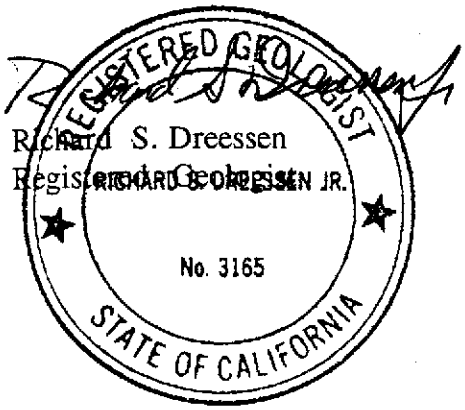
GROUNDWATER MONITORING WELL INSTALLATION REPORT
RAS-CO MANUFACTURING COMPANY, INC.
413 WEST SUNSET BOULEVARD
HAYWARD, CA 94541

Prepared For:
MR. OSCAR LANG
RAS-CO MANUFACTURING COMPANY, INC.
413 WEST SUNSET BOULEVARD
HAYWARD, CA 94541

Submitted By:
TANK PROTECT ENGINEERING
Of Northern California, Inc.
2821 WHIPPLE ROAD
UNION CITY, CA 94587
(510) 429-8088

August 5, 1999

Project Number 329



Richard S. Dreessen
Registered Geologist

Jeff J. Farhoomand, M.S.
Principal Engineer

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This report has been prepared by the staff of **Tank Protect Engineering of Northern California, Inc.** under direction of an Engineer and/or Geologist whose seal(s) and/or signature(s) appear hereon.

The findings, recommendations, specifications or professional opinions are presented, within the limits prescribed by the client, after being prepared in accordance with generally accepted professional engineering and geologic practice. We make no other warranty, either expressed or implied.

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1.0 INTRODUCTION

The subject site is located at 413 West Sunset Boulevard in the City of Hayward in Alameda County, California and is occupied by RAS-CO Manufacturing Company, Inc. [(RAS-CO) see Figure 1]. The contact person is Mr. Oscar Lang; telephone number (510) 782-3161.

On November 10, 1994, TPE removed one 500-gallon and one 250-gallon gasoline, steel, single-walled, underground, storage tank from the subject site. Details on tank closure activities, soil sampling and analytical results are documented in TPE's December 16, 1994 TANK CLOSURE REPORT AND WORKPLAN FOR EXCAVATION OF CONTAMINATED SOIL, RAS-CO MANUFACTURING COMPANY, INC., 413 WEST SUNSET BOULEVARD, HAYWARD, CA 94541.

Because soil samples collected at the time of tank removal detected total petroleum hydrocarbons as gasoline (TPHG) at concentrations of 1,100 parts per million (ppm) and 5,000 ppm in the north and east sidewalls of the excavation, respectively, RAS-CO contracted with Tank Protect Engineering of Northern California, Inc. (TPE) to investigate and remediate vadose zone soil contamination.

TPE conducted investigation and remediation of vadose zone soil contamination on March 27, and June 9 and 12, 1995 by excavation with a backhoe. Details on overexcavation activities, verification sampling and analytical results are documented in TPE's December 16, 1994 TANK CLOSURE REPORT AND WORKPLAN FOR EXCAVATION OF CONTAMINATED SOIL, RAS-CO MANUFACTURING COMPANY, INC., 413 WEST SUNSET BOULEVARD, HAYWARD, CA 94541 (WP).

Because verification soil samples and the "grab" groundwater sample collected from the excavation detected TPHG at concentrations up to 160 ppm and 10,000 parts per billion (ppb), respectively, RAS-CO contracted with TPE to install a groundwater monitoring well in the verified downgradient direction of the former tank excavation as a preliminary groundwater investigation. The groundwater investigation was required by the Alameda County Health Care Services Agency (ACHCSA). TPE's WP was approved by the ACHCSA in a February 15, 1996 letter to RAS-CO (see Appendix A).

This Groundwater Monitoring Well Installation Report (GWMWIR) documents work conducted under the above WP and present's the findings of TPE.

2.0 GROUNDWATER MONITORING WELL INSTALLATION

As a preliminary investigation of groundwater contamination, TPE conducted the following scope of work:

- Obtained a well installation permit.
- Drilled a soil boring to the depth of about 33 feet for installation of a groundwater monitoring well.
- Collected soil samples from the boring for preparation of a boring log and for chemical analysis.
- Analyzed 1 vadose zone soil sample for TPHG, Methyl Tertiary Butyl Ether (MTBE), and benzene, toluene, ethylbenzene, and xylenes (BTEX).
- Converted the boring into a 2-inch diameter casing groundwater monitoring well.
- Developed, purged and sampled the well.
- Analyzed 1 groundwater sample and a trip blank sample for TPHG, MTBE and BTEX.
- Collected and analyzed 1 groundwater sample from the agricultural well for TPHG, MTBE and BTEX.
- Prepared this GWMWIR.

2.1 Predrilling Activities

Prior to beginning field activities, TPE obtained a drilling permit (Permit Number 99WR251) from the Alameda County Public Works Agency (see Appendix A).

2.2 Rationale for Location of the Groundwater Monitoring Well

Monitoring well MW-1 was installed about 10 feet downgradient from the former underground tanks (see Figure 2). This location was based upon gradient information obtained from the ACHCSA on 2 sites located near the subject site, 310 Bartlett Avenue and 525 West A Street (see Figure 1).

2.3 Soil Boring and Sampling Procedures

The exploratory boring for the groundwater monitoring well was drilled on June 17, 1999 by the State of California licensed water well driller PC Exploration, Inc. (C-57 license number 265556) using 8-inch diameter, hollow-stem, auger drilling equipment. The augers were steam-cleaned before drilling to prevent the introduction of offsite contamination to the boring. Soil samples were continuously collected, beginning at a depth of about 5 feet below the ground surface to the total depth explored, for construction of a lithologic log and for selection for chemical analysis. Soil samples in the vadose zone were collected by advancing a California split-spoon sampler, equipped with 2-inch diameter by 6-inch long brass tubes, into the undisturbed soil beyond the tip of the augers. The sampling equipment was cleaned before each sampling event by washing with an Alconox solution and rinsing in tap water.

Drill cuttings were stored on site in 55-gallon drums. Each drum was labeled to show material stored, known or suspected chemical contaminant, date filled, expected removal date, site name, contact person, and telephone number.

A detailed monitoring well construction design (see Appendix B) was prepared from auger return material and split-spoon samples. The soil was logged according to the Unified Soil Classification System under the direction of a California Registered Geologist.

Appendices C and D document TPE's protocols relative to hollow-stem auger drilling and soil sampling procedures, and waste handling and decontamination procedures, respectively.

2.3.1 Soil Sample Selection for Chemical Analyses

Selected soil samples were examined for the presence of apparent hydrocarbon contamination based on visible hydrocarbon stains, odors, and headspace analysis for volatile organic compounds using a Gastech. Inc., Trace-Techtor hydrocarbon vapor tester (HVT). Headspace analysis was conducted by sealing the soil sample in a quart-size plastic bag and warming the bagged sample to promote volatilization of any hydrocarbons that may be present in the soil. The headspace in the plastic bag was tested by inserting the probe of the HVT into the bag while minimizing the entry of new air into the bag and recording the response in ppm.

One sample (MW-1) was collected at a depth of about 15.5 feet for chemical analysis. The sample was preserved in a brass tube by quickly covering the open ends with Teflon sheeting and capping the tube ends with plastic end-caps. The tube was labeled to show site name, project number, date and time collected, sample name, depth collected, and sampler name; sealed in a quart-size plastic bag; and stored in an iced cooler. The sample was delivered to the California Department of Health Services (DHS) certified laboratory Priority Environmental Labs (Priority) located in Milpitas, California accompanied by chain-of-custody documentation.

Appendices E and F document TPE's protocols relative to sample handling and quality assurance and quality control procedures, respectively.

2.3.1.1 Results of Chemical Analyses

Sample MW-1 was analyzed for TPHG by DHS Method 5030/8015 and for MTBE and BTEX by EPA Method 8020.

All analytical results were nondetectable.

Analytical results are summarized in Table 1 and documented with a certified analytical report and a chain-of-custody in Appendix G.

2.4 Groundwater Monitoring Well Installation

The exploratory boring for groundwater monitoring well MW-1 was drilled to a depth of about 33 feet on June 17, 1999. Groundwater was encountered at a depth of about 25 feet. The boring was converted into a groundwater monitoring well by installing 2-inch diameter, flush-threaded, schedule 40, polyvinyl chloride (PVC) casing and 15 feet of 0.010-inch machine-slotted screen.

A sand pack of Number 2/12 filter sand was placed in the annular space of the well from the bottom of the screen to about 2 feet above the top of the screened interval and about 1 foot of bentonite was placed above the sand pack followed by a neat cement slurry seal to ground surface. A traffic rated, bolt-locked, vault box was set in concrete to protect the well and a water tight locking well cap with lock was installed on the well casing.

Appendix H documents TPE's protocol relative to groundwater monitoring well construction procedures, and see Appendix B for monitoring well construction design.

2.5 Groundwater Monitoring Well Development

Well MW-1 was developed on June 28, 1999. Before development, depth-to-groundwater was measured from the TOC to the nearest 0.01 foot using an electronic Solinst water level meter. A minimum of 3 repetitive measurements were made for each level determination to ensure accuracy. The well was checked for floating product using a dedicated polyethylene bailer. No floating product was present in the well.

The well was developed by using a 1.7-inch, positive displacement, PVC hand pump until no further improvement in the water clarity was apparent (see Appendix I for Record of Well Development).

Development water was stored on site in a 55-gallon steel drum labeled to show contents, date filled, suspected chemical contaminant, company's name, contact person and telephone number.

Appendix J documents TPE's protocol relative to groundwater monitoring well development procedures.

2.6 Groundwater Monitoring Well Sampling

Well MW-1 was sampled on June 29, 1999. Before sampling, depth to stabilized water was measured and recorded as discussed about under section 2.5 Groundwater Monitoring Well Development. Depth-to-water was 21.86 feet below TOC.

Before sampling, the well was purged with a dedicated disposable polyethylene bailer until the temperature, pH, and electrical conductivity of the water in the well had stabilized (see Appendix I for Record of Water Sampling). After purging was completed, a water sample was collected in laboratory supplied, preserved, clean, sterilized, 40-millimeters glass vials having Teflon-lined screw caps; and labeled with project name, date and time collected, sample number, and sampler name. The sample was immediately stored in an iced-cooler for transport to Priority accompanied by chain-of-custody documentation.

The well was checked for floating product using a dedicated, disposable polyethylene bailer. No odor, sheen, or floating product was detected in the well.

Appendix K documents TPE's protocol relative to groundwater monitoring well sampling procedures. Appendices D and F document TPE's protocols relative to waste handling and decontamination procedures, and quality assurance and quality control procedures, respectively.

Purge water was stored on site in a labeled 55-gallon steel drum.

2.6.1 Results of Chemical Analyses

Groundwater sample MW-1 and the trip blank sample MW-2 were analyzed for TPHG by EPA Method 5030/8015 and for MTBE and BTEX by EPA Method 602.

All analytical results were nondetectable.

Analytical results are summarized in Table 2 and documented with a certified analytical report and a chain-of-custody in Appendix G.

2.7 Agricultural Well Sampling

The agricultural well AW was purged and sampled on June 29, 1999 as described above in section 2.6 Groundwater Monitoring Well Sampling. Depth-to-water was 21.38 feet (see Appendix I for Record of Water Sampling). A groundwater sample (AW) was collected from the well and transported to Priority accompanied by chain-of-custody documentation.

2.7.1 Results of Chemical Analyses

Groundwater sample AW was analyzed for TPHG by EPA Method 5030/8015 and for MTBE and BTEX by EPA Method 602.

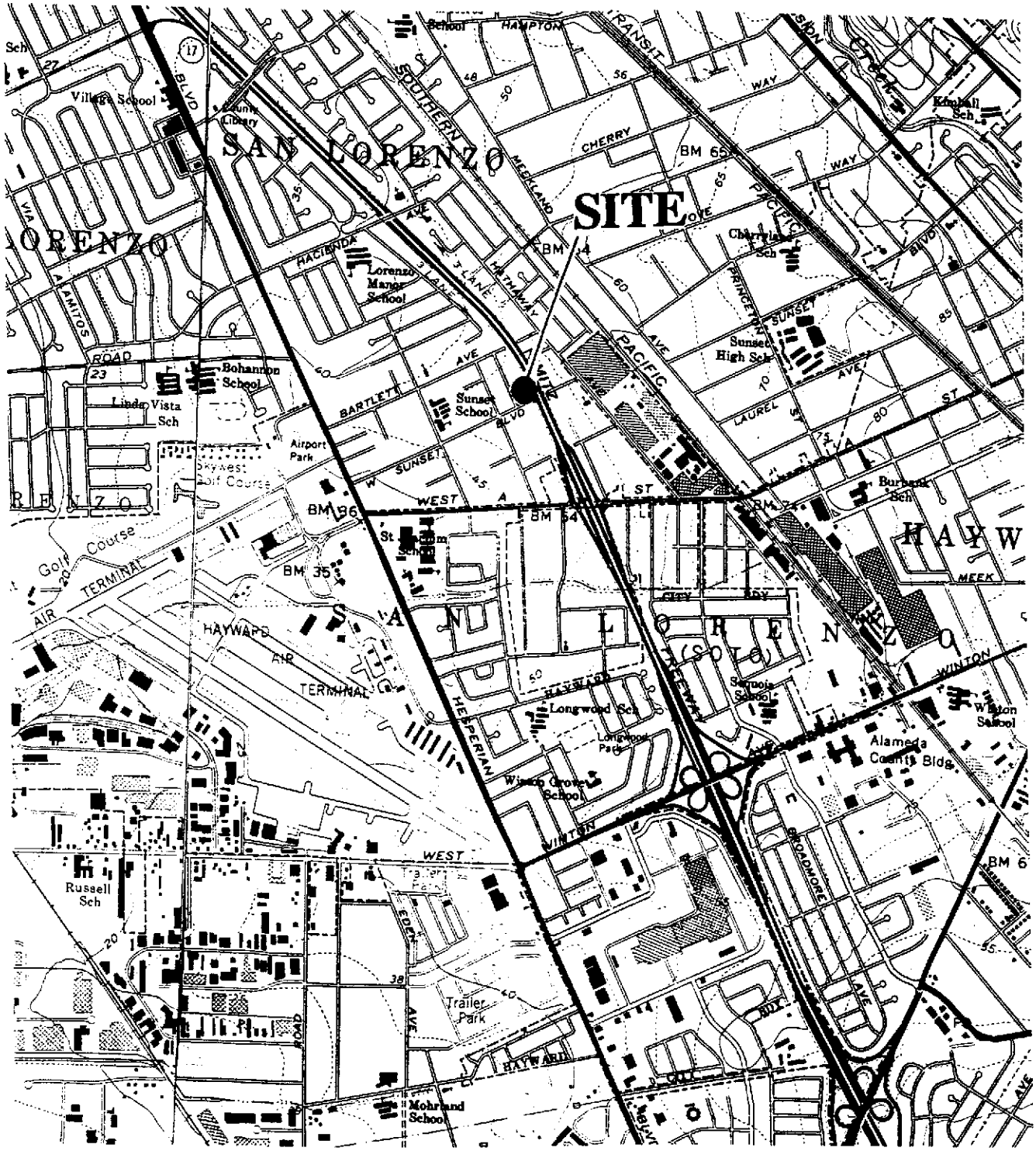
All analytical results were nondetectable.

Analytical results are summarized in Table 2 and documented with a certified analytical report and a chain-of-custody in Appendix G.

3.0 CONCLUSION AND RECOMMENDATIONS

Chemical analyses of soil and groundwater samples for well MW-1 were nondetectable for TPHG, MTBE and BTEX chemicals.

Based on the above results, TPE recommends quarterly groundwater sampling of well MW-1 until 4 consecutive quarters of nondetectable analytical results for TPHG, MTBE and BTEX are achieved. At that time, TPE will recommend that the client request site closure from the ACHCSA.



LEGEND

REFERENCE: USGS 7.5 MINUTE SERIES QUADRANGLE MAP 1959 HAYWARD & SAN LEANDRO, CALIFORNIA PHOTOREVISED 1980

N

0 2,000

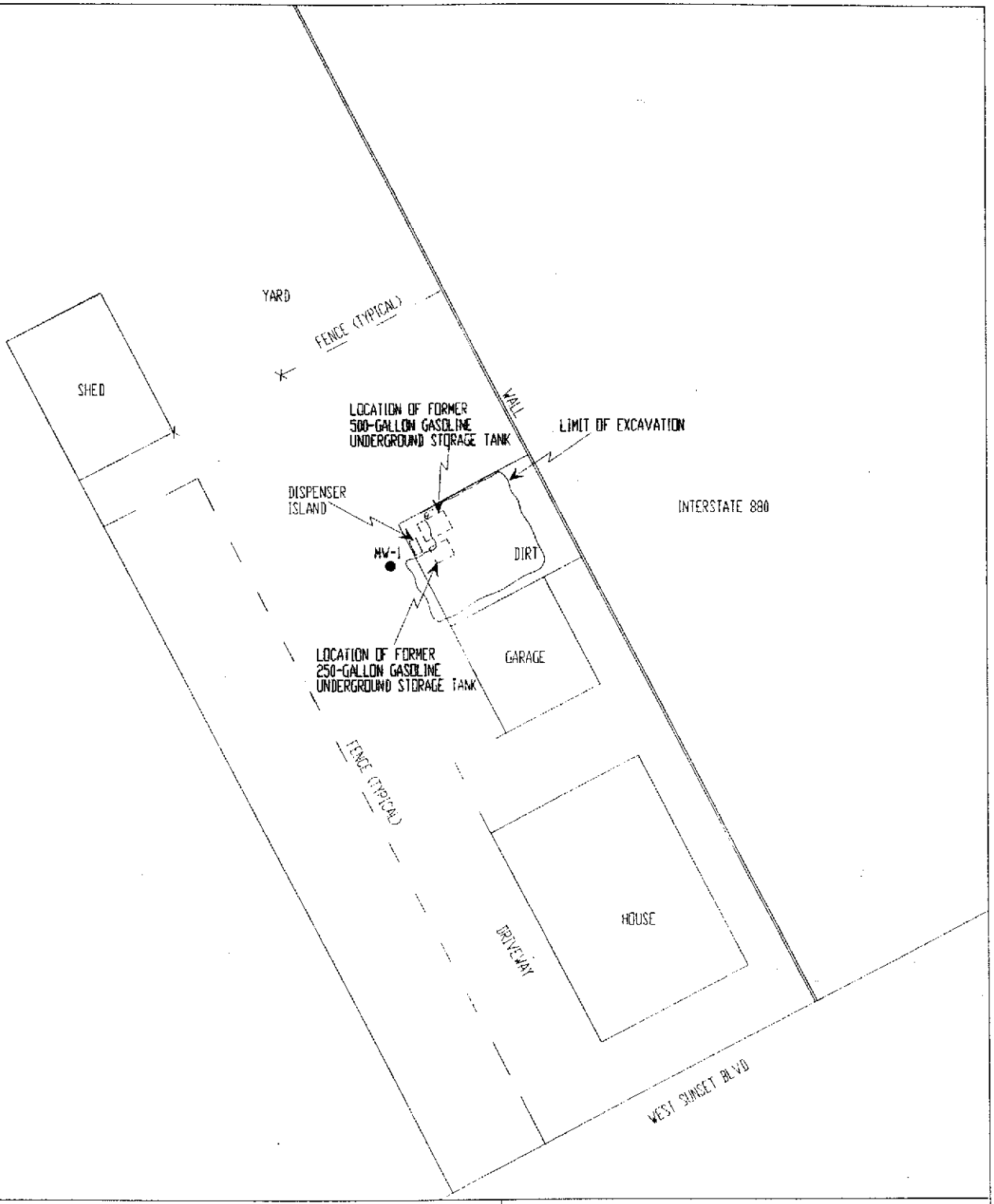
SCALE IN FEET

TANK PROTECT ENGINEERING

SITE VICINITY MAP

RAS-CO MANUFACTURING CO.
413 W. SUNSET BLVD.
HAYWARD, CA 94541

DATE	1/30/96
FIGURE	1
FILE #	329-N
DRAWN BY	VK
CHECKED BY	LNH



LEGEND

MW-1 ● NAME AND LOCATION OF GROUNDWATER MONITORING WELL

-N-

0 30

APPROXIMATE SCALE IN FEET

TANK PROTECT ENGINEERING

SITE PLAN:
MONITORING WELL LOCATION

RASCO MANUFACTURING CO.
413 W. SUNSET BLVD.
HAYWARD, CA 94141

DATE	06/29/99
FIGURE	2
FILE #	329-1T
DRAWN BY	VK
CHECKED BY	RD

TABLE 1
SUMMARY OF SOIL SAMPLE ANALYTICAL RESULTS
(ppm[1])

Sample ID Name	Date	Depth (Feet)	TPHG	Benzene	Toluene	Ethyl-benzene	Xylenes	MTBE
MW-1	06/17/99	15.5-16.0	<1.0	<.005	<.005	<.005	<.005	<.005

[1] PARTS PER MILLION

TABLE 2
SUMMARY OF GROUNDWATER SAMPLE ANALYTICAL RESULTS
(ppb[1])

Sample ID Name	Date	TPHG	Methyl t-Butyl ether	Benzene	Toluene	Ethyl-benzene	Xylenes
AW	02/29/96	<500	1,200	<5.0	<5.0	<5.0	<15
	06/29/99	<50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-1	06/29/99	<50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-2[2]	02/29/96	<500	<50	<5.0	<5.0	<5.0	<15
	06/29/99	<50	<0.50	<0.50	<0.50	<0.50	<0.50

[1] PARTS PER BILLION
[2] TRIP BLANK

APPENDIX A

ALAMEDA COUNTY HEALTH CARE SERVICES AGENCY,
FEBRUARY 15, 1996 LETTER AND
ALAMEDA COUNTY PUBLIC WORKS AGENCY PERMIT

ALAMEDA COUNTY
HEALTH CARE SERVICES
AGENCY
DAVID J. KEARS, Agency Director

RAFAT A. SHAHID, DIRECTOR

DEPARTMENT OF ENVIRONMENTAL HEALTH
1131 Harbor Bay Parkway
Alameda, CA 94502-6577
(510) 567-6700

StId 4118

February 15, 1996

Karniel, Oscar, and Mildred Lang
Ras-Co Manufacturing Company, Inc
413 W Sunset Blvd
Hayward CA 94541

Subject: Workplan for investigations at 413 West Sunset Blvd., Hayward

Dear Messrs. and Ms. Lang:

This office has reviewed Tank Protect Engineering of Northern California, Inc.'s (TPE) work plan, dated February 8, 1996. This work plan proposes to install one groundwater monitoring well in the assumed downgradient location approximately 10 feet west of the former underground storage tank (UST) pit at the subject site. This work plan is acceptable to this office with the following comments/additions:

- There is a domestic well located along the northwest side of this site. Please supply this office with any information that may be available on this well, including type of use and construction logs. Groundwater should be sampled and analyzed from this well using appropriate sampling protocols.

- The installation of one monitoring well may *not* be sufficient to delineate the lateral extent of groundwater contamination at this site. Be advised that if elevated levels of petroleum hydrocarbons are detected in samples collected from the proposed monitoring well or the on-site domestic well, then you may be required to further define the lateral extent of groundwater contamination. As we discussed during our telephone conversation on February 5 and 15, 1996, in addition to the proposed monitoring well, you may want to include additional sample locations during this phase of investigations to assist in confirming the extent of groundwater contamination.

- All groundwater samples should be analyzed for TPHg, BTEX, and Methyl Tertiary Butyl Ether (MTBE). (See the attached memo for MTBE reporting requirements.)

- Please check with the State Trust Fund regarding their requirements for obtaining three bids prior to completing proposed work.

As we discussed, if you submit documentation confirming a completion date for these investigations to this office *in writing* by February 26, 1996, then it may be appropriate to cancel the Pre-Enforcement Panel Review scheduled on February 28, 1996.

Please notify this office at least 72 hours before field work begins. If you have questions, please call me at (510)567-6755 or Eva Chu at (510)567-6762 between February 20 - 23, 1996.

Sincerely,

Amy Leech

Amy Leech
Hazardous Materials Specialist

ATTACHMENT

c: Tank Protect Engineering, 2821 Whipple Rd., Union City CA 94587
Gordon Coleman-File(ALL)

ALAMEDA COUNTY PUBLIC WORKS AGENCY

WATER RESOURCES SECTION
951 TURNER COURT, SUITE 300, HAYWARD, CA 94545-2651
PHONE (510) 670-5575 ANDREAS GODFREY FAX (510) 670-5262
(510) 670-5248 ALVIN KAN

DRILLING PERMIT APPLICATION

FOR APPLICANT TO COMPLETE

LOCATION OF PROJECT 413 W. Sunset Blvd
Hayward CA 94541

California Coordinates Source / ft. Accuracy ± / ft.
CCN / ft. CCE / ft.
APN /

CLIENT
Name Rac-Co Manufacturing Co.
Address 413 W Sunset Blvd Phone (510) 782-3161
City Hayward Zip 94541

APPLICANT
Name Tank Protect Engineering of Northern CA
Fax (510) 429-9089
Address 2821 Whipple Road Phone (510) 429-8088
City Union City Zip 94587

TYPE OF PROJECT
Well Construction
- Cathodic Protection ☐
- Water Supply ☐
- Monitoring ☑

Geotechnical Investigation
- General ☐
- Contamination ☐
- Well Destruction ☐

PROPOSED WATER SUPPLY WELL USE
- New Domestic ☐
- Replacement Domestic ☐
- Municipal ☐
- Irrigation ☐
- Industrial ☐
- Other ______ ☐

DRILLING METHOD:
- Mud Rotary ☐
- Air Rotary ☐
- Auger ☑
- Cable ☐
- Other ☐

DRILLER'S LICENSE NO. 057 - 24556

WELL PROJECTS
Drill Hole Diameter 8 in. Maximum
Casing Diameter 2 in. Depth 45 ft.
Surface Seal Depth ______ ft. Number 1

GEOTECHNICAL PROJECTS
Number of Borings ______ Maximum
Hole Diameter ______ in. Depth ______ ft.

ESTIMATED STARTING DATE 6/15/99
ESTIMATED COMPLETION DATE 6/15/99

I hereby agree to comply with all requirements of this permit and Alameda County Ordinance No. 73-68.

APPLICANT'S SIGNATURE [signature] DATE 6/2/99

FOR OFFICE USE

PERMIT NUMBER 99WR251
WELL NUMBER ______
APN ______

PERMIT CONDITIONS

Circled Permit Requirements Apply

A. GENERAL
1. A permit application should be submitted so as to arrive at the ACPWA office five days prior to proposed starting date.
2. Submit to ACPWA within 60 days after completion of permitted work the original Department of Water Resources Water Well Drillers Report or equivalent for well projects, or drilling logs and location sketch for geotechnical projects.
3. Permit is void if project not begun within 90 days of approval date.

B. WATER SUPPLY WELLS
1. Minimum surface seal thickness is two inches of cement grout placed by tremie.
2. Minimum seal depth is 50 feet for municipal and industrial wells or 20 feet for domestic and irrigation wells unless a lesser depth is specially approved.

C. GROUNDWATER MONITORING WELLS INCLUDING PIEZOMETERS
1. Minimum surface seal thickness is two inches of cement grout placed by tremie.
2. Minimum seal depth for monitoring wells is the maximum depth practicable or 20 feet.

D. GEOTECHNICAL
Backfill bore hole with compacted cuttings or heavy bentonite and upper two feet with compacted material. In areas of known or suspected contamination, tremied cement grout shall be used in place of compacted cuttings.

E. CATHODIC
Fill hole above anode zone with concrete placed by tremie.

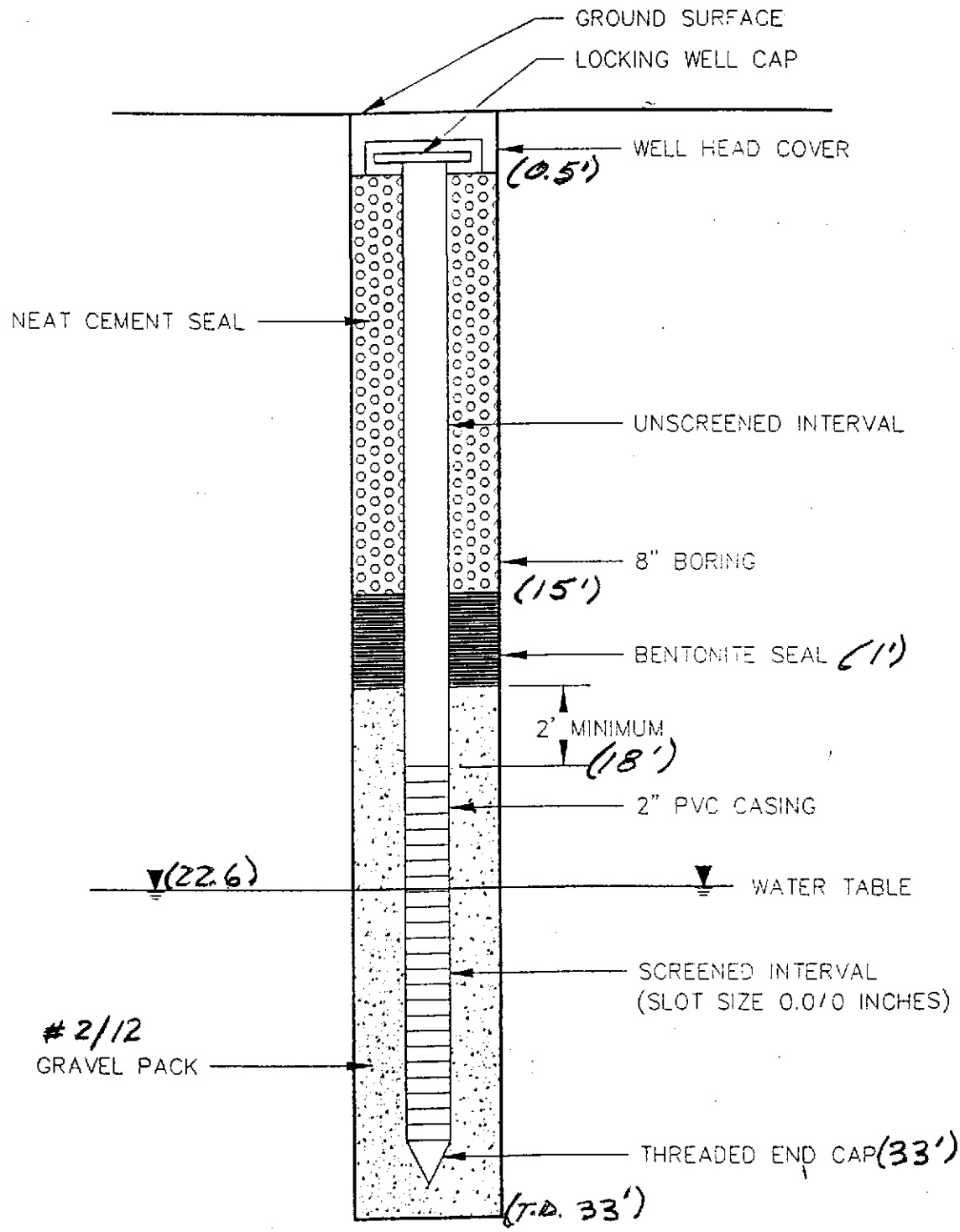
F. WELL DESTRUCTION
See attached.

G. SPECIAL CONDITIONS

APPROVED [signature] DATE 6-7-99

APPENDIX B

MONITORING WELL CONSTRUCTION DESIGN



	PROJECT NAME: TANK PROTECT ENGRG. Ras-Co Manufacturing Co.	DATE: 6/29/99
		DWG NO.:
		PROJ NO.: 329-N
	TITLE: MONITORING WELL CONSTRUCTION DESIGN FIGURE NO.	DRAWN BY:
		APP'D BY:
		SCALE:

APPENDIX C

HOLLOW-STEM AUGER DRILLING AND SOIL SAMPLING PROCEDURES

APPENDIX C

HOLLOW-STEM AUGER DRILLING AND SOIL SAMPLING PROCEDURES

Undisturbed soil samples will be recovered from soil without introducing liquids into the borings. At a minimum, soil samples as core will be taken at 5-foot depth intervals, changes in lithology and when encountering apparent soil contamination to termination depth, or through the aquifer zone of interest for lithologic logging.

Borings will be drilled with a hollow-stem auger and sampled with a California or modified California-type split-spoon sampler. Soil samples will be of sufficient volume to perform the analyses which may be required, including replicate analyses.

Soil from all borings will be described in detail using the Unified Soil Classification System and will be logged under the direction of a geologist, civil engineer or engineering geologist who is registered or certified by the State of California and is experienced in the use of the Unified Soil Classification System.

All wet zones above the free water zone will be noted and accurately logged.

Soil samples will be collected in clean brass or stainless steel sampling tubes in the split-spoon. Sediment traps will be used when unconsolidated sands and gravels fall from the sampler during retrieval. The brass tubes will be cut apart using a clean knife. The ends of the tubes will be covered with Teflon sheets or aluminum foil beneath plastic end caps and sealed with electrical or duct tape and properly labeled. In lieu of electrical or duct tape, the tubes may be individually sealed in plastic bags. The samples will be stored in an iced-cooler at a temperature of 4 degrees Celsius. In the Alameda County Water District, the samples will be stored in an iced-cooler containing dry ice.

Drill cuttings will be stored on site in 55-gallon drums or covered with plastic sheeting. Analytical results will be submitted immediately to the site owner for determination of appropriate disposal procedures. The soil borings not completed as wells will be backfilled with a cement grout.

APPENDIX D

WASTE HANDLING AND DECONTAMINATION PROCEDURES

APPENDIX D

WASTE HANDLING AND DECONTAMINATION PROCEDURES

Decontamination: Any drilling, sampling or field measurement equipment that comes into contact with soil or groundwater will be properly decontaminated prior to its use at the site and after each incident of contact with the soil or groundwater being investigated. Proper decontamination is essential to obtain samples that are representative of environmental conditions and to accurately characterize the extent of soil and groundwater contamination. Hollow-stem auger flights and the drill bit will be steam-cleaned between the drilling of each well.

All sample equipment, including the split-spoon sampler and brass tubes, will be cleaned by washing with trisodium phosphate or alconox detergent, followed by rinsing with tap water. Where required by specific regulatory guidelines, a nonphosphate detergent will be used.

Waste Handling: Waste materials generated during site characterization activities will be handled and stored as hazardous waste and will be stored on site in appropriately labeled containers. Waste materials anticipated include excavated soil, drill cuttings, development and purge water, water generated during aquifer testing, water generated during decontamination and used personnel protection equipment such as gloves and Tyvek. The site owner will be responsible for providing the storage containers and will be responsible for the disposal of the waste materials. Drill cuttings from individual borings will be stored separately in drums or covered by plastic sheeting, and the appropriate disposal procedure will be determined by the site owner or TPE following receipt of the soil sample analytical results. Drums will be labeled to show material stored, known or suggested contaminant, date stored, expected removal date, company name, contact and telephone number.

APPENDIX E

SAMPLE HANDLING PROCEDURES

APPENDIX E

SAMPLE HANDLING PROCEDURES

Soil and groundwater samples will be packaged carefully to avoid breakage or contamination and will be delivered to the laboratory in an iced-cooler. The following sample packaging requirements will be followed.

- Sample bottle/sleeve lids will not be mixed. All sample lids will stay with the original containers and have custody seals affixed to them.

- Samples will be secured in coolers to maintain custody, control temperature and prevent breakage during transportation to the laboratory.

- A chain-of-custody form will be completed for all samples and accompany the sample cooler to the laboratory.

- Ice, blue ice or dry ice (dry ice will be used for preserving soil samples collected for the Alameda County Water District) will be used to cool samples during transport to the laboratory.

- Water samples will be cooled with crushed ice. In the Alameda County Water District, water samples will be buried in the crushed ice with a thermometer, and the laboratory will be requested to record thermometer temperature at the time of receipt.

- Each sample will be identified by affixing a pressure sensitive, gummed label or standardized tag on the container(s). This label will contain the site identification, sample identification number, date and time of sample collection and the collector's initials.

- Soil samples collected in brass tubes will be preserved by covering the ends with Teflon tape and capping with plastic end-caps. The tubes will

be labeled, sealed in quart size bags and placed in an iced-cooler for transport to the laboratory.

All groundwater sample containers will be precleaned and will be obtained from a State Department of Health Services certified analytical laboratory.

Sample Control/Chain-of-Custody: All field personnel will refer to this workplan to verify the methods to be employed during sample collection. All sample gathering activities will be recorded in the site file; all sample transfers will be documented in the chain-of-custody; samples will be identified with labels; all sample bottles will be custody-sealed. All information is to be recorded in waterproof ink. All TPE field personnel are personally responsible for sample collection and the care and custody of collected samples until the samples are transferred or properly dispatched.

The custody record will be completed by the field technician or professional who has been designated by the TPE project manager as being responsible for sample shipment to the appropriate laboratory. The custody record will include, among other things, the following information: site identification, name of person collecting the samples, date and time samples were collected, type of sampling conducted (composite/grab), location of sampling station, number and type of containers used and signature of the TPE person relinquishing samples to a non-TPE person with the date and time of transfer noted. The relinquishing individual will also put all the specific shipping data on the custody record.

Records will be maintained by a designated TPE field employee for each sample: site identification, sampling location, station number, date, time, sampler's name, designation of the sample as a grab or composite, notation of the type of sample (e.g., groundwater, soil boring, etc.), preservatives used, onsite measurement data and other observations or remarks.

APPENDIX F

QUALITY ASSURANCE AND QUALITY CONTROL PROCEDURES

APPENDIX F

QUALITY ASSURANCE AND QUALITY CONTROL PROCEDURES

The overall objectives of the field sampling program include generation of reliable data that will support development of a remedial action plan. Sample quality will be checked by the use of proper sampling, handling and testing methods. Additional sample quality control methods may include the use of background samples, equipment rinsate samples and trip and field blanks. Chain-of-custody forms, use of a qualified laboratory, acceptable detection limits and proper sample preservation and holding times also provide assurance of accurate analytical data.

TPE will follow a quality assurance and quality control (QA/QC) program in the field to ensure that all samples collected and field measurements taken are representative of actual field and environmental conditions and that data obtained are accurate and reproducible. These activities and laboratory QA/QC procedures are described below.

Field Samples: Additional samples may be taken in the field to evaluate both sampling and analytical methods. Three basic categories of QA/QC samples that may be collected are trip blanks, field blanks and duplicate samples.

Trip blanks are a check for cross-contamination during sample collection, shipment, and laboratory analysis. They are water samples that remain with the collected samples during transportation and are analyzed along with the field samples to check for residual contamination. Analytically confirmed organic-free water will be used for organic parameters and deionized water for metal parameters. Blanks will be prepared by the laboratory supplying the sample containers. The blanks will be numbered, packaged and sealed in the same manner as the other samples. One trip blank will be used for each sample set of less than 20 samples. At least 5% blanks will be used for sets greater than 20 samples. The trip blank is not to be opened by either the sample collectors or the handlers.

The field blank is a water sample that is taken into the field and is opened and exposed at the sampling point to detect contamination from air exposure. The water

sample is poured into appropriate containers to simulate actual sampling conditions. Contamination due to air exposure can vary considerably from site to site.

The laboratory will not be informed about the presence of trip and field blanks, and false identifying numbers will be put on the labels. Full documentation of these collection and decoy procedures will be made in the site log book.

Duplicate samples are identical sample pairs (collected in the same place and at the same time), placed in identical containers. For soils, adjacent sample liners will be analyzed. For the purpose of data reporting, one is arbitrarily designated the sample, and the other is designated as a duplicate sample. Both sets of results are reported to give an indication of the precision of sampling and analytical methods.

The laboratory's precision will be assessed without the laboratory's knowledge by labeling one of the duplicates with false identifying information. Data quality will be evaluated on the basis of the duplicate results.

Laboratory QA/QC: Execution of a strict QA/QC program is an essential ingredient in high-quality analytical results. By using accredited laboratory techniques and analytical procedures, estimates of the experimental values can be very close to the actual value of the environmental sample. The experimental value is monitored for its precision and accuracy by performing QC tests designed to measure the amount of random and systematic errors and to signal when correction of these errors is needed.

The QA/QC program describes methods for performing QC tests. These methods involve analyzing method blanks, calibration standards, check standards (both independent and the United States Environmental Protection Agency-certified standards), duplicates, replicates and sample spikes. Internal QC also requires adherence to written methods, procedural documentation and the observance of good laboratory practices.

APPENDIX G

CERTIFIED ANALYTICAL REPORTS AND CHAIN-OF-CUSTODY DOCUMENTATION

PRIORITY ENVIRONMENTAL LABS

June 20, 1999 PEL # 9906011

TANK PROTECT ENGINEERING

Attn: Louis Travis III

Re: One soil sample for Gasoline/BTEX with MTBE analyses.

Project name: Rasco Manufacturing
Project location: 413 W. Sunset blvd., HAyward, CA.
Project number: 329-061799

Date sampled: June 17, 1999 Date submitted: June 17, 1999
Date extracted: June 17-18, 1999 Date analyzed: June 17-18, 1999

RESULTS:

SAMPLE I.D.	Gasoline (mg/Kg)	MTBE (ug/Kg)	Benzene (ug/Kg)	Toluene (ug/Kg)	Ethyl Benzene (ug/Kg)	Total Xylenes (ug/Kg)
MW-1(15.5'-16.0')	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Blank	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Spiked Recovery	89.9%	---	91.4%	80.4%	90.4%	102.6%
Detection limit	1.0	5.0	5.0	5.0	5.0	5.0
Method of Analysis	5030/ 8015	8020	8020	8020	8020	8020

David Duong
Laboratory Director

1764 Houret Court Milpitas, CA. 95035 Tel: 408-946-9636 Fax: 408-946-9663

TANK PROTECT ENGINEERING
of Northern California, Inc.
2821 Whipple Rd., Union City, CA 94587-1233
(510) 429-8088 ■ (800) 523-8088 ■ Fax (510) 429-8089

LAB: PEL

TURNAROUND: Normal

P.O. #: 1537

PAGE 1 OF 1

CHAIN OF CUSTODY

PROJECT NO.	SITE NAME & ADDRESS
329-061799	Rasco Manufacturing 413 W. Sunset Blvd, Hayward, CA

SAMPLER NAME, ADDRESS AND TELEPHONE NUMBER
Louis Travis III
2821 WHIPPLE ROAD, UNION CITY, CA 94587 (415) 429-8088

ID NO.	DATE	TIME	SOIL	WATER	SAMPLING LOCATION	(1) TYPE OF CONTAINER	ANALYTES REQUESTED: TOTAL LIGHT HC	AROMATIC HC (BTX)	TOTAL HEAVY HC	OIL & GREASE	VOC SCAN (624's)	OTHER MTBE	REMARKS
MW-1 (15.5'-16.0')	6/17/99	9:27	✓		MW-1 (15.5'-16.0')	Brass Tube	✓	✓				✓	

Relinquished by : (Signature)	Date / Time	Received by : (Signature)	Relinquished by : (Signature)	Date / Time	Received by : (Signature)
Relinquished by : (Signature)	Date / Time	Received by : (Signature)	Relinquished by : (Signature)	Date / Time	Received by : (Signature)
Relinquished By : (Signature)	Date / Time	Received for Laboratory by: [Signature]	Date / Time	Remarks	
			06/17/99 2:30 pm		

DATE: _____

PRIORITY ENVIRONMENTAL LABS
Precision Environmental Analytical laboratory

July 06, 1999 PEL # 9906024

TANK PROTECT ENGINEERING

Attn: Louis Travis III

Re: Three water samples for Gasoline/BTEX with MTBE analyses.

Project name: Rasco Manufacturing
Project location: 413 W. Sunset blvd., Hayward, CA.
Project number: 329-062999

Date sampled: June 29, 1999 Date submitted: June 29, 1999
Date extracted: June 29-30, 1999 Date analyzed: June 29-30, 1999

RESULTS:

SAMPLE I.D.	Gasoline (ug/L)	MTBE (ug/L)	Benzene (ug/L)	Toluene (ug/L)	Ethyl Benzene (ug/L)	Total Xylenes (ug/L)
AW	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MW-1	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MW-2	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Blank	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Spiked Recovery	87.8%	---	86.2%	91.1%	94.3%	95.9%
Detection limit	50	0.5	0.5	0.5	0.5	0.5
Method of Analysis	5030/ 8015	602	602	602	602	602

David Duong
Laboratory Director

1764 Houret Court Milpitas, CA. 95035 Tel: 408-946-9636 Fax: 408-946-9663

TANK PROTECT ENGINEERING
of Northern California, Inc.
2821 Whipple Rd., Union City, CA 94587-1233
(510) 429-8088 ■ (800) 523-8088 ■ Fax (510) 429-8089

TEL # 9906024

LAB: PEL

TURNAROUND: 72 hrs

P.O. #: 1531

PAGE 1 OF 1

CHAIN OF CUSTODY

PROJECT NO.	SITE NAME & ADDRESS
329-062999	Rasco Manufacturing 415 W. Sunset Blvd. Hayward, CA

SAMPLER NAME, ADDRESS AND TELEPHONE NUMBER
Louis Troutt III
2821 WHIPPLE ROAD, UNION CITY, CA 94587 (415) 429-8888

ID NO.	DATE	TIME	SOIL	WATER	SAMPLING LOCATION	(1) TYPE OF CONTAINER	ANALYSES REQUESTED: TOTAL LIGHT HC	AROMATIC HC (BTX)	TOTAL HEAVY HC	OIL & GREASE	VOC SCAN (624's)	OTHER TPHG, BTEX	BTEX, TBA, EDB, EDC	REMARKS
AW	4/29/99	9:45		✓	AW	4-40ml	✓	✓				✓		
MW-1	"	10:40		"	MW-1	2-40ml	✓	✓						
MW-2	"	11:40			MW-2	2-40ml	✓	✓						

Relinquished by : (Signature)	Date / Time	Received by : (Signature)	Relinquished by : (Signature)	Date / Time	Received by : (Signature)
Relinquished by : (Signature)	Date / Time	Received by : (Signature)	Relinquished by : (Signature)	Date / Time	Received by : (Signature)
Relinquished by : (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time 04/29/99 1:15 PM	Remarks	

DATE: _____

APPENDIX H

GROUNDWATER MONITORING WELL CONSTRUCTION PROCEDURES

APPENDIX H

GROUNDWATER MONITORING WELL CONSTRUCTION PROCEDURES

BOREHOLE DESIGN

Casing Diameter: The minimum diameter of well casings will be 2 inches (nominal).

Borehole Diameter: The diameter of the borehole will be a minimum of 4 inches and a maximum of 12 inches greater than the diameter of the well casing. The minimum annular space will be 2.5 inches as measured from the outside diameter of the casing to the drill hole wall.

Shallow (Unconfined Zone) Wells: When unconfined groundwater is encountered, the borehole will be advanced through the aquifer to an underlying clay layer or aquitard or to a maximum depth of 15 feet into the saturated zone, or the maximum depths required by regulatory guidelines. The screened interval will begin a minimum of 5 feet above the saturated zone or above the anticipated seasonal high level of groundwater. The screen will extend the full thickness of the aquifer or no more than 15 feet (or 20 feet if required by regulatory guidelines) into the saturated zone, whichever is reached first. The well screen will not extend into the aquitard, nor will the screened interval exceed 20 feet in length (or 30 feet if required by regulatory guidelines).

Deep (Confined Zone) Wells: Any monitoring well to be screened below the upper aquifer will be installed as a double-cased well. A steel conductor casing will be placed through the upper water-bearing zone to prevent aquifer cross-contamination.

The conductor casing will be installed in the following manner: a large diameter borehole (typically 18 inches) will be drilled until it is determined that the first competent aquitard has been reached; a low carbon steel conductor casing will be placed in the borehole to the depth drilled and centralizers will be used to center the casing in the borehole. The annular space between the conductor casing and the

formation will be cement-grouted from bottom to top by the tremie pipe method. The grout will be allowed to set for a minimum of 72 hours.

Drilling will continue inside the conductor casing, with a drill bit of smaller diameter than the conductor casing. If additional known aquifers are to be fully penetrated, the procedure will be repeated with successively smaller diameter conductor casings.

The bottom of the well screen in a confined aquifer will be determined by presence or lack of a clay layer or aquitard as described above. The screened interval in a confined zone will extend across the entire saturated zone of the aquifer or up to a length of 20 feet, whichever is less. The screened zone and filter pack will not cross-connect to another aquifer.

CONSTRUCTION MATERIALS

Casing and Screen Materials: Well casing and screen will be constructed of clean materials that have the least potential for affecting the quality of the sample. The most suitable material for a particular installation will depend upon the parameters to be monitored. Acceptable materials include PVC, stainless steel or low carbon steel.

Casing Joints: Joints will be connected by flush threaded couplers. Organic bonding compounds and solvents will not be used on joints.

Well Screen Slots: Well screen will be factory slotted. The size of the slots will be selected to allow sufficient groundwater flow to the well for sampling, minimize the passage of formation materials into the well and ensure sufficient structural integrity to prevent the collapse of the intake structure.

Casing Bottom Plug: The bottom of the well casing will be permanently plugged, either by flush threaded screw-on or friction cap. Friction caps will be secured with stainless steel set screws. No organic solvents or cements will be applied.

Filter Pack Material: Filter envelope materials will be durable, water worn, and washed clean of silt, dirt and foreign matter. Sand size particles will be screened silica sand.

Particles will be well rounded and graded to an appropriate size for retention of aquifer materials.

Bentonite Seal Material: Bentonite will be pure and free of additives that may affect groundwater quality. Bentonite will be hydrated with potable or tap water.

Grout Seal Material: Neat cement grout or sand-cement grout will consist of a proper mixture of Type 1/11 Portland cement, hydrated with potable or tap water. Up to 3% bentonite may be added to the mixture to control shrinkage.

CONSTRUCTION PROCEDURES

Decontamination: All downhole tools, well casings, casing fittings, screens, and all other components that are installed in the well will be thoroughly cleaned immediately before starting each well installation. When available, each component will be cleaned with a high temperature, high pressure washer for a minimum of 5 minutes. When a washer is not available, components will be cleaned with water and detergent, rinsed in potable or tap water, then rinsed in distilled water.

Soil and water sampling equipment and material used to construct the wells will not donate to, capture, mask or alter the chemical composition of the soil and groundwater.

Drilling Methods: Acceptable drilling methods include solid and hollow-stem auger, percussion, direct circulation mud and air rotary and reverse rotary. The best alternative is that which minimizes the introduction of foreign materials or fluids. If drilling fluid is employed, drilling fluid additives will be limited to inorganic and non-hazardous compounds. Compressed air introduced into the borehole will be adequately filtered to remove oil and particulates.

Casing Installation: The casing will be set under tension, when necessary, to ensure straightness. Centralizers will be used where necessary to prevent curvature or stress to the casing.

Sand Pack Installation: The sand pack will be installed so as to avoid bridging and the creation of void spaces. The tremie pipe method will be used where installation conditions or local regulations require. Drilling mud, when used, will be thinned prior to pack placement. The sand pack will cover the entire screened interval and rise a minimum of 2 feet above the highest perforation.

Bentonite Seal Placement: A bentonite seal will be placed above the sand pack by a method that prevents bridging. Bentonite pellets can be placed by free fall if proper sinking through annular water can be assured. Bentonite slurry will be placed by the tremie pipe method from the bottom upward. The bentonite seal will not be less than 1 to 3-feet in thickness, depending on regulatory guidelines. In the Alameda County Water District, the bentonite seal will be less than 1 foot in thickness.

Grout Seal Placement: The cement grout mixture will be hydrated with potable or tap water and thoroughly mixed prior to placement. If substantial groundwater exists in the bore hole, the grout will be placed by the tremie pipe method from the bottom upward. In a dry borehole, the grout may be surface poured to a depth of 30 feet. Below a depth of 30 feet, grout will be placed by tremie pipe. Grout will be placed in 1 continuous lift and will extend to the surface or to the well vault if the well head is completed below grade. A minimum of 5 feet of grout seal will be installed, unless impractical due to the shallow nature of the well.

Surface Completion: The well head will be protected from fluid entry, accidental damage, unauthorized access and vandalism. A watertight, locking cap will be installed on the well casing. Access to the casing will be controlled by a keyed lock.

Well heads completed below grade will be completed in a concrete and/or steel vault, installed to drain surface runoff away from the vault.

Well Identification: Each well will be labeled to show well number, depth, hole and casing diameter and screened interval.

APPENDIX I

RECORDS OF WELL DEVELOPMENT AND RECORDS OF WATER SAMPLING

RECORD OF WELL DEVELOPMENT

PROJECT NO.: 329 DATE: 6/28/91

WELL NO.: MW-1

PROJECT NAME: Rasco Manufacturing

WELL DIAMETER: 2-3"

PROJECT LOCATION: 413 W. Sunset Blvd

TOC ELEV:

DEVELOPER: L.T. & I

LOCK NO.:

WELL DEPTH (from construction detail):

WELL DEPTH (measured): 30.80 SOFT BOTTOM?: YES

DEPTH TO WATER: 19.83 TIME: 2:00

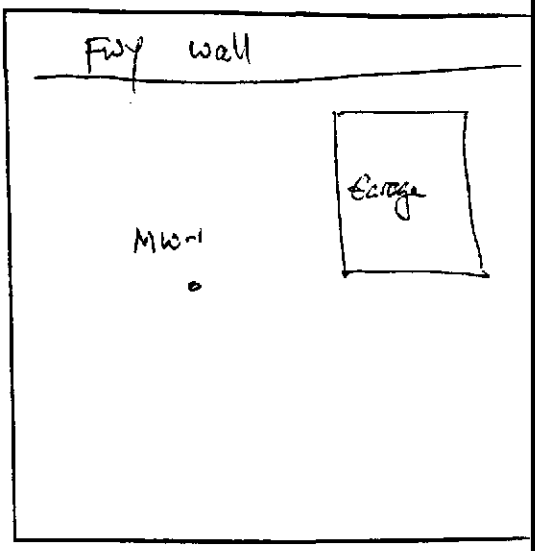
PRESSURE (circle one)?: YES OR (NO)

IF YES, WAS PRESSURE (circle one): POSITIVE OR NEGATIVE?

WATER VOLUME IN WELL: 1.75 gal

[2-INCH CASING = 0.16 GAL/FT] [4-INCH CASING = 0.65 GAL/FT]

[6-INCH CASING = 1.47 GAL/FT] [1 GAL = 3.78L]



LOCATION MAP

DEVELOPMENT METHOD: Poly

FLOATING PRODUCT PRESENT: YES ☐ NO ☑

SHEEN PRESENT: YES ☐ NO ☑

ODOR PRESENT: YES ☐ NO ☑

FIELD MEASUREMENTS

Time	Depth to Water (FT)	Vol (Gal)	Clarity (NTU'S)	Remarks
2:30	19.83'	1		1st bailer: turbid, no odor or sheen
		40 gal		turbid, no odor or sheen

TOTAL VOLUME DEVELOPED (GAL): 40 (L):

WATER VOL. IN DRUM: 40

SIGNATURE:

NEED NEW DRUM?: N

RECORD OF WATER SAMPLING

PROJECT NO.: 329 DATE: 6/29/99

WELL NO.: MW-1

PROJECT NAME: RASCO

WELL DIAMETER: 2"

PROJECT LOCATION: 413 W. Sunset Blvd

TOC ELEV:

SAMPLER: L.T.

LOCK NO.:

ANALYSES: TPHG, MBTEX

WELL DEPTH (from construction detail):

WELL DEPTH (measured): 31.20 SOFT BOTTOM?:

DEPTH TO WATER: 21.84 TIME: 9:50

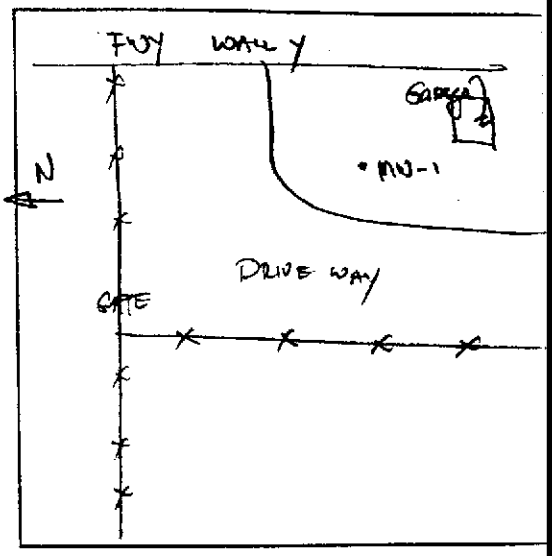
PRESSURE (circle one)?: YES OR (NO)

IF YES, WAS PRESSURE (circle one): POSITIVE OR NEGATIVE?

WATER VOLUME IN WELL: 1.5 gal

[2-INCH CASING = 0.16 GAL/FT] [4-INCH CASING = 0.65 GAL/FT]

[6-INCH CASING = 1.47 GAL/FT] [1 GAL = 3.78 L]



LOCATION MAP

CALCULATED PURGE VOL. (GAL): 6 (L): 24 ACTUAL PURGE VOL. (GAL): (L): 24

PURGE METHOD: Poly SAMPLE METHOD: Poly

FIELD MEASUREMENTS

Time	Depth to Water (FT)	Vol (L)	Temp (Deg. F)	pH	EC $\times 10^3$	Clarity	Turbidity (NTU)	Remarks
10:00		1	72.3	6.70	3.22	Slightly Turbid		slightly turbid; no sheen or odor
			73.8	6.86	0.97			
			69.9	6.84	0.89			
			68.5	6.89	0.91			
			68.4	6.88	0.92			
10:40								Sampled MW-1

SIGNATURE:

WATER VOL. IN DRUM: 50 gal

NEED NEW DRUM?: yes

RECORD OF WATER SAMPLING

PROJECT NO.: 329 DATE: 6/29/99

WELL NO.: AW

PROJECT NAME: Rasco

WELL DIAMETER: 6"ø

PROJECT LOCATION: 413 W. Sunset Blvd

TOC ELEV: _____

SAMPLER: L-T-M

LOCK NO.: _____

ANALYSES: TAME, DIPE, ETBE, TBA, EDB, EDC

WELL DEPTH (from construction detail): _____

WELL DEPTH (measured): 68.68 SOFT BOTTOM?: _____

DEPTH TO WATER: 21.38 TIME: 9:20

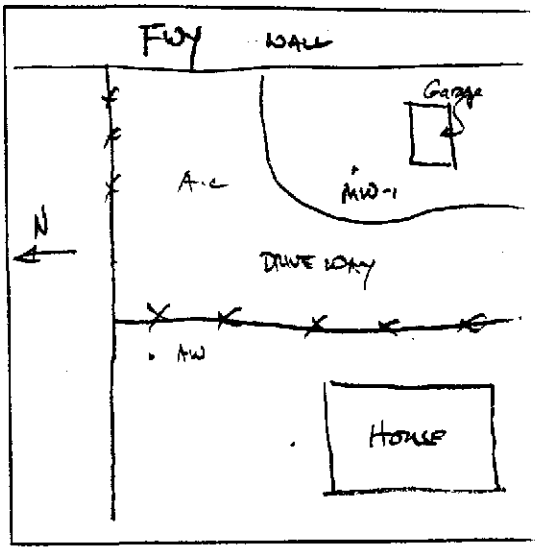
PRESSURE (circle one)?: YES OR (NO)

IF YES, WAS PRESSURE (circle one): POSITIVE OR NEGATIVE?

WATER VOLUME IN WELL: 69.53 gal

[2-INCH CASING = 0.16 GAL/FT] [4-INCH CASING = 0.65 GAL/FT]

[6-INCH CASING = 1.47 GAL/FT] [1 GAL = 3.78 L]



LOCATION MAP

CALCULATED PURGE VOL. (GAL): 209 (L): 834 ACTUAL PURGE VOL. (GAL): _____ (L): 834

PURGE METHOD: POLY SAMPLE METHOD: POLY

FIELD MEASUREMENTS

Time	Depth to Water (FT)	Vol (L)	Temp (Deg. F)	pH	EC $\times 10^2$	Clarity	Turbidity (NTU)	Remarks
8:10		1	69.5	7.45	9.40	clear		Clear, no sheen or odor
			64.4	8.30	2.17			
			65.8	8.57	2.05			
			65.7	8.56	2.05			
			65.6	8.56	2.04			
9:45								Sampled AW

SIGNATURE: _____

WATER VOL. IN DRUM: 200

NEED NEW DRUM?: YES

APPENDIX J

GROUNDWATER MONITORING WELL DEVELOPMENT PROCEDURES

APPENDIX J

GROUNDWATER MONITORING WELL DEVELOPMENT PROCEDURES

INTRODUCTION

Newly installed groundwater monitoring wells will be developed to restore natural hydraulic conductivity of the formation, remove sediments from well casing and filter pack, stabilize the filter pack and aquifer material and promote turbidity-free groundwater samples.

Wells may be developed by bailing, hand pumping, mechanical pumping, air lift pumping, surging, swabbing or an effective combination of methods. Wells will be developed until the water is free of sand and silt and minimum turbidity has stabilized.

In some cases where low permeability formations are involved or the drilling mud used fails to respond to cleanup, initial development pumping may immediately dewater the well casing and thereby inhibit development. When this occurs, clean, potable grade water may be introduced into the well, followed by surging of the introduced waters with a surge block. This operation will be followed by pumping or bailing. The procedure may be repeated as required to establish full development.

METHODOLOGY

Seal Stabilization: Cement and bentonite annular seals will set and cure not less than 24 to 72 hours (according to local regulatory guidelines) prior to well development.

Decontamination: All well development tools and equipment will be thoroughly cleaned immediately before starting each well installation. When available, each component will be cleaned with a high temperature, high pressure washer for a minimum of 5 minutes. When a washer is not available, components will be cleaned with potable or tap water, then rinsed with distilled water.

Development equipment will not donate to, capture, mask or alter the chemical composition of the soil and groundwater.

Introduction of Water: Initial development of wells in low permeability formations may dewater the casing and filter pack. When this occurs, clean, potable or tap water will be introduced into the well to enhance development.

Bailing: Development will begin by bailing to remove heavy sediments from the well casing. Care will be taken not to damage the well bottom cap during lowering of the bailer.

Surging: Care will be exercised when using a surge block to avoid damaging the well screen and casing. When surging wells screened in coarse (sandy/gravelly) aquifers, the rate of surge block lifting will be slow and constant. When surging wells screened in fine (silty) aquifers, more vigorous lifting may be required. Between surging episodes, wells will be bailed to remove accumulated sediments.

Pumping: Development pumping rates will be less than the recharge rate of the well in order to avoid dewatering.

Discharged Water Containment and Disposal: All water and sediment generated by well development will be collected in labeled 55-gallon steel drums. Development water will be temporarily contained on site, pending sampling and laboratory analysis. No hazardous development water will be released to the environment. Disposal of development water will be the responsibility of the client

APPENDIX K

GROUNDWATER MONITORING WELL SAMPLING PROCEDURES

APPENDIX K

GROUNDWATER MONITORING WELL SAMPLING PROCEDURES

Groundwater monitoring wells will not be sampled until at least 24 to 72 hours (according to local regulatory guidelines) after well development. Groundwater samples will be obtained using a bladder pump, clear Teflon bailer or dedicated polyethylene bailer. Prior to collecting samples, the sampling equipment will be thoroughly decontaminated to prevent introduction of contaminants into the well and to avoid cross-contamination. Monitoring wells will be sampled after 3 to 10 wetted casing volumes of groundwater have been evacuated and pH, electrical conductivity and temperature have stabilized as measured with a Hydac Digital Tester. If the well is emptied before 3 to 10 well volumes are removed, the sample will be taken when the water level in the well recovers to 80% or more of its initial water level.

When a water sample is collected, turbidity of the water will be measured and recorded with a digital turbidimeter. Degree of turbidity will be measured and recorded in nephelometric turbidity units (NTU).

TPE will also measure the thickness of any floating product in the monitoring wells using an interface probe or clear Teflon or polyethylene bailer. The floating product will be measured after well development but prior to the collection of groundwater samples. If floating product is present in the well, TPE will recommend to the client that product removal be commenced immediately and reported to the appropriate regulatory agency.

Unless specifically waived or changed by the local, prevailing regulatory agency, water samples will be handled and preserved according to the latest United States Environmental Protection Agency methods as described in the Federal Register (Volume 44, No. 233, Page 69544, Table ll) for the type of analysis to be performed.

Development and/or purge water will be stored on site in labeled containers. The disposal of the containers and development and/or purge water is the responsibility of the client.

MEASUREMENTS

Purged Water Parameter: During purging, discharged water will be measured for the following parameters.

Parameter	Units of Measurement
pH	None
Electrical Conductivity	Micromhos
Temperature	Degrees F or C
Depth to Water	Feet/Hundredths
Volume of Water Discharged	Gallons
Turbidity	NTU

Documentation: All parameter measurements will be documented in writing on TPE development logs.