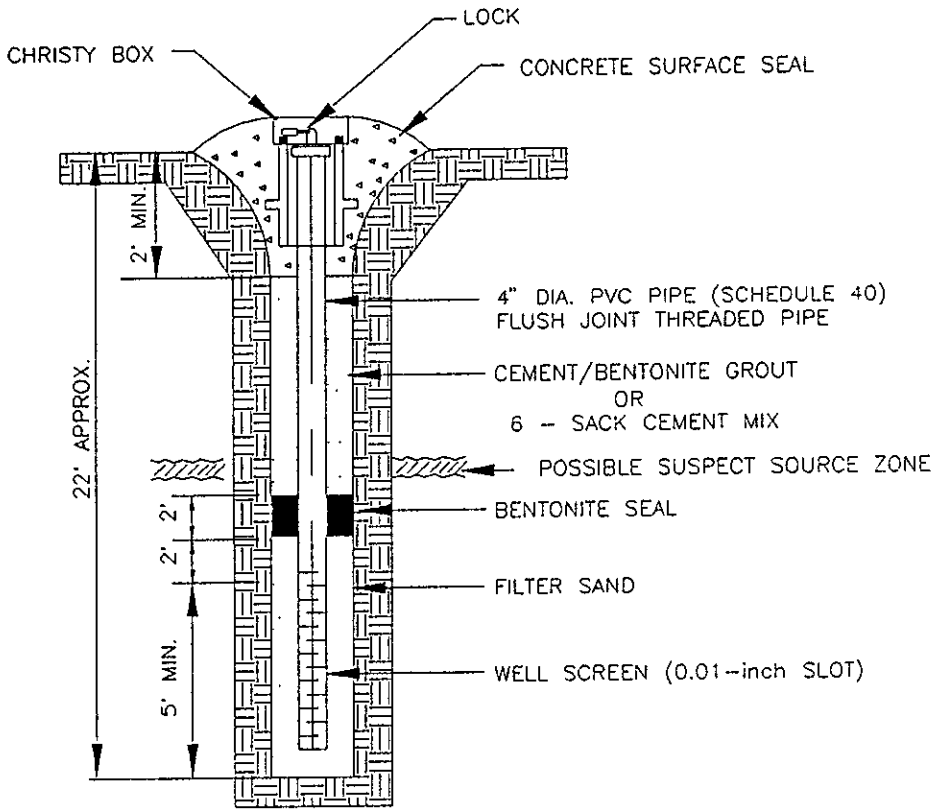
Scale: 1"=30'

PROPOSED INVESTIGATION PLAN
FORMER GASOLINE UST AREA

RMT INC.

DWN. BY.	RAS
DATE.	JUNE, 1991
PROJ.#	12012.10
FILE #	12012104

FIGURE 4



WELL DIAGRAM
OBSERVATION WELL CONSTRUCTION DETAIL

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DATE	JULY, 1991
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FILE #	12012105

FIGURE 5

2.3 Former Loading Dock Area

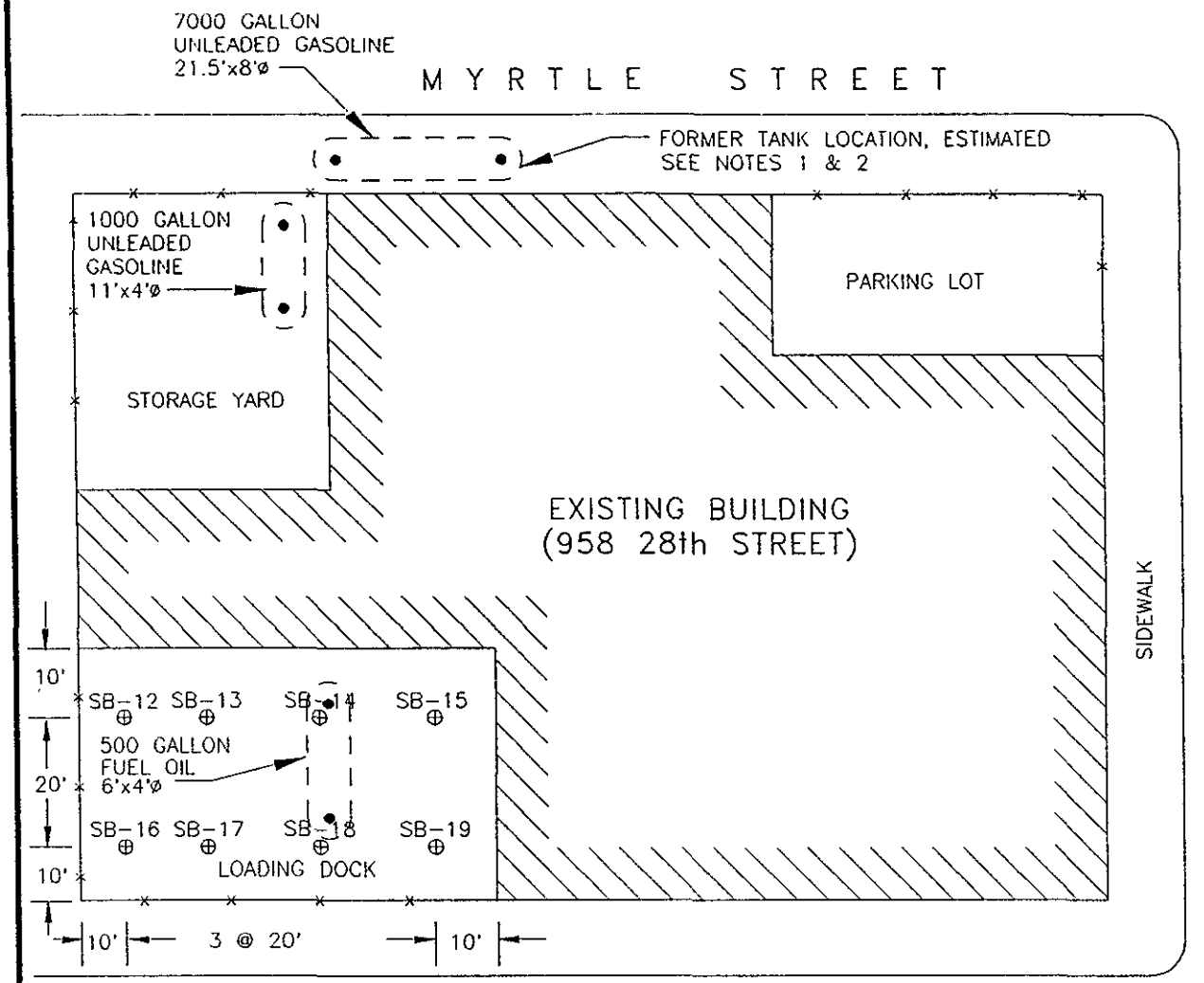
Eight borings covering the "Loading Dock" area are proposed to investigate the vertical and lateral extent of high boiling point hydrocarbons in the vadose zone soils. We understand that in the Storage Yard Area the surficial few feet of soil has been reworked during repaving and [due to "pumping"] as such has in all probability obscured any evidence where the 500 gallon fuel oil tank was located. Since no UST installation or removal as-builts are available from which to plan investigation locations, a closely-spaced geometric distribution, as shown on Figure 6, is considered the best method for investigation and possibly locating the tank excavation.

Borings for this area will be conducted in the same manner as described above for the "Storage Yard" area. Each soil sample interval will be field screened for evidence of hydrocarbon contamination. Selected soil samples will be analyzed by TMA/NorCAL for high boiling total petroleum hydrocarbons and AVOCs.

One of the above boring locations will be extended to below ground water for monitoring well installation. Soil sampling below ground water will be at 5-foot intervals or at lithologic changes. The well will be constructed as shown on Figure 5.

2.4 Schedule

We propose to complete all of the above field work the week of July 15, 1990, including development of the new well [MW-4A] and the second of three semiannual ground water monitoring sampling. Analytical testing will be completed within the prescribed two week holding time. Because of the number of tests that will be performed, receipt of the final analytical results is not expected for another couple of weeks. Another month will be required to analyze the data and finalize the report. Allowing an additional two weeks for client review and finalization, reporting of this work scope is targeted for September 25, 1991.



LEGEND

- ⊙ Ground water monitoring wells installed by IT corp. February 1989.
- ● Ground water monitoring wells installed by RMT; March 1990.
- ◒ Soil borings installed by RMT, March 1990.
- ⊕ Proposed soil boring location
- ⌖ Optional soil boring

NOTES :

1. Former tanks locations and site plan reproduced from IT Corp. Report titled "Ground Water Monitoring Well Installation", March 29,1989.
2. Tanks removed in May of 1988 (IT Corp; July 5,1988).
3. Proposed boring locations reflect spatial distrbution across the "Loading Dock" lot; actual locations will depend in accessibility and lot size
4. See Figure 4 for proposed investigations in "storage Yard" lot.

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PROPOSED INVESTIGATION PLAN
FORMER 500 GALLON FUEL OIL UST AREA
958-28th STREET
OAKLAND, CALIFORNIA

RMT INC.

DWN. BY:	RAS
DATE:	JULY, 1991
PROJ #	12012.10
FILE #	12012106

FIGURE 6

3. FIELD PROCEDURES

Outlined below are the sampling methodologies and protocols controlling the investigations. All sampling equipment used to sample [or develop] ground water monitoring wells will be decontaminated prior their use at each location. Drilling and sampling equipment will be steam cleaned, as further described in Section 3.6, before starting each boring and at the finish of each day's drilling.

3.1 Ground Water Sampling

Samples will be collected in accordance with RWQCB guidelines. Prior to sampling, all the [4-inch diameter] wells will be purged:

1. At least three casing volumes and one filter pack volume of water will be evacuated from each well. A void ratio of 0.5 will be assumed for the filter pack to calculate interstitial water volume.

2. Monitored parameters [Ph, conductivity, and temperature] do not vary by more than 10 percent between three successive readings. Readings will be taken at least once every 5 gallons for 4-inch wells.

3. The turbidity of the purge waters is less than 5 ntu or varies by less than 10 percent over three successive readings. Readings will be taken at the same time as the parameters monitoring.

Purging will be by manual means or bladder pump. Depth to water will be measured at the start and finish of purging, and at intermediate times if significant drawdown is observed. Well drawdown during purging, if any, will be limited to no more than 50 percent of the water column's height within the casing. Cascading will not be allowed. Purge volumes will be measured in a 5 gallon bucket that will be emptied into DOT-approved and appropriately labeled, 55 gallon drums. A record of well purging volumes, measurements, monitoring, and observations will be maintained through completion of sampling.

Samples for laboratory organics analyses will be obtained manually using a bottom-filling teflon bailer [approximately 4-foot long and 1.5-inch diameter]. The bailer will be decontaminated before each use. Sterile sample containers will be provided by the analytical laboratory. A clean nylon rope will be used to slowly lower the bailer bottom about five feet below the standing water level. A stop cock will be inserted into the bottom of the bailer to transfer the collected sample into 40 ml, clear glass "VOA" vials with teflon septum and screw on lids. Triplicate samples will be obtained from each well. Sample vials will be over-filled, tightly capped, checked for air bubbles, adjusted as necessary, and labeled. The samples from each well will be placed in a clear zip lock bag, preserved in an ice-filled cooler (shuttle), and logged onto Chain-of-Custody Forms. [Soil samples will be preserved in a separate container.] The sample shuttle will be delivered under chain of custody protocol to the analytical laboratory at the completion of ground water sampling.

Sampling quality control will include one trip blank, one duplicate, one decontamination method blank, and one rinsate blank. The analytical laboratory will provide the [filled] trip blank, which will remain in the sample cooler/shuttle. A duplicate sample will be prepared for blind testing by the laboratory. Sampling equipment decontamination procedures will be checked by testing a sample of deionized water that has been poured through the sampling assembly after decontamination. A sample of the final rinse water at the completion of sampling will also be tested.

3.2 Ground Water Measurements

Depth to ground water will be checked at least once daily while site work is in progress. Depth to ground water will also be checked in each of the wells just prior to the start of purging [and development] sampling and at completion. Water depth measurements will be by tape accurate to 0.01 foot. Top of Casing (TOCs) elevations will be reestablished relative to mean sea level. As part of this surveying the state plane coordinates of the well locations will also be established [typical RWQCB requirement]. A water table map will be developed from a typical data set.

3.3 Drilling and Sampling

Drilling of the proposed soil borings will be by truck-mounted, rotary drilling equipment. Advancement and sampling will be by continuous-flight, hollow stem augers having a minimum borehole diameter of 8 inches. RMT will be on-site during all drilling-related activities to observe compliance with this work plan, log the borings, perform health and safety monitoring, and obtain the necessary samples for laboratory

3.4 Soil Sampling

Soil sampling will be through the hollow of the augers, using a 2.5-inch diameter split spoon sampler. The recovered samples will be logged in the field using the Unified Soil Classification System (USCS). Field descriptions would be adjusted, based on laboratory index properties results. The sampler will be advanced by a 140 pound hammer, free-falling through a distance of about 30 inches. Sampling information such as recoveries, penetration resistance, and general observations will be included on the logs. At locations where analytical samples are required, the split spoon sampler will be fitted [internally] with three, 6-inch long brass sleeves to obtain "undisturbed" samples.

One sample from each sampled interval will be preserved, as for laboratory analyses. Generally, this sample will be the bottom-most and full sample liner. The soil-filled liner will be trimmed flush, ends covered with aluminum foil or teflon, capped with plastic end caps, sealed with electric tape, and labelled. Sealed samples will be packed in an ice-filled cooler (sample shuttle). Another liner sample will also be prepared in much the same manner for head space VOC emissions. An approximately 1-inch deep cavity will be carved out of one end, covered, and allowed to stabilize prior to monitoring with the PID [Readings will be recorded on the field log]. Representative lithologic samples will also be obtained to assist with stratigraphic interpretations and material characterization.

Disturbed samples or extra liner samples will be used for any index (engineering) properties testing.

All soil test samples for chemical analysis will be logged onto Chain of Custody forms and assignee noted prior to their release by RMT. Completed Chain of Custody forms and sample shuttle(s) will either be couriered or delivered by an RMT representative to the testing laboratory within 48 hours of sampling excepting weekends and holidays. Lithologic and duplicate samples will be retained by RMT for storage in a specially designated refrigerator. Any samples shipped to the laboratory would be archived there until the completion of testing or expiration of the allowable holding time. All samples will ultimately be disposed of in accordance with state requirements.

3.5 Field Monitoring

A site specific Health and Safety Plan, incorporating the most recent Occupational Health and Safety Administration (OSHA) revisions is included in Attachment A. Health and Safety specific monitoring will be performed in the breathing zone, above the open borehole, at the completion of drilling, or when odors indicate otherwise. A direct reading, photoionization detector (PID) with a 10 electron volt lamp will be used to monitor for VOC emissions. Colorimetric tubes will be used to monitor VOCs that are known or suspect carcinogens.

The PID will also be used to screen representative soil samples obtained from each sampling interval [above the ground water table]. These field assessments will be used in evaluating which samples have uncharacteristically high or low PID readings. The field monitoring results will aid in selecting soil samples for laboratory analyses.

3.6 Decontamination Procedures

All sampling equipment which will contact soils or ground water will be decontaminated prior to being used. Decontamination of drilling equipment is necessary to prevent cross-hole contamination. Drilling augers will be steam cleaned prior to each use and at the completion of drilling. The stainless steel split spoon sampler, "shoe", "head", and individual brass liners used during soil sampling will be decontaminated prior to each down-hole trip, i.e. for each sampling interval:

1. Brushing and washing sampling equipment with tap water to remove any particulate matter and visible surficial films [this step may be skipped if no residue is visible or considered to be insignificant.]

2. The equipment will then be washed/rinsed with a tri-sodium phosphate (TSP) and deionized water mixture to remove potential contaminants.

3. The TSP-washed equipment will then be rinsed thoroughly with deionized (DI) water to remove TSP residuals.

4. The rinsed equipment will be placed in the sun, on clean aluminum foil, in readiness for its use. Given the frequency at which the split spoon sampler is typically used, it is unlikely that there will be sufficient time for it to air dry. The brass liner tubes will be air dried before use.

Large equipment that will/may contact the samples, such as augers, stands, wrenches, and the working area of the drill rig will be steam-cleaned and visually inspected for hydraulic fluid leaks or other malfunctions. Equipment which fails the inspection will either be repaired and/or replaced. It is planned to use water from the on-site source of public water. Augers will be steam cleaned at the end of each working day and before the next days work. Exceptions to this would include if the augers are left down the hole or if the drill rig remains on-site between successive borings.

3.7 Wastes Containment and Disposal

Department of Transportation approved (DOT 17H) drums with positive sealing covers will be used to contain waste generated by the investigation. Wastes will be segregated by boring and material type. Drum contents will be clearly marked on both the side and top. An inventory will be maintained until the wastes are properly disposed of.

Pursuant to the analytical results and materials characterization, the drums will be disposed of at a suitable facility. Drums containing materials that are characterized as being hazardous will be manifested and transported to a licensed hazardous waste disposal or recycling facility. The non-hazardous wastes will also be disposed of off-site at a suitably licensed facility. Removal and disposal of the drummed wastes is not part of this work scope.

4. LABORATORY CHEMICAL ANALYSES

All ground water samples and selected soil samples will be analyzed for petroleum hydrocarbons. The ground water monitoring, including any new wells as part of this work will be analyzed as before. Soil samples will be analyzed for total petroleum hydrocarbons and aromatic compounds as detailed below.

4.1 Ground Water

All ground water samples, including QA/QC blanks, will be analyzed for dissolved hydrocarbons by TMA/NorCAL of Richmond, California. They will be analyzed for gasoline-range, total petroleum hydrocarbons constituents and aromatic volatile organic compounds. TPH-G testing will be by EPA Method 8015M. Analyses for aromatic compounds will be by EPA Method 602 [8020]. Samples for TPH-G testing will be prepared by EPA Method 3520. A total of ten ground water samples will be analyzed: six well samples and QA/QC blanks.

4.2 Soil Samples

Selected vadose zone soil samples will be analyzed for contamination by petroleum hydrocarbons: low boiling point and high boiling point hydrocarbons by EPA Method 8015; AVOCs by Method 8020. Methods 5030 and 3540 will be used for the TPH. Selection of samples for analyses will be based on a combination of field data, including field observations and VOC-screening and stratigraphy. A minimum of two samples from each boring will be analyzed as described below.

A minimum of two samples from each boring in the "Storage Lot" area will be analyzed for both low boiling and high boiling point hydrocarbons and AVOCs. One sample will come from any contiguous strata observed to contain free product. If product is not observed, sample selection will be on the basis of VOC readings recorded by field monitoring. Additional samples will be selected from strata considered most likely to retain product. For example, at the top of a fine grained strata underlying pervious materials.

A minimum of three samples from each boring in the former "Loading Dock" area will be analyzed for high boiling point hydrocarbons and AVOCs. One sample will be from the surficial two feet. The other two samples will be obtained in the interval from five feet to fifteen feet, the estimated completion depth. Sample selection will be based on the criteria described above for the "Storage Lot" area analyses. Additional analyses will be performed as deemed appropriate to define the vertical distribution of petroleum hydrocarbons. Additionally, the two boring locations having the highest field monitoring readings, the surface and deep samples will also be analyzed for low boiling point hydrocarbons.

Two samples from the soil stockpiles in the "Loading Dock" area will be analyzed. There two samples will be analyzed for TPH-G, TPH-D, and AVOCs. Results will be used to identify disposal options.

5. REFERENCES

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ARATEX SERVICES, Inc; January 26, 1989; RE: Groundwater Monitoring Well Installations at 95 E. 28th St. Oakland, CA; Letter to Mrs. Mary Jo Meyers-Barnes; Phil Krejci, Director of Environmental Management.

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International Technology Corp.; July 5, 1988; UNDERGROUND STORAGE TANK PERMANENT CLOSURE REPORT, 958 EAST 28TH STREET, OAKLAND, CALIFORNIA [IT PROJECT NUMBER 190260]; Letter to Mr. Phil Krejci; John P. McQuire, Supervisor UST Engineering.

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