WORKPLAN
FOR
SOIL AND GROUNDWATER
INVESTIGATION

FIESTA BEVERAGES (*)
966 89TH AVENUE
OAKLAND, CA 94621

(*) Mailing Address
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Pleasanton, CA. 94588

Submitted By:
TANK PROTECT ENGINEERING
Of Northern California, Inc.
May 24, 1993

John V. Mrakovich, Ph.D.
Registered Geologist

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May 24, 1993

This Workplan 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.

Jeff J. Farhoomand, M.S.
Civil Engineer

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1.0 INTRODUCTION

The subject site is located at 966 89th Avenue in the city of Oakland in Alameda County, California (see Figure 1). The site contact person is Mr. Ted Walbey [(510) 832-6081]. Tank Protect Engineering of Northern California, Inc. (TPE) understands that 2 underground gasoline storage tanks, one 500-gallon and one 1,000-gallon, were removed from separate excavations at the site on August 24, 1990 (see Figure 2). Contaminated soil was documented in both excavations with total petroleum hydrocarbons as gasoline (TPHG) detected at a maximum concentration of 4,900 parts per million (ppm) in the excavation containing the 1,000-gallon tank.

TPE further understands that contaminated soil was excavated from the floor of both excavations on January 15, 1991 to the depth of groundwater, about 15 feet below ground surface. Soil and groundwater samples collected on January 15, 1991 detected TPHG in the soil and groundwater samples from the 500-gallon tank excavation at concentrations of 2.2 ppm and 36,000 parts per billion (ppb), respectively. A groundwater sample from the 1,000-gallon tank excavation detected TPHG at a concentration of 25,000 ppb.

In a December 17, 1992 letter, the Alameda County Health Care Services Agency (ACHCSA) has required Fiesta Beverages to perform a subsurface investigation which determines the extent of the soil and groundwater contamination (see Appendix A).

This workplan proposes a preliminary investigation of the horizontal and vertical extent of contaminated vadose zone soil and groundwater; with respect to contamination by TPHG, benzene, toluene, ethylbenzene, and xylenes (BTEX); by drilling 3 soil borings and converting up to 3 into groundwater monitoring wells.

This workplan is submitted for the review and approval of the ACHCSA and the California Regional Water Quality Control Board-San Francisco Bay Region (CRWQCB).

2.0 PROPOSED PRELIMINARY INVESTIGATION OF VADOSE ZONE SOIL AND GROUNDWATER CONTAMINATION

Because the ACHCSA has required an investigation of the soil and groundwater in the vicinity of the 2 former, underground gasoline tanks, Fiesta Beverages has contracted with TPE to drill up to 3 soil borings and to convert up to 3 of the borings into groundwater monitoring wells as an investigation of vadose zone soil and groundwater contamination resulting from the fuel leak.

2.1 Proposed Scope of Work

As an investigation of vadose zone soil and groundwater contamination, TPE proposes the following scope of work:

- Conduct a subsurface utility survey to minimize the potential of encountering unexpected utilities, if necessary, and to assist in selecting locations for 3 soil borings.
- Conduct a file review at the office of the CRWQCB and/or ACHCSA to investigate the potential for any documented, off-site contamination that may be impacting the subject site and to investigate vicinity and site groundwater flow direction.
- 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 chemical analysis.
- Analyze vadose zone soil samples from the borings for TPHG and BTEX.
- Convert up to 3 borings into groundwater monitoring wells.

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

- Analyze all groundwater samples for TPHG and BTEX.

- If 3 monitoring wells are installed, survey top-of-casings (TOC) to the nearest .01 foot above Mean Sea Level (MSL).

- Interpret direction and gradient of groundwater flow.

- Prepare a Preliminary Site Assessment Report (PSAR).

Details of the proposed scope of work are presented below.

2.1.1 Prefield Activities

Prior to beginning drilling activities TPE will contract with subsurface locators, if necessary, and conduct an Underground Service Alert location request to minimize the potential for encountering any buried utilities or underground objects during drilling activities.

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

Before commencing drilling activities, TPE will obtain soil boring and 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.

2.1.2 Soil Boring and Sampling Procedures

The vertical and horizontal limits of vadose zone soil contamination will be investigated by drilling 3 soil borings. The locations of the 3 proposed soil borings are tentatively shown in Figure 2. These locations were chosen to investigate vadose zone contamination beyond the sidewalls of the 2 former excavations and for potential construction of up to 3 groundwater monitoring wells, of which 1 is estimated to be in the verified downgradient direction of the former underground tank locations 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 2.1.1 Prefield Activities.

The exploratory borings 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 split-spoon sampler, equipped with three 2-inch diameter by 6-inch long brass tubes, into the undisturbed soil beyond the tip of the augers. The lead tube will be selected for chemical analysis; if the lead tube is not full, the middle tube will be selected. If neither the lead nor the middle tube is full, the sample will be retaken. The sampling equipment will be cleaned before each sampling event by washing with a trisodium phosphate solution and rinsing in potable or distilled water. Samples collected for chemical analysis from the vadose zone will be preserved in the tubes by quickly covering the open ends with teflon tape and capping the ends with plastic end caps. The tubes will be labeled to show site name, project number, date, time, sample name, depth collected, and sampler and placed in an iced cooler for transport to a California State Department of Health Services (DHS) 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 55-gallon steel drums. The stored cuttings will be labeled to show contents, date stored, suspected contaminant, 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, at their request, assist them in remediation, or disposal of the cuttings, or both in an appropriate manner as an additional work item.

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

2.1.2.1 Chemical Analyses

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

2.2 Groundwater Investigation

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

2.2.1 Groundwater Monitoring Well Installation

Based on an estimated depth of 15 feet to groundwater, exploratory borings for up to 3 groundwater monitoring wells are proposed to be drilled to a depth of up to 30 feet.

Each boring will be converted into a monitoring well by installing 2-inch diameter, flush-threaded, schedule 40, polyvinyl chloride (PVC) casing and machine-slotted screen. Slot size will be based on the smallest-grained aquifer material encountered. TPE expects to use .010-inch 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 5-feet above the water table surface if the aquifer is unconfined. If the aquifer is confined, the screen will extend no more than .5 feet above the aquifer's upper surface. The length of screen below the water table surface may be up to 15 feet if the aquifer is confined or 10 feet if unconfined. In either case, the screen length may be less if an aquiclude at least 5-feet in thickness is encountered. Based on using a .010-inch screen, a sand pack of #2/16 filter sand will be placed in the annular space from the bottom of the boring to a maximum of 2 feet above the top of the screened interval. If the aquifer is confined, the sand pack will be placed a maximum of 1 foot above the top of the screened interval to prevent the potential for cross contamination. Up to 2 feet of bentonite will be placed above the sand pack followed by neat cement. 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, if 3 wells are installed.

2.2.2 Groundwater Monitoring Well Development

The groundwater monitoring well(s) 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.

The well(s) will be developed by using a 1.7", positive displacement, PVC hand pump or by bailing with a PVC bailer 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 client. After the water is characterized by chemical analysis, TPE will provide recommendations to the client and, at their request, assist them in remediation, or disposal of the fluids, or both in an appropriate manner as an additional work item.

2.2.3 Groundwater Sampling

After a minimum of 48 hours after well development, depth to stabilized water will be measured and recorded as discussed above in section 2.2.2 Groundwater Monitoring Well Development and the well(s) will be sampled.

Prior to sampling, the well(s) 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 laboratory prepared, 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 in an iced cooler for transport to a DHS certified laboratory accompanied by chain-of-custody documentation. See Appendices C and G 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 client and, at their request, assist them in remediation or disposal of the fluids, or both in an appropriate manner as an additional work item.

2.2.3.1 Chemical Analyses

Water samples will be analyzed for TPHG and BTEX by EPA Methods 5030/8015 (Modified), and 5030/8020 (Modified).

2.3 Groundwater Gradient Evaluation

If 3 wells are installed, 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.

2.4 Preliminary 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 locations of soil borings and/or installed monitoring wells, graphic boring logs, graphic monitoring well construction details, a geologic cross section(s), a groundwater gradient map (if 3 wells are installed), tables summarizing results of chemical analyses, and other documentation to support the conclusions. Copies of all permits required and certified analytical reports with chain-of-custodies will also be included.

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.

3.0 SITE SAFETY PLAN

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

4.0 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 2: Regulator Approval Received.

Week 3: Subcontracting, Conduct Underground Utility Survey, Drill Soil Borings, Install up to 3 Groundwater Monitoring Wells and Submit Soil and Groundwater Samples for Chemical Analyses.

Week 5: Receive Chemical Analyses, Interpret Data and Write PSAR.

Week 7: Submit PSAR to Client.

LEGEND

REFERENCE: USGS 7.5 MINUTE SERIES QUADRANGLE MAPS SAN LEANDRO AND OAKLAND EAST, CALIFORNIA, PHOTOREVISED 1980.

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0 2,000

SCALE IN FEET

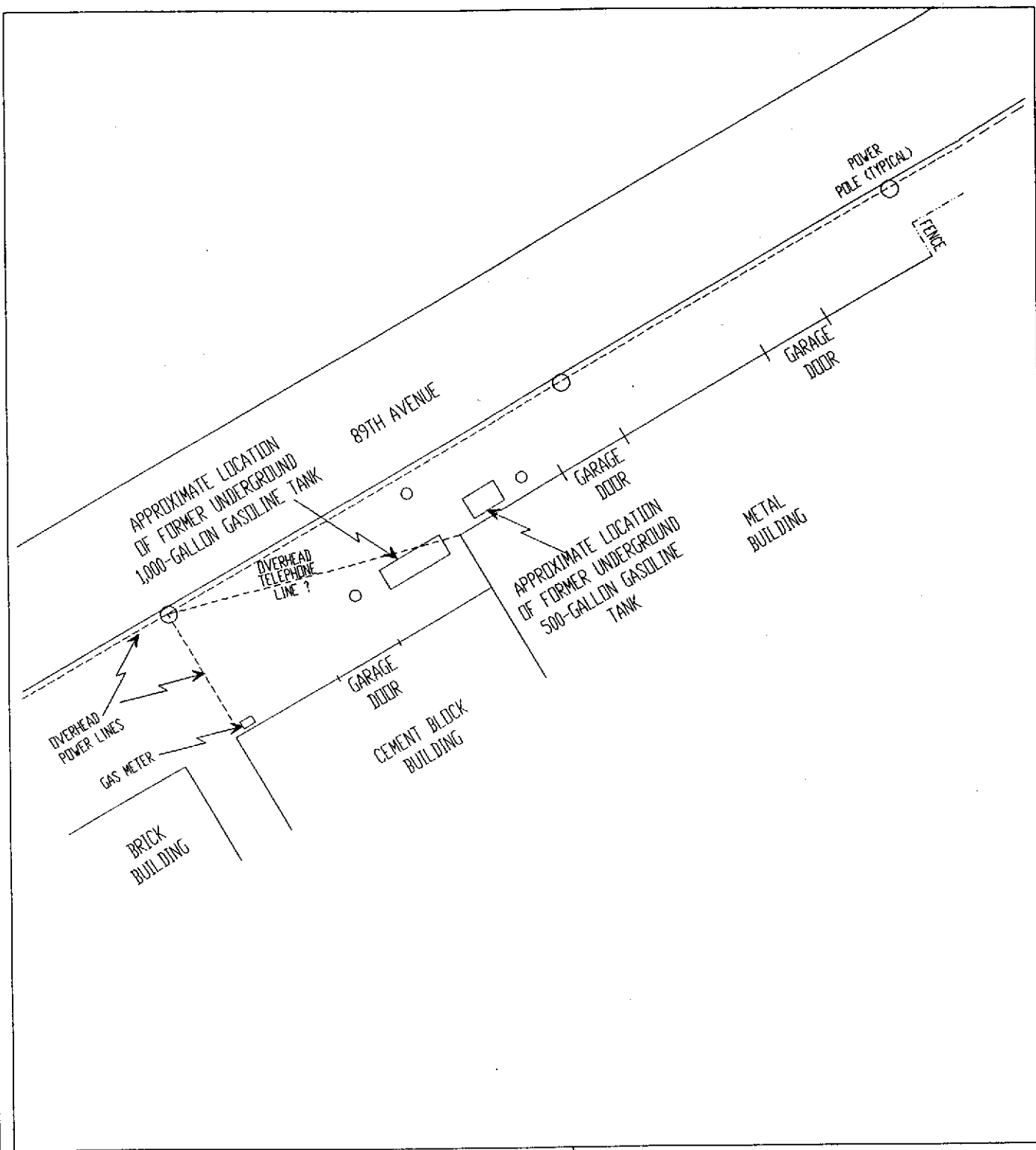
TANK PROTECT ENGINEERING

SITE VICINITY MAP

FIESTA BEVERAGES
966 89TH AVENUE
OAKLAND, CA 94621

DATE	5/14/93
FIGURE	1
FILE #	264-1
DRAWN BY	STACY
CHECKED BY	JVM

Lanardin = 925 89th Ave



LEGEND

○ PROPOSED LOCATION OF SOIL BORING

-N-

0 25

SCALE IN FEET

TANK PROTECT ENGINEERING

SITE PLAN

FIESTA BEVERAGES
966 89TH AVENUE
OAKLAND, CA 94621

DATE	5/14/93
FIGURE	2
FILE #	264-2
DRAWN BY	SL
CHECKED BY	JVM

APPENDIX A

ALAMEDA COUNTY HEALTH CARE SERVICES AGENCY, LETTER DATED DECEMBER 17, 1992 TO FIESTA BEVERAGES

ALAMEDA COUNTY
HEALTH CARE SERVICES
AGENCY

DAVID J. KEARS, Agency Director

RAFAT A. SHAHID, ASST. AGENCY DIRECTOR

DEPARTMENT OF ENVIRONMENTAL HEALTH
State Water Resources Control Board
Division of Clean Water Programs
UST Local Oversight Program
80 Swan Way, Rm 200
Oakland, CA 94621
(510) 271-4530

December 23, 1992
STID # 4241

Mr. Ted Walley
Fiesta Beverage
966 89th Ave.
Oakland CA 94621

Re: Request for Work Plan for Subsurface Investigation at Fiesta Beverage, 966 89th Ave., Oakland CA 94621

Dear Mr. Walley:

Please be advised that the oversight of the remediation at the above site has been transferred to the Local Oversight Program, (LOP), section of Alameda County Environmental Health, Hazardous Materials Division. You have been made aware of this through a **Notice of Requirement to Reimburse** letter recently sent to you. Also, the case worker is now the undersigned, Hazardous Materials Specialist.

Our office has received and reviewed the documents dated February 5, 1991 prepared for you by Scott Co. These documents gave the results of soil and groundwater samples taken subsequent to the removal of the two underground tanks at the above site on August 24, 1990. As you are aware, considerable Total Petroleum Hydrocarbons as gasoline (TPHg) and BTEX (Benzene, Toluene, Ethylbenzene and Xylenes) was found in the soil samples originally taken from the excavation pit. As high as 4900 parts per million, (ppm), TPHg was found in soil sample 2 taken under the 1000 gallon tank. In addition, the water samples taken from the pits had 25 and 36 ppm TPHg and significant BTEX concentrations. Because of the soil and groundwater contamination found, you are required to perform a subsurface investigation which determines the extent of the soil and groundwater contamination. Enclosed please find a copy of **Appendix A, Workplan for Initial Subsurface Investigation**, a document provided by the Regional Water Quality Control Board (RWQCB) which you may use as a guide for your workplan. Please provide a work plan for this investigation **within 45 days** of receipt of this letter. In addition, please provide documentation for the final disposition of all stockpiled soils generated from this excavation. It was noted that the product piping was left in place due to their location beneath the building. Please verify that the piping was properly inerted and closed in place and that the piping was verified "tight" and not leaking.

You should consider this a formal request for technical reports pursuant to the Californin Water Code Section 13267 (b). All work plans, analytical results or reports should be sent to our office and to that of the RWQCB to the attention of Mr. Rich Hiett. Their address is 2101 Webster St., Suite 500, Oakland CA 94612. Be aware that failure to submit the requested documents may subject you to civil liabilities.

You may contact me at (510) 271-4530 should you have any questions.

Sincerely,

Barney M. Chan
Hazardous Materials Specialist

enclosure (Mr. Walley)

cc: G. Jensen, Alameda County District Attorney Office
R. Hiett, RWQCB
~~Fiesta Beverages~~, 7402 Hillview Ct., Pleasanton, CA 94588
E. Howell, files

WP-966-89

APPENDIX B

HOLLOW-STEM AUGER DRILLING AND SOIL SAMPLING PROCEDURES

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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-foot depth intervals and changes in lithology 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 C

WASTE HANDLING AND DECONTAMINATION PROCEDURES

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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 D

GROUNDWATER MONITORING WELL CONSTRUCTION PROCEDURES

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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 affect groundwater quality. Bentonite will be hydrated with clean water.

Grout Seal Material: Cement grout will consist of a proper mixture of 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 5 minutes. When a washer is not available, components shall be cleaned with water and detergent or trisodium phosphate, rinsed in clean water, then 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 into 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 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 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 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 E

GROUNDWATER MONITORING WELL DEVELOPMENT PROCEDURES

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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 5 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 dewatering.

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 F

GROUNDWATER SAMPLING PROCEDURES

APPENDIX F

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 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% 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).

TPE 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.

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/Tenths
Volume of Water Discharged	Gallons
Turbidity	NTU

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

APPENDIX G

QUALITY ASSURANCE AND QUALITY CONTROL PROCEDURES

APPENDIX G

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 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 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 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 H

SITE SAFETY PLAN

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

Site **Fiesta Beverages**
966 - 89th Avenue
Oakland, CA 94621

Project Number **264**

Original Site Safety Plan: Yes (X) No ( )
Revision Number

Plan Prepared by **John Mrakovich**
Date **5/19/93**

Plan Approved by **Lee Huckins**
Date **5/21/93**

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

1. KEY PERSONNEL AND RESPONSIBILITIES

Project Manager	**John Mrakovich (510) 429-8088**
Site Safety Manager	**Lee Huckins (510) 429-8088**
Alternate Site Safety Manager	**N/A**
Field Team Members	**N/A**

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

(L) Alameda County Department of Health Service (510) 271-4320

2. JOB HAZARD ANALYSIS

2.1 OVERALL HAZARD EVALUATION

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

Known or suspected hazardous materials present on site

Benzene, Toluene, Ethyl-Benzene, Xylenes, (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 (X)	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 ( )

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 drilling 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 boreholes

Measures to minimize the effects of the additional hazards are:

Protect with barricades, caution tape, or traffic cones when unattended.

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)
5 ppm	**Cease work and commence perimeter monitoring until contamination disperses.**

(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).

Gastech, Inc. Trace-Techtor, hexane Calibration. Monitor at borehole during each sampling event if vapors detected.

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

N/A

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 borehole with Gastech, Inc., Trace-Techtor**

(b) Equipments used for sampling: **Gastech, Inc., 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), steel-toed boots

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.
- Boreholes shall be protected when drilling and sampling activities are not actually taking place.
- Excavations shall be protected when unattended. Visitors will not be allowed to enter the work zone unless they have attended a project safety briefing.

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 potable 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 (OSHA Level A or B), 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 agency requirements.
* 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 any time.

11. EMERGENCY RESPONSE PLAN

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

Person	Title	Phone No.
John Mrakovich	Project Manager	(510) 429-8088
_____	Fire	911 or_____
_____	Police	911 or_____
_____	Ambulance	911 or_____
_____	Poison Control Center	(800) 523-2222
_____	Site Phone	(510) 000-0000
_____	Nearest off-site no.	_____
Humana Hospital	Medical Advisor	(510) 667-4545
Ted Walbey	Client Contact	(510) 832-6081

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

Humana Hospital
13855 E. 14th Street
Oakland, CA 94578
Emergency # (510) 667-4545
Gen. Info # (510) 367-6500

Drive easterly on 89th Avenue to E. 14th Street. Turn right (south) on E. 14th Street. Proceed on E. 14th Street and look for the hospital on the right hand side.