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CITY OF EMERYVILLE

INCORPORATED 1896
2200 POWELL 12TH FLOOR
EMERYVILLE, CALIFORNIA 94608

TELEPHONE: (415) 596-4300

January 16, 1992

Alameda County Health Agency
Division of Hazardous Materials
Department of Environmental Health
80 Swan Way Rm. 200
Oakland, CA 94621

ATTN: Brian P. Oliva (R.E.H.S.)

Dear Mr. Oliva

Enclose are two sets of work plan for the over excavation of the contaminated soil and installation of groundwater monitoring wells, performed by Tank Protect Engineering.

Please notify me, if the above is suitable to proceed towards the completion of the 1333 Park Avenue underground tank project. My telephone number is (510) 596-4333.

Thank you in advance for all of your efforts to expedite the project.

Sincerely yours

Juan C. Arreguin
Public Works Deprt.

Ala c.1

TANK PROTECT ENGINEERING
Of Northern California, Inc.

TRANSMITTAL FORM

DATE: 01/15/92 PROJECT NO.: 213

TO: Juan Arreguin
City of Emeryville
2200 Powell Street 12th Floor
Emeryville, CA 94608

FROM: John V. Mrakovich
Tank Protect Engineering
2821 Whipple Road
Union City, CA 94587

WE ARE SENDING YOU ☐ ATTACHED ☐ UNDER SEPARATE COVER
VIA mail THE FOLLOWING ITEMS:

☐ LETTER(S) ☒ PROPOSAL(S) ☐ TABLE(S) ☐ FIGURE(S)
☐ SPECIFICATION(S) ☐ CHANGE ORDER(S) ☐ REPORT(S)
☐ _____

COPIES	DATED	DESCRIPTION
3	01/15/92	Workplan For Overexcavation of Contaminated Soil And Installation of Groundwater Monitoring Wells.

THESE ARE TRANSMITTED FOR:
☐ YOUR REVIEW AND COMMENT
☐ YOUR REQUEST
☐ YOUR APPROVAL
☒ YOUR FILES
☐ APPROVED AS SUBMITTED
☐ APPROVED AS NOTED
☒ For your delivery to:

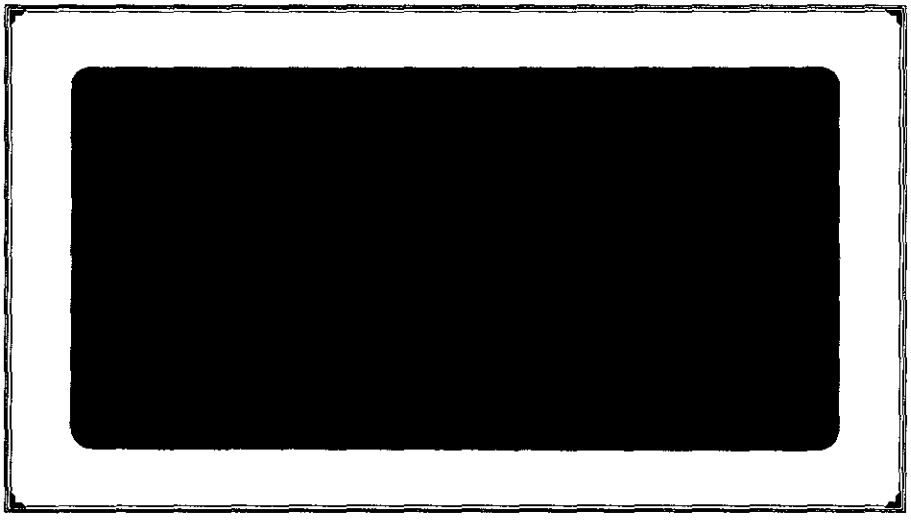
REMARKS:

Mr. Brian Oliva
Alameda County Health Care Services Agency
Department of Environmental Health
Hazardous Material Program
80 Swan Way, Room 200
Oakland, CA 94621

California Regional Water Quality Control Board
San Francisco Bay Region
2101 Webster Street, Suite 500
Oakland, CA 94612

CC: File

SIGNATURE: John V. Mrakovich



TANK PROTECT
ENGINEERING
Of Northern California, Inc.

2821 Whipple Road
Union City, CA 94587-1233
415/429-8088 • 800/523-8088
FAX: 415/429-8089
Engr. Contr. Lic. # 575837

TANK PROTECT ENGINEERING
Of Northern California, Inc.

TRANSMITTAL FORM

DATE: 1/29/92 PROJECT NO.: 213

TO: Mr. Brian Oliva
Alameda County Health Care Services Agency
Department of Environmental Health
Hazardous Material Program
80 Swan Way, Room 200
Oakland, CA 94621

FROM: John V. Mrakovich
Tank Protect Engineering
2821 Whipple Road
Union City, CA 94587

WE ARE SENDING YOU ☐ ATTACHED ☐ UNDER SEPARATE COVER
VIA mail THE FOLLOWING ITEMS:

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☐ SPECIFICATION(S) ☐ CHANGE ORDER(S) ☐ REPORT(S)
☐ _____

COPIES	DATED	DESCRIPTION
1	01/15/92	New cover page for TPE's January 15, 1992 Workplan For Overexcavation of Contaminated Soil And Installation of Groundwater Monitoring Wells, at 1333 Park Avenue, Emeryville, CA 94608

THESE ARE TRANSMITTED FOR:
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☐ APPROVED AS NOTED

REMARKS: _____

CC: File

SIGNATURE: John V. Mrakovich

WORKPLAN FOR OVEREXCAVATION OF CONTAMINATED SOIL AND INSTALLATION OF GROUNDWATER MONITORING WELLS

CITY OF EMERYVILLE
1333 PARK AVENUE
EMERYVILLE, CA 94608

Submitted By:
TANK PROTECT ENGINEERING
Of Northern California
January 15, 1992

WORKPLAN FOR OVEREXCAVATION OF CONTAMINATED SOIL AND INSTALLATION OF GROUNDWATER MONITORING WELLS

CITY OF EMERYVILLE
1333 PARK AVENUE
EMERYVILLE, CA 94608

Submitted By:
TANK PROTECT ENGINEERING
Of Northern California
January 15, 1991

John V. Mrakovich, Ph.D.
Registered Geologist

Jeff J. Farhoomand, M.S.
Civil Engineer

WORKPLAN FOR OVEREXCAVATION
OF CONTAMINATED SOIL AND
INSTALLATION OF GROUNDWATER
MONITORING WELLS

CITY OF EMERYVILLE
1333 PARK AVENUE
EMERYVILLE, CA 94608

This report has been prepared by the staff of **Tank Protect Engineering** under supervision of Engineer and/or Geologist whose seal(s) and 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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FIGURES

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APPENDICES

1.0 INTRODUCTION

The subject site is located at 1333 Park Avenue in the City of Emeryville in Alameda County, California (see Figure 1). Chemical analyses of soil samples collected during removal of 1 underground fuel storage tank at the site indicate the subsurface has experienced a confirmed release of petroleum hydrocarbons that has impacted the soil. This report discusses tank closure activities; proposes a workplan to investigate and remediate the horizontal and vertical extent of contaminated vadose zone soil by excavation; recommends on-site remediation of contaminated stockpiled soil, if necessary, and on-site reuse and/or disposal of excavated soil at an appropriate landfill; and proposes the installation of 3 groundwater monitoring wells as an initial investigation of groundwater contamination.

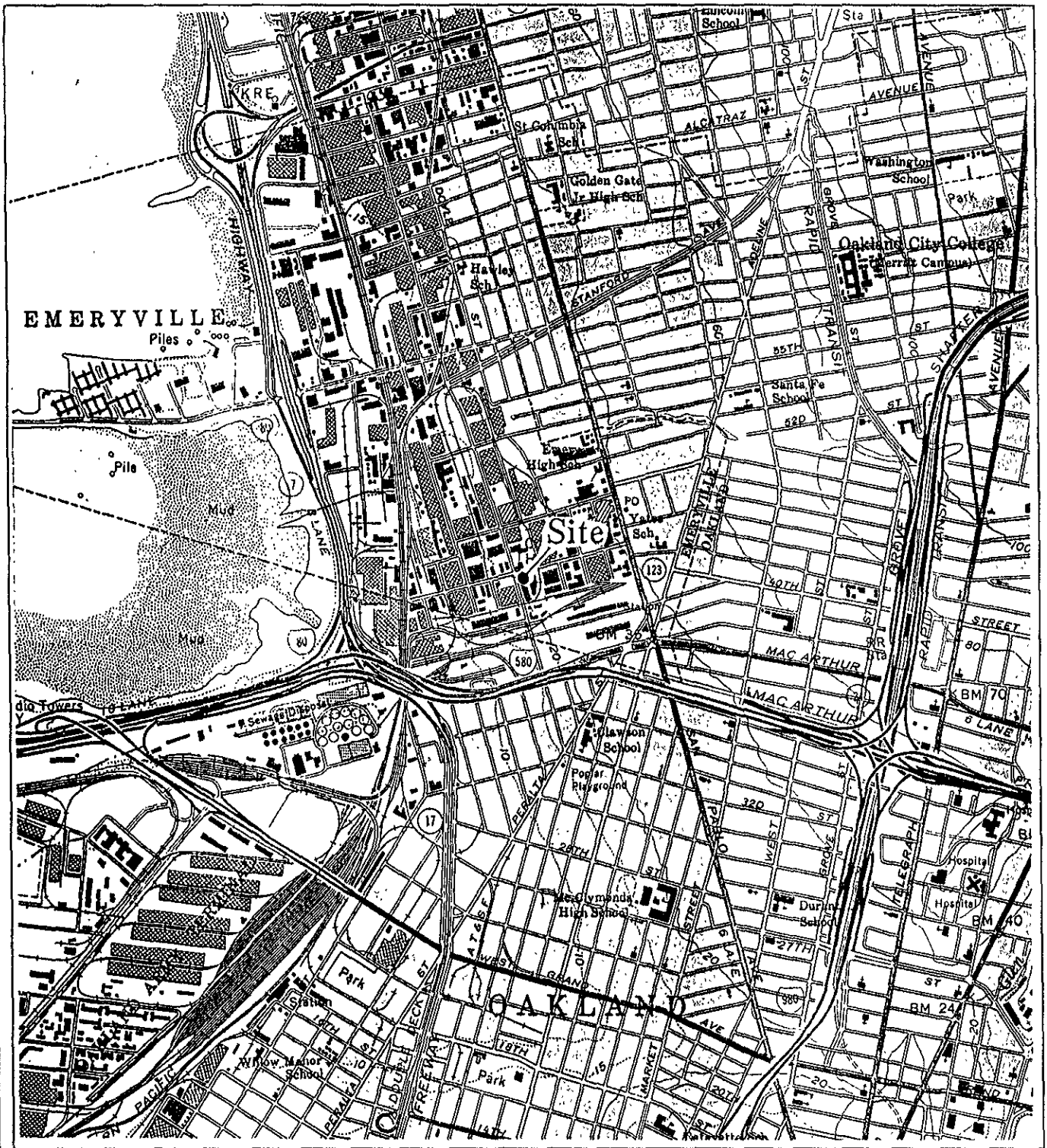
2.0 BACKGROUND

On January 2, 1992, Tank Protect Engineering (TPE), under contract to the City of Emeryville (COE), removed 1 underground, 2,000-gallon, single wall, steel, unleaded gasoline storage tank and dispenser island from the subject site [the site contact person is Mr. Juan C. Arreguin, telephone number (510) 596-4333]. After removal, the tank was visually examined and appeared rusty; however no holes were apparent.

About 45 cubic yards (cyd) of silty clay soil were excavated and stockpiled on site during tank removal activities. Apparent soil contamination was present in the excavated soil and excavation sidewalls as evidenced by stains and odor.

Groundwater was present in the excavation at a depth of about 8 feet. Sheen and minor floating product were visible on the water's surface.

After tank removal, TPE conducted soil and groundwater sampling in accordance with the California Regional Water Quality Control Board (CRWQCB)-San Francisco Bay Region's "Tri-Regional Board Staff Recommendations for Preliminary Evaluation and Investigation of Underground Tank Sites", dated August 10, 1990, and as directed by a representative of the Alameda County Health Agency, Division of Hazardous



LEGEND

REFERENCED USGS 7.5 MINUTE SERIES QUADRANGLE MAP
OAKLAND WEST, CALIFORNIA
PHOTOREVISED 1980

N

0 2,000
SCALE IN FEET

TANK PROTECT ENGINEERING

SITE VICINITY MAP

1333 PARK AVENUE
EMERYVILLE, CA

DATE	1/14/92
FIGURE	1
FILE #	213A-3
DRAWN BY	MAC
CHECKED BY	JVM

Materials, Department of Environmental Health [(ACDEH), see Appendix A for ACDEH's Hazardous Materials Inspection Form].

2.1 Soil Sampling

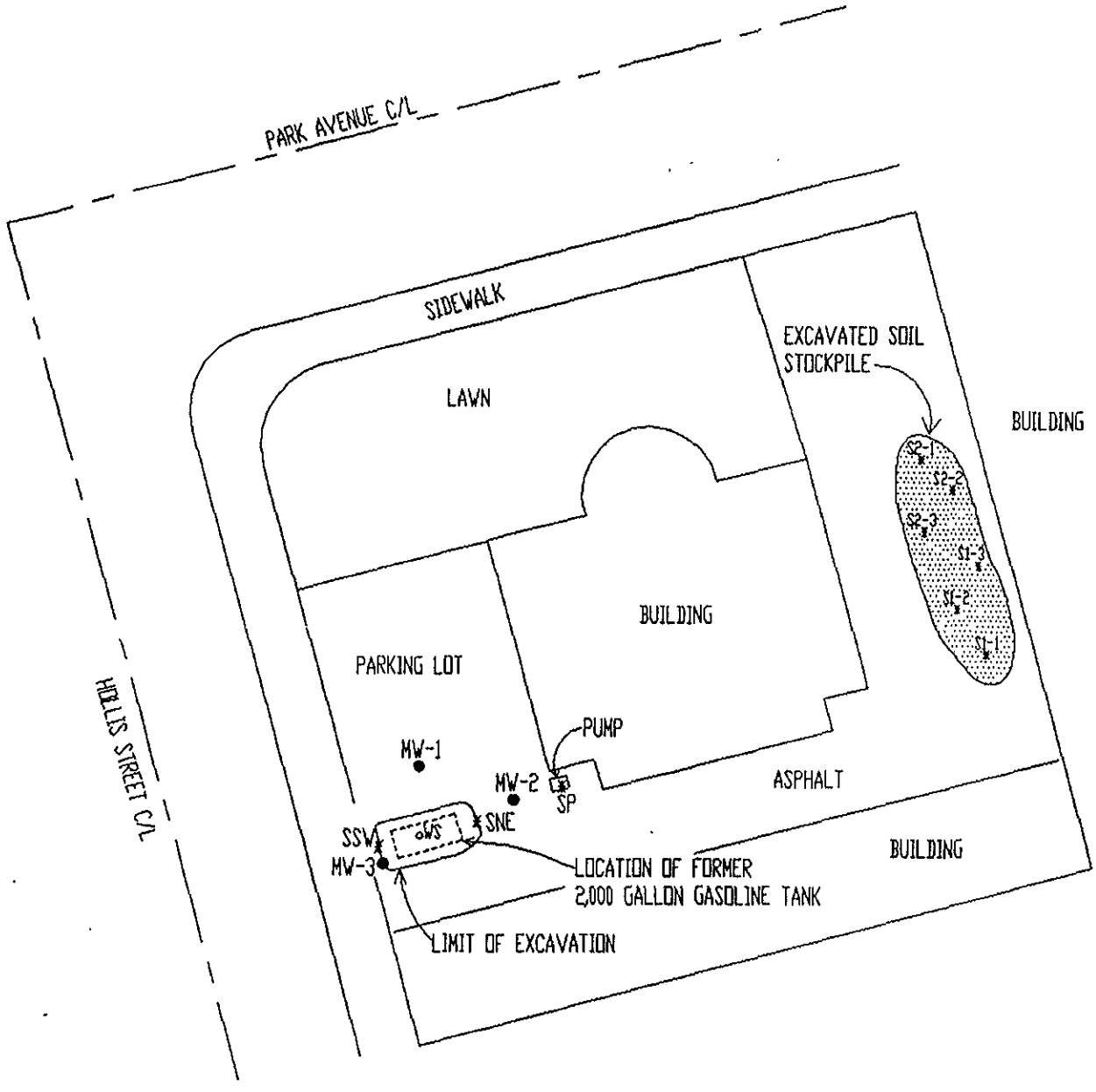
One discrete soil sample was collected for chemical analysis from native soil in each sidewall opposite each end of the tank, about 1-foot above the groundwater's surface, and 1 discrete sample was collected from beneath the dispenser island (see Figure 2 for sample locations SSW, SNE, and SP). The samples were collected about 1 to 2 feet into the native soil by excavating the soil with a backhoe bucket and collecting a sample from the bucket in a clean 2-inch diameter by 6-inch long brass tube driven by a slide-hammer corer. After collecting each sample, the brass tube ends were covered with aluminum foil and capped with plastic end-caps which were taped to the brass tubes with duct tape.

Two composite samples consisting of 3 discrete samples (S1-1,2,3 and S2-1,2,3) were also collected to characterize the stockpiled soil (see Figure 2). The samples were collected by removing about 2 feet to 3 feet of soil from the upper surface of the stockpile and collecting a sample in a brass tube driven by a slide-hammer corer into the newly exposed surface. The samples were handled as described above.

All tubes were labeled and placed in an iced cooler for transport to California Department of Health Services (DHS) certified Trace Analysis Laboratory, Inc. located in Hayward, California accompanied by chain-of-custody documentation (see Appendix B for TPE's protocol relative to sample handling procedures).

2.2 Groundwater Sampling

Grab groundwater sample WS was collected for chemical analysis from water in the tank excavation.



LEGEND

SSW ✱ NAME AND LOCATION OF SOIL SAMPLE

WS ○ NAME AND LOCATION OF GROUNDWATER SAMPLE

MW-1 ● NAME AND LOCATION OF PROPOSED GROUNDWATER MONITORING WELL

0 30

SCALE IN FEET

N

TANK PROTECT ENGINEERING

SITE PLAN

1333 PARK AVENUE
EMERYVILLE, CA

DATE	1/2/92
FIGURE	2
FILE #	213A-2
DRAWN BY	ASH
CHECKED BY	JVH

2.3 Chemical Analyses

All soil samples and the groundwater sample were analyzed for total petroleum hydrocarbons as gasoline (TPHG), and for benzene, toluene, ethylbenzene, and xylenes (BTEX) by the DHS Method and United States Environmental Protection Agency (EPA) Method 8020, respectively.

2.4 Analytical Results

Chemical analyses of soil samples SNE and SSW, collected from the tank excavation during tank removal, detected no TPHG, benzene, ethylbenzene, or xylenes; toluene was detected in both samples at concentrations of .0056 parts per million (ppm) and .008 ppm, respectively. Sample SNE, also analyzed for total and organic lead, detected only total lead at a concentration of 3.9 ppm. Soil sample SP, collected beneath the dispenser island, detected TPHG, toluene, ethylbenzene, and xylenes at concentrations of 180 ppm, .46 ppm, 1.4 ppm, and 20 ppm, respectively.

Stockpile soil samples S1-1,2,3 and S2-1,2,3 detected TPHG at concentrations of 410 ppm and 130 ppm, respectively. All BTEX chemicals were detected in both samples (see Table 1).

Grab groundwater sample WS detected TPHG, benzene, toluene, ethylbenzene, and xylenes at concentrations of 2,700 parts per billion (ppb), 120 ppb, 570 ppb, 140 ppb, and 900 ppb, respectively.

Analytical results are summarized in Tables 1 and 2 and documented with certified analytical reports and chain-of-custodies in Appendix C.

3.0 PROPOSED REMEDIAL INVESTIGATION AND REMEDIATION OF CONTAMINATED SOIL

Because soil sample SP, collected beneath the dispenser island, detected TPHG at a concentration of 180 ppm, and because there was apparent soil contamination in the

TABLE 1
SUMMARY OF SOIL ANALYTICAL RESULTS
(ppm)

Sample ID Name	Date	Depth (feet)	TPHG	Benzene	Toluene	Ethyl-Benzene	Xylenes	Total Lead	Organic Lead
S1-1, 2, 3	---	02.0-03.5	410	6.1	91	18	120	NA[1]	NA
S2-1, 2, 3	---	02.0-03.5	130	1.4	8.7	4.4	28	NA	NA
SNE	01/02/92	07.0-07.5	<.5	<.005	.0056	<.005	<.015	3.9	<.5
SP	01/02/92	02.0-02.5	180	<.088	.46	1.4	20	NA	NA
SSW	01/02/92	07.0-07.5	<.5	<.005	.008	<.005	<.015	NA	NA

[1] NA = NOT ANALYZED

88,

TABLE 2
SUMMARY OF WATER ANALYTICAL RESULTS
(ppb)

Sample ID Name	Date	TPHG	Benzene	Toluene	Ethyl-Benzene	Xylenes
WS	01/02/92	2,700	120	570	140	900

excavation sidewalls as evidenced by stains and odor in native soil in the tank excavation, COE contracted with TPE to conduct overexcavation of contaminated soil from beneath the former dispenser island and from the sidewalls of the excavation to investigate and remediate vadose zone soil contamination and to install 3 groundwater monitoring wells to investigate the horizontal extent of groundwater contamination as a result of the fuel leak.

After completing overexcavation, TPE proposes to remediate the stockpiled soil, if necessary, by aeration and/or chemical oxidation and reuse the soil to backfill the excavation (with regulator approval) or dispose of the soil at an appropriate landfill.

3.1 Objectives and Proposed Scope of Work

TPE's objectives in this preliminary investigation are (1) to excavate and remediate contaminated vadose zone soil, relative to TPHG and BTEX, to within the specified limits prescribed in this workplan, (2) to investigate hydrocarbon impact to groundwater, relative to TPHG, BTEX, and organic lead, and (3) to determine the hydraulic gradient and direction of groundwater flow.

To meet these objectives, TPE proposes the following scope of work:

- Conduct a subsurface utility survey to minimize the potential of encountering underground utilities and to assist in selecting locations for installation of 3 groundwater monitoring wells.

- Excavate contaminated soil from the sidewalls of the underground tank excavation to the depth of groundwater. If the sidewalls are stable, TPE will excavate contaminated soil below the groundwater surface up to a depth of about 12 feet to remove sources of contamination to groundwater and facilitate groundwater remediation.

- After excavating contaminated soil in the above task, collect verification soil samples from the sidewalls of the excavation for chemical analysis for TPHG, BTEX, and organic lead.

- Remediate the stockpiled soil on site, if appropriate, and collect verification soil samples from the remediated stockpile for chemical analyses.

- Dispose of the excavated soil at an appropriate landfill or reuse the soil on site for excavation closure.

- Backfill the excavation with remediated soil and/or clean imported fill.

- Conduct a file review at the CRWQCB to investigate the potential for any documented, off-site contamination to be impacting the subject site and to investigate vicinity and site groundwater flow direction to assist TPE in locating 3 proposed groundwater monitoring wells.

- Drill 3 soil borings to investigate the horizontal and vertical extent of vadose zone soil contamination.

- Collect soil samples from each soil boring at approximately 5-foot depth intervals for construction of a boring log and for selection for chemical analysis.

- Analyze vadose zone soil samples from the borings for TPHG, BTEX, and organic lead.

- Convert the 3 borings into groundwater monitoring wells.

- Develop, purge, and sample groundwater from each monitoring well for chemical analysis.

- Analyze 3 groundwater samples and 1 trip blank for TPHG, BTEX, and organic lead.

- Survey top-of-casings (TOC's) to the nearest .01 foot above Mean Sea Level (MSL) and evaluate direction and gradient of groundwater flow.

- Prepare a Site Assessment Report.

Details of the proposed scope of work are presented below.

3.2 Prefield Activities

Prior to beginning overexcavation activities TPE will notify the BAAQMD and will contract with subsurface locators and conduct an Underground Service Alert location request to minimize the potential for encountering any underground utilities or buried objects during overexcavation and installation of 3 groundwater monitoring wells.

3.3 Overexcavation of Contaminated Soil

TPE proposes to conduct horizontal excavation of contaminated vadose zone soil to a distance of about 2 feet to 15 feet outward from the present position of the sidewalls and vertical excavation to the depth of groundwater or about 8 feet. If the sidewalls remain stable, TPE proposes to conduct excavation of contaminated soil below the groundwater surface to a depth of about 12 feet to remove sources of contamination to the groundwater to facilitate groundwater remediation. Horizontal excavation will not be conducted to the extent of endangering buildings, sidewalk areas, utilities, or any other structures or objects. If, after excavating to the above limits, soil contamination is still present in the walls of the excavation and appears to be widespread horizontally, TPE may advise the client to conduct soil borings as a second phase of remedial investigation to assess other remedial options such as vapor extraction.

The extent of overexcavation will be based on field screening, by head-space analysis, of excavated floor and/or sidewall soil samples for volatile organic compounds using a combustible gas indicator.

Overexcavated soil will be stockpiled on site and placed on polyethylene plastic to prevent cross contamination to the underlying soil. Prior to leaving the site, TPE will

cover the stockpiled soil with plastic. The plastic cover will remain the responsibility of the client.

3.3.1 Overexcavation Verification Soil Sampling

When the horizontal and vertical extent of contaminated vadose zone soil has been reached, based on field screening, or the horizontal and vertical limits discussed above have been reached, verification soil samples will be collected for chemical analysis. As a minimum, soil samples will be collected at about 15-foot horizontal intervals at a depth of about 1 foot above the groundwater surface. Additional soil samples may be collected where contaminated soil is suspected and in permeable zones that may provide pathways for contaminant transport. Additional overexcavation may be conducted if all contaminated soil has not been removed, based on results of chemical analyses.

Soil samples will be collected from the sidewalls of the excavation by removing about 1 foot of soil to expose a fresh surface and driving a 2-inch diameter by 6-inch long brass tube into the newly exposed surface with a slide-hammer corer. The samples may also be collected by excavating soil with the bucket of a backhoe and collecting a sample in a brass tube from soil in the bucket. After collecting each sample, the brass tube ends will be quickly covered with aluminum foil and capped with plastic end-caps taped to the brass tubes with duct tape. The tubes will be labeled and placed in an iced cooler for transport to a DHS certified laboratory accompanied by chain-of-custody documentation (see Appendix B for TPE's protocol relative to sample handling techniques).

3.3.1.1 Chemical Analysis

The above soil samples are proposed to be analyzed for TPHG, BTEX, and organic lead by EPA recommended and DHS approved Methods 5030/8015, 5030/8020, and the DHS-LUFT Method, respectively.

3.4 Remediation/Disposal of Stockpiled Soil

Based on concentrations of contaminants and volume of soil excavated, TPE may recommend to the client either disposal of contaminated soil at an appropriate landfill or on-site treatment of contaminated soil followed by disposal at an appropriate landfill or on-site reuse of the soil.

If stockpiled soil is remediated on site, TPE may recommend treatment by aeration and/or chemical oxidation of the hydrocarbons. Treatment by chemical oxidation will consist of spreading the contaminated soil on the ground over a layer of polyethylene plastic to prevent cross contamination to the underlying soil. The chemical oxidizer will be applied until the soil is moist. The soil will be turned to expose all surfaces. Aeration and/or chemical oxidation will only be conducted with the approval of the ACDEH and after notifying the BAAQMD.

3.4.1 Stockpiled Soil Sampling

If treated for on-site reuse, 1 verification soil sample will be collected for each 20 cyd to confirm an appropriate cleanup level. If greater than 200 cyd of soil is stockpiled for remediation, TPE may ask the ACDEH to approve a statistical soil sampling plan to reduce the number and cost of verification soil samples needed to verify soil cleanup. Cleanup levels of less than 10 ppm for TPHG and non-detectable BTEX are recommended by TPE for on-site reuse of remediated soil. If excavated soil is disposed of at a landfill, the cleanup level and number of soil samples for characterization will be determined by the landfill guidelines.

3.4.1.1 Chemical Analyses

The above soil samples are proposed to be analyzed for TPHG, BTEX, and organic lead by EPA recommended and DHS approved Methods 5030/8015, 5030/8020, and the DHS-LUFT Method, respectively.

3.5 Excavation Closure

After overexcavation is completed, TPE will backfill and seal the excavation. Backfill material will consist of remediated soil and/or imported clean fill. Remediated soil will be used only with the approval of the ACDEH. The fill will be placed in the excavation in 2-foot to 3-foot compacted lifts to final grade.

3.6 Predrilling Activities

A representative of TPE will review CRWQCB files to investigate if any documented contaminated sites exist in the area of the subject site. This information may be useful in estimating groundwater gradient beneath the site which will assist TPE in selecting locations for 3 groundwater monitoring wells and may indicate if the subject site may be potentially contaminated by upgradient contaminant sources.

Before commencing drilling activities TPE will obtain well installation permits from the Alameda County Flood Control and Water Conservation District, Water Resources Management Zone 7 and visit the site to select the proposed soil boring locations.

3.7 Soil Boring and Sampling Procedures

The vertical and horizontal limits of vadose zone soil contamination, if any, will be investigated while drilling 3 soil borings for the construction of groundwater monitoring wells. The locations of the 3 proposed soil borings/monitoring wells are tentatively shown in Figure 2. These locations are estimated to place at least 1 well within 10 feet and in the verified downgradient direction of the former underground tank location according to recommendations in the CRWQCB's "Tri-Regional Board Staff Recommendations for Preliminary Evaluation and Investigation of Underground Tank Sites", dated August 10, 1990. These locations are subject to change based on information obtained during the file review discussed above in section 3.6 Predrilling Activities.

The exploratory borings for the monitoring wells will be drilled by a State of California licensed water well driller (C-57 Water Well Driller contractor's license) using 8-inch diameter, hollow-stem, auger drilling equipment. The augers will be steam-cleaned before drilling each boring to prevent cross contamination between borings or the introduction of off-site contamination for the initial boring. Representative soil samples will be collected for chemical analyses in the vadose zone at approximately 5-foot depth intervals below the ground surface 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 will be cleaned before each sampling event by washing with a trisodium phosphate solution and rinsing in distilled water. Samples collected for chemical analysis will be preserved in the tubes by quickly covering the open ends with aluminum foil and capping with plastic end caps taped to the tubes with duct tape. The tubes will be labeled and stored on ice for transport to a California State-certified laboratory accompanied by chain-of-custody documentation.

A detailed boring log will be prepared from auger return material and split-spoon samples. The soil will be logged according to the Unified Soil Classification System by a California Registered Geologist.

Drill cuttings will be stored on site, contained in plastic or 55-gallon steel drums. The stored cuttings will be labeled to show contents, date stored, suspected contamination, expected date of removal, company name, contact, and telephone number. Disposal of the cuttings is the responsibility of the client. After the cuttings are characterized by chemical analysis, TPE will provide recommendations to the client and, upon their request, assist them in remediation, or disposal of the cuttings, or both in an appropriate manner as an additional work item.

See Appendices D and E for TPE's protocols relative to hollow-stem auger drilling and soil sampling procedures and waste handling and decontamination procedures.

3.7.1 Chemical Analyses

Soil samples collected from soil borings for chemical analysis are proposed to be analyzed for TPHG and BTEX by EPA and DHS approved Methods 5030/8015 (Modified) and 5030/8020 (Modified), respectively.

3.8 Groundwater Investigation

The following discussion proposes groundwater monitoring well construction, development, and sampling procedures; and chemical analyses. Appendices F, G, and H document TPE's protocols relative to groundwater monitoring well construction, development, and sampling procedures.

3.8.1 Groundwater Monitoring Well Installation

Based on an estimated depth of 8 feet to groundwater, exploratory borings for 3 groundwater monitoring wells are proposed to be drilled to a depth of about 23 feet. Each boring will be converted to a monitoring well by installing 2-inch diameter, flush-threaded, schedule 40, polyvinyl chloride (PVC) casing and machine-slotted screen. The exact depth of each boring and screen length will be determined by the geologic profile and occurrence of groundwater in the boring at each location. The screen is proposed to extend about 3-feet above the water table surface. The length of screen below the water table surface may be less than 15 feet if an aquiclude is encountered. A sand pack of commercial filter sand will be placed in the annular space from the bottom of the boring to a maximum of 1 foot above the top of the screened interval. Approximately 1 foot of bentonite will be placed above the sand pack followed by a sand/cement slurry surface seal. A traffic rated, bolt-locked, vault box will be set in concrete to protect the well. A locking well cap with lock will be installed on each well casing and the elevation of the TOC for each well will be surveyed with respect to MSL datum by a professional civil engineer or licensed land surveyor.

3.8.2 Groundwater Monitoring Well Development

The 3 groundwater monitoring wells will be developed a minimum of 48 hours after well construction is completed. Before development, depth to water will be measured from the TOC to the nearest 0.01 foot using an electronic Solinst water level meter. A minimum of 3 repetitive measurements will be made for each level determination to ensure accuracy. Each well will be checked for floating product using a dedicated polyethylene bailer. If floating product is present, the thickness of product in the bailer will be measured and recorded to the nearest .05 inch.

The wells will be developed by using a 1.7", positive displacement, PVC hand pump or by bailing with dedicated polyethylene bailers until the well is free of sand, silt, and turbidity or no further improvement is apparent.

Development water will be stored on site in 55-gallon steel drums labeled to show contents, date filled, suspected contaminant, company name, contact, and telephone number. Disposal of the drummed water is the responsibility of the COE. After the water is characterized by chemical analysis, TPE will provide recommendations to the client and, upon their request, assist them in remediation, or disposal of the fluids, or both in an appropriate manner as an additional work item.

3.8.3 Groundwater Sampling

After a minimum of 48 hours after well development, depth to stabilized water will be measured and recorded as discussed above under section 3.8.2 Groundwater Monitoring Well Development and the wells will be sampled.

Prior to sampling, the wells will be purged a minimum of 3 wetted well volumes with dedicated polyethylene bailers. Temperature, pH, and electrical conductivity will be monitored and purging will continue until they are stabilized. Since dedicated bailers will be used for each well sampled, no decontamination will be necessary between sampling events. After purging is completed, turbidity will be measured and the water samples will be collected in sterilized glass vials with teflon lined screw caps, immediately sealed in the vials, and labeled to include: date, time, sample location,

project number, and sampler. The samples will be immediately stored on ice for transport to a California State-certified laboratory accompanied by chain-of-custody documentation. See Appendices E and I for waste handling and decontamination procedures, and quality assurance and quality control procedures (QA/QC).

Purge water will be stored on site in 55-gallon drums. After the drummed water is characterized by chemical analysis, TPE will provide recommendations to the COE and, upon their request, assist them in remediation or disposal of the fluids, or both in an appropriate manner as an additional work item.

3.8.3.1 Chemical Analyses

Three groundwater well samples and 1 trip blank will be analyzed for TPHG, BTEX, and organic lead by EPA Methods 5030/8015 (Modified), 5030/8020 (Modified), and the DHS-LUFT Method, respectively.

3.9 Groundwater Gradient Evaluation

The groundwater gradient will be evaluated by triangulation. The stabilized depth to water in the wells, when subtracted from their respective TOC, will provide the groundwater elevations on the dates measured. From this information, the groundwater gradient and flow direction will be evaluated.

3.10 Site Assessment Report

The information collected, analytical results, and TPE's conclusions and recommendations will be summarized in a report. The report will describe the work performed and include: an area map, a detailed site plan showing limits of overexcavation, locations of verification soil samples and installed monitoring wells, graphic boring logs, graphic monitoring well construction details, geologic cross section(s), a groundwater gradient map, results of chemical analyses, and other documentation to support the conclusions. Conclusions regarding the extent and type(s)

of contamination will be presented within the context of this workplan. Recommendations for feasible remedial alternatives and/or supplemental sampling and analyses will be included.

4.0 SITE SAFETY PLAN

A Site Safety Plan for conducting work under this workplan is included in Appendix J.

5.0 TIME SCHEDULE

The projected time schedule for implementation of the activities described in this workplan is presented below. The schedule reflects a relatively problem-free program. However, delays in the workplan review, permitting, or laboratory analyses could lengthen the project schedule. Access difficulties, adverse weather, and regulator review could also delay the proposed time schedule. TPE will make every effort to adhere to the project schedule.

Week 1: Client submits Workplan for Regulator Approval.

Week 3: Regulator Approval Received.

Week 4: Subcontracting; Conduct Underground Utility Survey; Conduct Overexcavation and Chemical Analyses of Verification Soil Sampling.

Week 5: Remediate and/or Sample Stockpiled Soil.

Week 6: Conduct Chemical Analyses.

Week 7: Reuse and/or Dispose of Stockpiled Soil; Close Excavation; Conduct File Review.

Week 8: Install 3 Groundwater Monitoring Wells and Submit Soil and Groundwater Samples for Chemical Analyses.

Week 9: Receive Chemical Analyses, Interpret Data and Write Site Assessment Report.

Week 11: Submit Site Assessment Report to Client.

APPENDIX A

ALAMEDA COUNTY, DEPARTMENT OF ENVIRONMENTAL HEALTH, HAZARDOUS MATERIALS INSPECTION FORM

white	-env.health
yellow	-facility
pink	-files

ALAMEDA COUNTY, DEPARTMENT OF ENVIRONMENTAL HEALTH

80 Swan Way, #200
Oakland, CA 94621
(415) 271-4320

Hazardous Materials Inspection Form

II,III

Site ID # ____ Site Name City of Emeryville Today's Date 1/2/92

Site Address 1333 Park Ave

City Emeryville Zip 94608 Phone ______

____ MAX AMT stored ≥ 500 lbs, 55 gal., 200 cft.?

Inspection Categories:

___ I. Haz. Mat/Waste GENERATOR/TRANSPORTER
___ II. Business Plans, Acute Hazardous Materials
✓ III. Underground Tanks TANK Removal

* Calif. Administration Code (CAC) or the Health & Safety Code (HS&C)

II.A BUSINESS PLANS (Title 19)

___	1. Immediate Reporting	2703
___	2. Bus. Plan Stds.	25503(b)
___	3. RR Cars > 30 days	25503.7
___	4. Inventory Information	25504(a)
___	5. Inventory Complete	2730
___	6. Emergency Response	25504(b)
___	7. Training	25504(c)
___	8. Deficiency	25505(a)
___	9. Modification	25505(b)

II.B ACUTELY HAZ. MAT'LS

___	10. Registration Form Filed	25533(a)
___	11. Form Complete	25533(b)
___	12. RMPP Contents	25534(c)
___	13. Implement Sch. Req'd? (Y/N)	___
___	14. Offsite Conseq. Assess.	25524(c)
___	15. Probable Risk Assessment	25534(d)
___	16. Persons Responsible	25534(g)
___	17. Certification	25534(i)
___	18. Exemption Request? (Y/N)	25536(b)
___	19. Trade Secret Requested?	25538

III. UNDERGROUND TANKS (Title 23)

General	___ 1. Permit Application	25284 (H&S)
	___ 2. Pipeline Leak Detection	25292 (H&S)
	___ 3. Records Maintenance	2712
	___ 4. Release Report	2651
	___ 5. Closure Plans	2670
Monitoring for Existing Tanks	___ 6. Method	
	1) Monthly Test	
	2) Daily Vadose; Semi-annual gndwater; One time soils	
	3) Daily Vadose; One time soils; Annual tank test	
	4) Monthly Gndwater; One time soils	
	5) Daily Inventory; Annual tank testing; Cont pipe leak det; Vadose/gndwater mon.	
	6) Daily Inventory; Annual tank testing; Cont pipe leak det	
	7) Weekly Tank Gauge; Annual tank tstng	
	8) Annual Tank Testing; Daily Inventory	
	9) Other ______	
	___ 7. Precis Tank Test; Date: ______	2643
	___ 8. Inventory Rec.	2644
	___ 9. Soil Testing	2646
	___ 10. Ground Water	2647
New Tanks	___ 11. Monitor Plan	2632
	___ 12. Access. Secure	2634
	___ 13. Plans Submit; Date: ______	2711
	___ 14. As Built; Date: ______	2635

Rev 6/88

Comments:

12:10 travel 1/2 ... 500 gallons of gas were removed this ...

1:00 PM on Site for Removal of Underground Storage tank (UST) 2000 g(?)

the tank is on a slab.

TPE on Site TANK in ground denatured with dry ice lel level 01

Note (Photographs taken)

Note Soil on Site has been Stained and has an odor of stale/old hydrocarbon — Supply [illegible]

Note: groundwater encountered at (±) 7 feet

Note (Site to be sampled Sample Contractor)

Note! there is a sheen (from fuel on the water at the west end of the excavation. photo # 5

Crane to be used for removal of UST

note at 3:10 a new gastech reading done of UST "0"

upon removal the tank was area underneath the tank (below cement, soil that adhered had a area obviously stained (Photo taken)

STATE manifest number.
90796610 → Erickson in the hauler.

Total Samples
2 at [illegible] UST
1 at Dispenser
Groundwater
Composite samples

CAC 000658512 Generator # City of Emeryville **II, III**

Contact: ______

Title: ______ Inspector: Brian P. Oliver

Signature: [signature] Signature: [signature]

white -env.health
yellow -facility
pink -files

ALAMEDA COUNTY, DEPARTMENT OF ENVIRONMENTAL HEALTH

Hazardous Materials Inspection Form

80 Swan Way, #200
Oakland, CA 94621
(415) 271-4320

II,III

Site ID # ____ Site Name City of Emeryville Today's Date 11/02/92

Site Address 1333 Park Avenue

City Emeryville Zip 94608 Phone ____

____ MAX AMT stored > 500 lbs, 55 gal., 200 cft.?

Inspection Categories:

X I. Haz. Mat/Waste GENERATOR/TRANSPORTER
__ II. Business Plans, Acute Hazardous Materials
__ III. Underground Tanks TANK Removal

• Calif. Administration Code (CAC) or the Health & Safety Code (HS&C)

II.A BUSINESS PLANS (Title 19)

__	1. Immediate Reporting	2703
__	2. Bus. Plan Stds.	25503(b)
__	3. RR Cars > 30 days	25503.7
__	4. Inventory Information	25504(a)
__	5. Inventory Complete	2730
__	6. Emergency Response	25504(b)
__	7. Training	25504(c)
__	8. Deficiency	25505(a)
__	9. Modification	25505(b)

II.B ACUTELY HAZ. MAT'LS

__	10. Registration Form Filed	25533(a)
__	11. Form Complete	25533(b)
__	12. RMPP Contents	25534(c)
__	13. Implement Sch. Req'd? (Y/N)	____
__	14. OffSite Conseq. Assess.	25524(c)
__	15. Probable Risk Assessment	25534(d)
__	16. Persons Responsible	25534(g)
__	17. Certification	25534(i)
__	18. Exemption Request? (Y/N)	25536(b)
__	19. Trade Secret Requested?	25538

III. UNDERGROUND TANKS (Title 23)

General

__	1. Permit Application	25284 (H&S)
__	2. Pipeline Leak Detection	25292 (H&S)
__	3. Records Maintenance	2712
__	4. Release Report	2651
__	5. Closure Plans	2670

Monitoring for Existing Tanks

__ 6. Method
1) Monthly Test
2) Daily Vadose
Semi-annual gndwater
One time soils
3) Daily Vadose
One time soils
Annual tank test
4) Monthly Gndwater
One time soils
5) Daily Inventory
Annual tank testing
Cont pipe leak det
Vadose/gndwater mon.
6) Daily Inventory
Annual tank testing
X Cont pipe leak det
7) Weekly Tank Gauge
Annual tank tstng
8) Annual Tank Testing
Daily Inventory
9) Other ____

__	7. Precis Tank Test Date: ____	2643
__	8. Inventory Rec.	2644
__	9. Soil Testing.	2646
__	10. Ground Water.	2647

New Tanks

__	11. Monitor Plan	2632
__	12. Access. Secure	2634
__	13. Plans Submit Date: ____	2711
__	14. As Built Date: ____	2635

Rev 6/88

Comments:

3.5

Emery Valley

42

City of Emeryville
Park Avenue

Required actions:

* (1) Two (2) soil samples taken from both ends of Tank
* (2) one (1) water sample * if soil/water interface
(3) submit samples analyzed by Certified lab to this office Within 14 days
(4) Samples to be analyzed for TPH as Gas BTEX
(5) Probable Organic Lead turn on soil sample as well as background level
(6) Complete Unauthorized Release form if Required
(7) Provide 1 sample for fuel dispenser line
(8) Provide Composite Sample: 1 per 10 cu yards of Soil

II, III

Contact: X

Title: X City Civil Engineer / Planning Staff Inspector: Brian P. Oliva

Signature: ____ Signature: ____

APPENDIX B

SAMPLE HANDLING PROCEDURES

APPENDIX B

SAMPLE HANDLING PROCEDURES

Soil and groundwater samples will be packaged carefully to avoid breakage or contamination, and will be delivered to the laboratory at proper storage temperatures. 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 keep samples at a constant temperature during transport to the laboratory.

- 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.

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 work plan to verify the methods to be employed during sample collection. All sample gathering activities will be recorded in the site logbook; all sample transfers will be documented in the site logbook; samples are to be identified with TPE labels and all sample

bottles are to 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 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.

Site log books will be maintained by a designated TPE field employee to record, for each sample, site identification, sampling locations, station numbers, dates, times, sampler's name, designation of the samples as a grab or composite, notation of the type of sample (e.g. groundwater, soil boring, etc.), preservatives used, on-site measurement data, and other observations or remarks.

APPENDIX C

CERTIFIED ANALYTICAL REPORTS AND CHAIN-OF-CUSTODY DOCUMENTATION

Trace Analysis Laboratory, Inc.
3423 Investment Boulevard, #8 • Hayward, California 94545
Telephone (510) 783-6960
Facsimile (510) 783-1512

TAL

January 7, 1992

Mr. Marc Zomorodi
Tank Protect Engineering
2821 Whipple Road
Union City, California 94587

Dear Mr. Zomorodi:

Trace Analysis Laboratory received nine soil samples on January 3, 1992 for your Project No. 213A-010392, 1333 Park Avenue, Emeryville, California (our custody log number 1632).

These samples were composited according to your chain of custody and analyzed for Total Petroleum Hydrocarbons as Gasoline, Benzene, Toluene, Ethylbenzene, Xylenes, Lead and Organic Lead. Our analytical report and the completed chain of custody form are enclosed for your review.

Trace Analysis Laboratory is certified under the California Environmental Laboratory Accreditation Program. Our certification number is 1199.

If you should have any questions or require additional information, please call me.

Sincerely yours,

Jennifer Pekol
Project Specialist

Enclosures

Trace Analysis Laboratory, Inc.
3423 Investment Boulevard, #8 • Hayward, California 94545
Telephone (510) 783-6960
Facsimile (510) 783-1512

TAL

LOG NUMBER: 1632
DATE SAMPLED: 01/02/92
DATE RECEIVED: 01/03/92
DATE EXTRACTED: 01/03/92
DATE ANALYZED: 01/04/92
DATE REPORTED: 01/07/92

CUSTOMER: Tank Protect Engineering

REQUESTER: Marc Zomorodi

PROJECT: No. 213A-010392, 1333 Park Avenue, Emeryville, CA 94608

Sample Type: Soil

Method and Constituent:	Units	Composite of S1-1, S1-2 and S1-3 Concentration	Composite of S1-1, S1-2 and S1-3 Reporting Limit	Composite of S2-1, S2-2 and S2-3 Concentration	Composite of S2-1, S2-2 and S2-3 Reporting Limit	SNE Concentration	SNE Reporting Limit
DHS Method:							
Total Petroleum Hydrocarbons as Gasoline	ug/kg	410,000	2,400	130,000	500	ND	500
EPA Method 8020 for:							
Benzene	ug/kg	6,100	440	1,400	44	ND	5.0
Toluene	ug/kg	91,000	380	8,700	38	5.6	5.0
Ethylbenzene	ug/kg	18,000	460	4,400	46	ND	5.0
Xylenes	ug/kg	120,000	1,200	28,000	120	ND	15

Concentrations reported as ND were not detected at or above the reporting limit.

LOG NUMBER: 1632
DATE SAMPLED: 01/02/92
DATE RECEIVED: 01/03/92
DATE EXTRACTED: 01/03/92
DATE ANALYZED: 01/04/92
DATE REPORTED: 01/07/92
PAGE: Two

Sample Type: Soil

Method and Constituent:	Units	SP Concentration	SP Reporting Limit	SSW Concentration	SSW Reporting Limit	Method Blank Concentration	Method Blank Reporting Limit
DHS Method:							
Total Petroleum Hydrocarbons as Gasoline	ug/kg	180,000	500	ND	500	ND	500
EPA Method 8020 for:							
Benzene	ug/kg	ND	88	ND	5.0	ND	5.0
Toluene	ug/kg	460	76	8.0	5.0	ND	5.0
Ethylbenzene	ug/kg	1,400	92	ND	5.0	ND	5.0
Xylenes	ug/kg	20,000	240	ND	15	ND	15

QC Summary:

% Recovery: 96
% RPD: 13

Concentrations reported as ND were not detected at or above the reporting limit.

LOG NUMBER: 1632
DATE SAMPLED: 01/02/92
DATE RECEIVED: 01/03/92
DATE EXTRACTED: 01/07/92
DATE ANALYZED: 01/07/92
DATE REPORTED: 01/07/92
PAGE: Three

Sample Type: Soil

Method and Constituent:	Units	SNE Concentration	SNE Reporting Limit	Method Blank Concentration	Method Blank Reporting Limit
EPA Method 7420:					
Lead	ug/kg	3,900	2,500	ND	2,500

QC Summary:

% Recovery: 86
% RPD: 6.5

Concentrations reported as ND were not detected at or above the reporting limit.

TAL Trace Analysis Laboratory, Inc.

LOG NUMBER: 1632
DATE SAMPLED: 01/02/92
DATE RECEIVED: 01/03/92
DATE EXTRACTED: 01/06/92
DATE ANALYZED: 01/07/92
DATE REPORTED: 01/07/92
PAGE: Four

Sample Type: Soil

Method and Constituent:	Units	SNE Concentration	SNE Reporting Limit	Method Blank Concentration	Method Blank Reporting Limit
DHS Method:					
Organic Lead	ug/kg	ND	500	ND	500

QC Summary:

% Recovery: 82
% RPD: *

Concentrations reported as ND were not detected at or above the reporting limit.

* The RPD is not reportable since the sample prepared in duplicate was not detectable.

Louis W. DuPuis
Quality Assurance/ Quality Control Manager

TANK PROTECT ENGINEERING

2821 WHIPPLE ROAD
UNION CITY, CA 94587
(415)429-8088
(800)523-8088
FAX(415)429-8089

LAB: TAL

TURNAROUND: NORMAL / 5 DAYS

P.O. #: 0360

PAGE 1 OF 1

CHAIN OF CUSTODY

PROJECT NO.	SITE NAME & ADDRESS
213A-0103 92	1333 PARK AVE EMERYVILLE, CA 94608

SAMPLER NAME, ADDRESS AND TELEPHONE NUMBER
AHMAD SHAH TANK PROTECT'S ENGINEERING
2821 WHIPPLE ROAD, UNION CITY, CA 94587 (415) 429-8088

ID NO.	DATE	TIME	SOIL	WATER	SAMPLING LOCATION	(1) TYPE OF CON-TAINER	ANALYTES REQUESTED: TOTAL LIGHT HC	AROMATIC HC (BTX)	TOTAL HEAVY HC	OIL & GREASE	VOC SCAN (624's)	OTHER (TOTAL LEAD)	(TETRA ETHYL LEAD)	1632
SSW	01/02	3:50	✓		SSW @ -7' FROM GROUND LEVEL	BRASS TUBE	✓	✓						
SNE	01/02	4:00	✓		SNE @ -7' FROM GROUND LEVEL		✓	✓				✓	✓	
SP	01/02	4:45	✓		SP @ 2' UNDER PUMP ISLAND		✓	✓						
S1-1	01/02	5:09	✓		S1-1 @ 2' FROM STOCK PILE		✓	✓						} COMPOSITE
S1-2	01/02	5:15	✓		S1-2 @ 3' FROM STOCKPILE		✓	✓						
S1-3	01/02	5:30	✓		S1-3 @ 2' FROM STOCKPILE		✓	✓						
S2-1	01/02	5:40	✓		S2-1 @ 3' FROM STOCKPILE		✓	✓						} COMPOSITE
S2-2	01/02	5:50	✓		S2-2 @ 1' FROM STOCKPILE		✓	✓						
S2-3	01/02	6:00	✓		S-2-3 @ 2' FROM STOCKPILE		✓	✓						

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) Ehsan Rana	Date / Time 1/3/92 10am	Remarks 5-day 3021 walk-in 1-bt on ice Y-N gk	

DATE: 01/02/1992

Trace Analysis Laboratory, Inc.
3423 Investment Boulevard, #8 • Hayward, California 94545
Telephone (510) 783-6960
Facsimile (510) 783-1512

TAL

January 7, 1992

Mr. Marc Zomorodi
Tank Protect Engineering
2821 Whipple Road
Union City, California 94587

Dear Mr. Zomorodi:

Trace Analysis Laboratory received one water sample on January 3, 1992 for your Project No. 213A-010392, 1333 Park Avenue, Emeryville, California (our custody log number 1631).

This sample was analyzed for Total Petroleum Hydrocarbons as Gasoline, Benzene, Toluene, Ethylbenzene and Xylenes. Our analytical report and the completed chain of custody form are enclosed for your review.

Trace Analysis Laboratory is certified under the California Environmental Laboratory Accreditation Program. Our certification number is 1199.

If you should have any questions or require additional information, please call me.

Sincerely yours,

Jennifer Pekol
Project Specialist

Enclosures

Trace Analysis Laboratory, Inc.
3423 Investment Boulevard, #8 • Hayward, California 94545
Telephone (510) 783-6960
Facsimile (510) 783-1512

TAL

LOG NUMBER: 1631
DATE SAMPLED: 01/02/92
DATE RECEIVED: 01/03/92
DATE ANALYZED: 01/06/92
DATE REPORTED: 01/07/91

CUSTOMER: Tank Protect Engineering

REQUESTER: Marc Zomorodi

PROJECT: No. 213A-010392, 1333 Park Avenue, Emeryville, CA 94608

Sample Type: Water

Method and Constituent:	Units	WS Concentration	WS Reporting Limit	Method Blank Concentration	Method Blank Reporting Limit
DHS Method:					
Total Petroleum Hydrocarbons as Gasoline	ug/l	2,700	50	ND	50
EPA Method 8020 for:					
Benzene	ug/l	120	6.6	ND	0.50
Toluene	ug/l	570	5.6	ND	0.50
Ethylbenzene	ug/l	140	7.0	ND	0.50
Xylenes	ug/l	900	18	ND	1.5

QC Summary:

% Recovery: 102*
% RPD: 6.1

Concentrations reported as ND were not detected at or above the reporting limit.

* The Recovery is for the Laboratory Control Sample, due to the high concentration in the spiked sample.

Louis W. DuPuis
Quality Assurance/Quality Control Manager

TANK PROTECT ENGINEERING
2821 WHIPPLE ROAD
UNION CITY, CA 94587
(415)429-8088
(800)523-8088
FAX(415)429-8089

LAB: TAL

TURNAROUND: NORMAL / 5 DAYS

P.O. #: 0360

PAGE 1 OF 1

CHAIN OF CUSTODY

PROJECT NO.	SITE NAME & ADDRESS
213A-010392	1333 PARK AVE EMERYVILLE, CA 94608

SAMPLER NAME, ADDRESS AND TELEPHONE NUMBER
AHMAD SHAH TANK PROTECT ENGINEERING
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	1631
WS	01/02	4:20		✓	WS FROM BOTTOM OF PIT	2-40(ml)	✓	✓					

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	
			1/3/92 1020	5-day water	walk-in 2-40's on ice green gk

DATE: _____

APPENDIX D

HOLLOW-STEM AUGER DRILLING AND SOIL SAMPLING PROCEDURES

APPENDIX D

HOLLOW-STEM AUGER DRILLING AND SOIL SAMPLING PROCEDURES

Undisturbed soil samples will be recovered from soil without introducing liquids into the borings. Soil samples as core will be taken at 5-feet depth intervals from ground surface 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 by 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 a thin sheet of Teflon tape or aluminum foil beneath plastic end caps and sealed with electrical or duct tape and properly labeled. The samples will be stored on ice at a temperature of 4 degrees Celsius.

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 E

WASTE HANDLING AND DECONTAMINATION PROCEDURES

APPENDIX E

WASTE HANDLING AND DECONTAMINATION PROCEDURES

Decontamination: Any drilling, sampling or field measurement equipment that comes into contact with soils or groundwater will be properly decontaminated prior to its use at the site and after each incident of contact with the soils 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-tube sampler and brass tubes, will be cleaned by washing with tri-sodium phosphate detergent, followed by sequential rinsing with tap water, and deionized water.

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 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 or plastic sheeting will be labeled to show material stored, known or suggested contaminant, date stored, expected removal date, company name, contact, and telephone number.

APPENDIX F

GROUNDWATER MONITORING WELL CONSTRUCTION PROCEDURES

APPENDIX F

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. 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 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.

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. 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 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 shall extend across the entire saturated zone of the aquifer or up to a length of 20 feet, which ever 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 effect groundwater quality. Bentonite will be hydrated with clean water.

Grout Seal Material: Cement grout will consist of a proper mixture if Type 1/11 Portland cement, hydrated with clean 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 shall be thoroughly cleaned immediately before starting each well installation. When available, each component shall be cleaned with a high temperature, high pressure washer for a minimum of five minutes. When a washer is not available, components shall be cleaned with water and detergent or tri-sodium phosphate, rinsed in clean water, than rinsed in distilled water.

Soil and water sampling equipment and material used to construct the wells shall not donate to, capture, mask, nor 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 shall be limited to inorganic and non-hazardous compounds. Compressed air introduced to the borehole shall 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 shall cover the entire screened interval and rise a minimum of two 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 foot in thickness.

Grout Seal Placement: The cement grout mixture will be hydrated with clean water and thoroughly mixed prior to placement. If substantial groundwater exists in the bore hole, the grout shall be placed by 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 one continuous lift and will extend to the surface or to the well vault if the wellhead 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 wellhead 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.

Wellheads 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 G

GROUNDWATER MONITORING WELL DEVELOPMENT PROCEDURES

APPENDIX G

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, 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. The procedure may be repeated as required to establish full development.

METHODOLOGY

Seal Stabilization: Cement and bentonite annular seals shall set and cure not less then 72 hours prior to well development.

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

Development equipment shall not donate to, capture, mask, nor alter the chemical composition of the soils 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 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 to not 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 (sand/gravelly) aquifers, the rate of surge block lifting shall 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 shall be less than the recharge rate of the well in order to avoid de-watering.

Discharged Water Containment and Disposal: All water and sediment generated by well development shall be collected in 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 H

GROUNDWATER SAMPLING PROCEDURES

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GROUNDWATER SAMPLING PROCEDURES

Groundwater monitoring wells will not be sampled until at least 72 hours after well development. Groundwater samples will be obtained using either 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 4 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 4 to 10 well volumes are removed, the sample will be taken when the water level in the well recovers to 80% of its initial water level or more.

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).

Tank Protect Engineering will also measure the thickness of any floating product in the monitoring wells using a probe, 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 shall be handled and preserved according to the latest EPA methods as described in the Federal Register (Volume 44, No.233, Page 69544, Table ll) for the type of analysis to be performed.

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/Tenths
Volume of Water Discharged	Gallons
Turbidity	NTU

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

APPENDIX I

QUALITY ASSURANCE AND QUALITY CONTROL PROCEDURES

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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.

Tank Protect Engineering will follow a 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 taken in the field are used to evaluate both sampling and analytical methods. Three basic categories of QA/QC samples that may be collected are trip samples, field blanks, and duplicate samples.

Trip blanks are a check for cross-contamination during sample collection, shipment, and in the laboratory. Analytically confirmed organic-free water shall be used for organic parameters and deionized water for metal parameters. Blanks will be prepared by the laboratory supplying the sample containers. The blank shall 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 a water sample that remains with the collected samples during transportation and is analyzed along with the field samples to check for residual contamination. 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 for air exposure can vary considerably from site to site.

The laboratory will not be informed about the presence of field and trip blanks and a false identifying number will be put on the label. Full documentation of these collection and decoy procedure will be made in the site logbook.

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 preforming QC test 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 EPA-certified standards), duplicates, replicates, and sample spikes. Internal QC also requires adherence to written methods, procedural documentation, and record keeping, and the observance of good laboratory practices.

APPENDIX J

SITE SAFETY PLAN

TPE SITE SAFETY PLAN

TANK PROTECT ENGINEERING OF NORTHERN CALIFORNIA, INC.
SITE SAFETY PLAN

Site City Of Emeryville
1333 Park Avenue
Emeryville, CA 94608

Project Number 213

Original Site Safety Plan: Yes ( ) No ( )

Revision Number _____

Plan Prepared by John V. Mrakovich

Date 01/15/92

Plan Approved by Marc Zomorodi

Date 01/15/92

Please respond to each item as completely as possible. Where an item is not applicable, please mark "N/A".

1. KEY PERSONNEL AND RESPONSIBILITIES

(Include name, telephone number and health and safety responsibilities; i.e., project manager - Joe Smith - responsible for supervision of all site activities.)

	Well Installation	Overexcavation
Project Manager	John V. Mrakovich	Lyle Travis
Site Safety Manager	Michael A. Casso	Ahmand Shah
Alternate Site Safety Manager	None	None
Field Team Members	None	None

Agency Reps: [Please specify by one of the following symbols: Federal: (F), State: (S), Local: (L), Contractor(s): (C)

(L) Brian Oliva

TPE SITE SAFETY PLAN

2. JOB HAZARD ANALYSIS

2.1 OVERALL HAZARD EVALUATION

Hazard Level:	High ( )	Moderate ( )	Low (X)	Unknown ( )
Hazard Type:	Liquid ( )	Solid ( )	Sludge ( )	Vapor/Gas (X)

Known or suspected hazardous materials present on site
Benzene, Toluene, Xylenes, Ethyl-Benzene (BTEX)

Characteristics of hazardous materials included above (complete for each chemical presents):

MATERIAL #1

Corrosive ( )	Ignitable (X)	Toxic (X)	Reactive ( )
Volatile (X)	Radioactive ( )	Biological Agent ( )	
Exposure Routes:	Inhalation (X)	Ingestion ( )	Contact (X)

MATERIAL #2

Corrosive ( )	Ignitable ( )	Toxic ( )	Reactive ( )
Volatile ( )	Radioactive ( )	Biological Agent ( )	
Exposure Routes:	Inhalation ( )	Ingestion ( )	Contact ( )

MATERIAL #3

Corrosive ( )	Ignitable ( )	Toxic ( )	Reactive ( )
Volatile ( )	Radioactive ( )	Biological Agent ( )	
Exposure Routes:	Inhalation ( )	Ingestion ( )	Contact ( )

MATERIAL #4

Corrosive ( )	Ignitable ( )	Toxic ( )	Reactive ( )
Volatile ( )	Radioactive ( )	Biological Agent ( )	
Exposure Routes:	Inhalation ( )	Ingestion ( )	Contact ( )

TPE SITE SAFETY PLAN

2.2 JOB-SPECIFIC HAZARDS

For each labor category specify the possible hazards based on information available (i.e., Task-driller, Hazards-trauma from drill rig accidents, etc.) For each hazard, indicate steps to be taken to minimize the hazard.

Driller/Helper/Geologist-trauma from drill rig accidents wear hard hat, gloves, steel-toed boots.

The following additional hazards are expected on site (i.e., snake infested area, extreme heat, etc.):

Temporary open bore holes

Measures to minimize the effects of the additional hazards are:

Cone unattended bore holes

3. MONITORING PLAN

3.1 (a) Air Monitoring Plan

Action levels for implementation of air monitoring. Action levels should be based on published data available on contaminants of concern. Action levels should be set by persons experienced in industrial hygiene.

Level (i.e.,.5 ppm)	Action Taken (i.e., commence perimeter monitoring)
1.0 ppm	commence perimeter monitoring

(b) Air Monitoring Equipment

Outline the specific equipment to be used, calibration method, frequency of monitoring, locations to be monitored, and analysis of samples (if applicable).
Trace-Techtor hexane calibration
Monitor at bore hole during each sampling event if vapors detected.

If air monitoring is not to be implemented for this site, explain why:

3.2 Personnel Monitoring

(Include hierarchy of responsibilities decision making on the site)
Site Safety Manager to make decision

3.3 Sampling Monitoring

(a) Techniques used for sampling Sample air at bore hole with Gastech Model 1314

(b) Equipments used for sampling Trace-Techtor

(c) Maintenance and calibration of equipments Calibrate to hexane prior to operation

4. PERSONAL PROTECTIVE EQUIPMENT (PPE)

Equipment used by employees for the site tasks and operations being conducted. Be Specific (i.e., hard hat, impact resistance goggles, other protective glove, etc.).
Hard hat, protective gloves (when necessary).

5. SITE CONTROL AND SECURITY MEASURES

The following general work zone security guidelines should be implemented:

- Work zone shall be barricaded and caution tape used.
- Excavations shall be closed when drilling and sampling activities are not actually taking place.
- No excavations shall be left unattended. Visitors will not enter the work zone unless they have attended a project safety briefing.
- Persons will not leave the work zone without first passing through the decontamination zone.

6. DECONTAMINATION PROCEDURE

List the procedures and specific steps to be taken to decontaminate equipment and PPE.
Wash equipment with trisodium phosphate solution and rinse with clean water.

7. TRAINING REQUIREMENTS

Prior to mobilization at the job site, employees will attend a safety briefing. The briefing will include the nature of the wastes and the site, donning personal protection equipment, decontamination procedures and emergency procedures.

8. MEDICAL SURVEILLANCE REQUIREMENTS

If any task requires a very high personnel protection level, personnel shall provide assurances that they have received a physical examination and they are fit to do the task. Also personnel will be instructed to look for any symptom of heat stress, heat stroke, heat exhaustion or any other unusual symptom. If there is any report of that kind it will be immediately followed through, and appropriate action will be taken.

9. STANDARD OPERATION PROCEDURES

Tank Protect Engineering of Northern California, Inc. (TPE) is responsible for the safety of all TPE employees on site. Each contractor shall provide all the equipment necessary to meet safe operation practices and procedures for their personnel on site and be responsible for the safety of their workers.

A "Three Warning" system is utilized to enforce compliance with Health and Safety procedures practices which will be implemented at the site for worker safety:

* Eating, drinking, chewing gum or tobacco, and smoking will be allowed only in designated areas.
* Wash facilities will be utilized by workers in the work areas before eating, drinking, or use of the toilet facilities.
* Containers will be labeled identifying them as waste, debris or contaminated clothing.

* All Excavation/drilling work will comply with regulatory agencies requirement.
* All site personnel will be required to wear hard hats and advised to take adequate measures for self protection.
* Any other action which is determined to be unsafe by the site safety officer.

10. CONFINED SPACE ENTRY PROCEDURES

No one is allowed to enter any confined space operation without proper safety measures. Specifically in case of an excavated Tank Pit no one should enter at no time.

11. EMERGENCY RESPONSE PLAN

Fire extinguisher(s) will be on site prior to excavation. Relevant phone numbers:

Person	Title	Phone No.
John V. Mrakovich	Project Manager	(510) 429-8088
	Fire	911 or
	Police	911 or
	Ambulance	911 or
	Poison Control Center	(800)523-2222
	Site Phone	
	Nearest off-site no.	
	Medical Advisor	
Juan Arreguin	Client Contact	(510) 596-4330

U.S EPA - ERT	(201) 321-6660
Chemtrec	(800) 424-9300
Centers for Disease Control	Day (404) 329-3311
	Night (404) 329-2888
National Response Center	(800) 424-8802
Superfund/RCRA Hotline	(800) 424-8802
TSCA Hotline	(800) 424-9065
National Pesticide Information Services	(800) 845-7633
Bureau of Alcohol, Tobacco, and Firearms	(800) 424-9555

HEALTH AND SAFETY COMPLIANCE STATEMENT

I, _____, have received and read a copy of the project Health and Safety Plan.

I understand that I am required to have read the aforementioned document and have received proper training under the occupational Safety and Health Act (29 CFR, Part 1910.120) prior to conducting site activities at the site.

_____ _____

Signature Date

Providence Hospital
3100 Summit Street
Oakland, CA 94609
Emergency # (510) 835-4500

Go East on 580, exit on Broadway, turn right onto Broadway, continuing until 3rd Street, then make a right onto Summit. Hospital is on the right hand side.