Subsurface Investigation Report
HET Inc

for

Tharco Corp
2222 Grant ave
San Lorenzo, Ca

July 7, 1994

THARCO®

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July 12, 1994

Ms. Juliet Shin
Dept. of Environmental Health
Alameda County
1131 Harbor Bay Parkway
Alameda, CA 94502

RE: Investigation Report, 2222 Grant Avenue, San Lorenzo

Dear Ms. Shin:

Enclosed is a copy of the report by Hydro Environmental Technologies, Inc.

If you have any questions, please contact me.

Sincerely,

Jim Burress
Project Manager

JB:py

Enc.

cc: Jim A. Steve N.
Tom A.

HYDRO
ENVIRONMENTAL
TECHNOLOGIES, INC.

SUBSURFACE INVESTIGATION REPORT

Tharco Corporation
2222 Grant Avenue
San Lorenzo, California

Prepared by:

HYDRO-ENVIRONMENTAL TECHNOLOGIES, INC.
2363 Mariner Square Drive, Suite 243
Alameda, California 94501
HETI Job No. 7-282

Prepared for:

THARCO CORPORATION
2222 Grant Avenue,
San Lorenzo, California 94850-8600

July 7, 1994

HYDRO ENVIRONMENTAL TECHNOLOGIES, INC.

TABLE OF CONTENTS

APPENDICES

APPENDIX A:	HETI Drilling, Well Construction and Sampling Protocols
APPENDIX B:	Site Safety Plan
APPENDIX C:	Boring Log Legend
	Boring Logs/Well Construction Diagrams
	Well Permits
APPENDIX D:	Well Water Development Data Sheet
	Monitoring Well Purge/Sample Sheets
APPENDIX E:	Laboratory Reports and Chain of Custody Records

1.0 INTRODUCTION

1.1 Purpose and Scope

The purpose of this report is to present the results of field activities conducted by Hydro-Environmental Technologies, Inc. (HETI) at the Tharco Corporation (Tharco) facility located in San Lorenzo, California. The investigation was performed to assess the extent of petroleum hydrocarbons in the subsurface soil and ground water, in the vicinity of the former underground storage tank at the site.

The field tasks performed for this investigation included the following:

- Necessary well installation permits were obtained.
- Three soil borings were drilled and logged. Soil samples were collected for laboratory analysis.
- Three monitoring wells were installed in the soil borings.
- The monitoring wells were developed and surveyed.
- The depth to ground water in the monitoring wells was gauged.
- Ground water samples were collected from the wells for laboratory analysis.

1.2 Site Location and Description

The subject site is located at 2222 Grant Avenue in San Lorenzo, California, in an area of mixed residential and light industrial usage (Figure 1). Tharco manufactures corrugated cardboard boxes. The property is occupied by a large factory, warehouse and office building surrounded by a concrete paved yard used for truck and car parking and for storage. A portion of the facility is shown on Figure 2, the Site Plan. The site is located approximately one-half mile from San Francisco Bay. The local geologic formations consist predominantly of fine-grained sediments derived from the East Bay Hills to the east. Regional ground water flow is predominantly

westerly, towards San Francisco Bay. Surface drainage in the area is dominated by San Lorenzo Creek, which drains into San Francisco Bay through a levee located approximately 1,600 feet northeast of Tharco.

1.3 Background

A 2,000 gallon underground diesel fuel storage tank was excavated and removed from the site in July, 1993. Ground water in the tank excavation was observed to stabilize at approximately seven to eight feet below ground surface. Following overexcavation, soil and ground water samples were collected and analyzed in a laboratory for the presence of petroleum hydrocarbons. Total Petroleum hydrocarbons as gasoline (TPHg) and benzene were detected in the soil samples at maximum concentrations of 350 parts per million (ppm) and 2.8 ppm, respectively. TPHg was detected in the water sample at a concentration of 850 parts per billion (ppb).

Fate of soil?

Tharco retained HETI to make a preliminary determination regarding the magnitude and extent of the hydrocarbons in soil and ground water at the site. The work was conducted pursuant to a request from the Alameda County Department of Environmental Health (ACDEH).

2.0 FIELD ACTIVITIES

2.1 Borehole Drilling and Soil Sampling

All drilling and soil sampling was performed according to standard HETI protocol which is consistent with ACDEH and San Francisco Bay Regional Water Quality Control Board (RWQCB) recommended guidelines and procedures. A copy of the HETI Drilling, Well Construction and Sampling protocol is included as Appendix A.

HETI conducted a safety briefing with Bayland Drilling personnel prior to the start of drilling. All personnel present on-site reviewed and signed a copy of the Site Safety Plan (SSP) prepared for this site. The SSP is included as Appendix B.

On March 25, 1994, Bayland Drilling of Menlo Park, California, supervised by HETI, used a CME 75 hollow-stem auger drill rig to drill three soil borings at the site. The borings were designated B-1 through B-3. Borings B-1 and B-2 were drilled to a depth of 19 feet below grade, and boring B-3 was drilled to a depth of 20.5 feet below grade. A California-modified split-spoon sampler, lined with brass tubes, was used to collect the soil samples. The soil sample collected nearest to the water table in each borehole was retained for laboratory analysis. Soil cuttings generated during drilling were stored at the site on and under plastic sheeting, pending future removal by a licensed waste hauler.

All collected soil samples were described using the Unified Soil Classification System, and were screened for the presence of volatile hydrocarbons using a Thermo-Environmental Model 580B organic vapor meter (OVM). OVM readings are not a quantitative determination of hydrocarbon concentrations in the soil samples, but they are useful in determining the relative magnitude of hydrocarbon concentrations. OVM readings for specific soil samples, as well as complete soil sample descriptions, are presented on the Boring Logs/Well Construction Diagrams in Appendix C.

All soil samples submitted for laboratory analysis were analyzed for TPHg using EPA Method 8015 (DHS-modified), total petroleum hydrocarbons as diesel (TPHd) using EPA Method 3550/8015 and benzene, toluene, ethylbenzene and total xylenes (BTEX) using EPA Method 8020 (DHS-modified). Soil sample analyses were performed by PACE, Inc., a state DHS-certified laboratory located in Novato, California.

2.2 Monitoring Well Installation, Development and Survey

On March 25, 1994, Bayland drilling installed a monitoring well in each of the borings B-1, B-2 and B-3. The monitoring wells were designated MW-1, MW-2 and MW-3, respectively. Monitoring well locations are shown on Figure 2.

All monitoring wells were all constructed of two-inch diameter Schedule 40 PVC well casing coupled to machine slotted 0.020-inch Schedule 40 PVC well screen. The annulus around the well screen was filled with clean #2/12 sand. A layer of bentonite pellets was placed above the sand pack and hydrated to form a seal. The

remainder of each borehole was grouted to the surface, and traffic-rated road boxes were concreted in place, flush with the ground surface. Well construction diagrams and copies of the well installation permits are included in Appendix C.

On March 28, 1994, HETI gauged each monitoring well for depth to water and depth to bottom using an electronic interface probe. No separate-phase petroleum was detected in any of the wells. The wells were then developed by a combination of surging and bailing of at least ten well volumes. Development water was stored on-site in 55-gallon drums. Well development information is presented on the Well Water Development Data Sheet in Appendix D.

Following development, the elevations of top-of-casings of the monitoring wells were surveyed relative to an arbitrary benchmark.

2.3 Ground Water Gauging, Sampling and Analysis

On March 29, 1994, the depth to water in each of the wells was gauged to the nearest hundredth of a foot using an interface probe. Gauging data is included in Table 2. Following gauging, the monitoring wells were purged of a minimum of three well volumes and until pH, temperature and conductivity stabilized. Purging data is included on the Monitoring Well Purge/Sample Sheets in Appendix D.

Following recovery of water levels to at least 80% of their original levels, ground water samples were collected from the monitoring wells using dedicated polyethylene bailers. Samples were then labeled, documented on a chain-of-custody form, and stored in a chilled cooler for transport to the analytical laboratory. On April 12, 1994, MW-2 was resampled for TPHd following breakage and loss of the original sample at the analytical laboratory. Ground water samples were analyzed for TPHg, TPHd and BTEX using EPA Methods 8015 (DHS-modified), 3510/8015 and 8020 (DHS-modified), respectively. Water sample analyses were performed by PACE, Inc.

3.0 RESULTS OF INVESTIGATION

3.1 Site Stratigraphy

Sediments encountered during the drilling of borings B-1, B-2 and B-3 consisted primarily of lean clay. The deepest samples collected from B-1 and B-3 consisted of clayey gravel with sand and poorly-graded sand, respectively. Pea-gravel fill was encountered in the upper part of B-2. Ground water was first encountered at depths ranging from six to nine feet below grade.

3.2 Results of Soil Sample Analysis

At the time of sample collection in the field, OVM head space readings for all the soil samples ranged from 0 to 11 ppm. During laboratory analysis, neither TPHg, TPHd nor BTEX were detected in concentrations exceeding method detection limits in the soil sample analyzed from boring B-3. Only toluene, at a concentration of 0.022 ppm, was detected in the soil sample analyzed from boring B-1. In the soil sample analyzed from boring B-2, TPHg was detected at a concentration of 710 ppm, TPHd was detected at a concentration of 200 ppm, and benzene was detected at a concentration of 2.1 ppm. These analytical results are summarized on Table 1. Copies of the soil sample analytical laboratory report and chain of custody are attached in Appendix E.

3.3 Ground Water Gradient

On March 29, 1994, the depth to ground water in each of the wells ranged from 4.81 to 5.41 feet below grade. The depth to water measurements were combined with the top-of-casing elevation data to calculate ground water elevation contours. These contours are shown on Figure 3, the Ground Water Contour Map. Figure 3 shows ground water flow to be to the southwest at an approximate gradient of 1.5%.

3.4 Results of Ground Water Sample Analysis

TPHg was detected in the water sample collected from well MW-2 only, at a concentration of 460 ppb. The analytical method detection limit for TPHg is 50 ppb. TPHd was detected in the water samples collected from wells MW-1, MW-2 and

MW-3 at concentrations of 50 ppb, 1,000 ppb and 80 ppb, respectively. The analytical method detection limit for TPHd is 50 ppb. Benzene was detected in the water samples collected from wells MW-1 and MW-2 only, at concentrations of 2.4 ppb and 8.4 ppb, respectively. The analytical method detection limit for benzene is 0.5 ppb. These analytical results are summarized on Table 2 and are shown on Figure 4, the Hydrocarbon Concentration Map. Copies of the ground water sample analytical laboratory report and chain of custody are attached in Appendix E.

4.0 SUMMARY AND DISCUSSION

Petroleum hydrocarbons were detected in both soil and ground water samples collected from the three soil borings/monitoring wells installed at this site. Petroleum hydrocarbons were detected in significant concentrations (significantly higher than the analytical detection limit) only in the soil sample collected from soil boring B-2.

Petroleum hydrocarbons were detected in water samples collected from all three wells, and benzene was detected in water samples collected from wells MW-1 and MW-2. Benzene is a constituent of concern to human health.

The petroleum hydrocarbon concentrations and distribution in soil and ground water are not indicative of a large fuel release. The presence of petroleum hydrocarbons in the subsurface could be the result of historical tank overspills, small leaks in the petroleum transmission lines, etc.

The petroleum hydrocarbons quantified as gasoline in the soil and ground water samples do not correlate with the type of fuel previously stored at the site. The OVM readings and laboratory analytical results for the soil samples collected from boring B-2 do not correlate well, but this is not unusual.

The ground water flow direction shown on Figure 4 is generally consistent with the inferred direction of regional ground water flow. The possibility of variations in the local ground water flow direction and/or gradient, due to tidal, recharge or other effects, has not been assessed.

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5.0 CERTIFICATION

This report was prepared under the supervision of a registered professional engineer. All statements, conclusions and recommendations are based solely upon field observations and analytical analyses performed by a state-certified laboratory related to the work performed by Hydro-Environmental Technologies, Inc.

It is possible that variations in the soil or ground water conditions exist beyond the points explored in this investigation. Also, site conditions are subject to change at some time in the future due to variations in rainfall, temperature, regional water usage, or other factors.

The service performed by Hydro-Environmental Technologies, Inc. has been conducted in a manner consistent with the level of care and skill ordinarily exercised by members of our profession currently practicing under similar conditions in the area of the site. No other warranty, expressed or implied, is made.

Hydro-Environmental Technologies, Inc. includes in this report chemical analytical data from a state-certified laboratory. These analyses are performed according to procedures suggested by the U.S. EPA and the State of California. Hydro-Environmental Technologies, Inc. is not responsible for laboratory errors in procedure or result reporting.

HYDRO-ENVIRONMENTAL TECHNOLOGIES, INC.

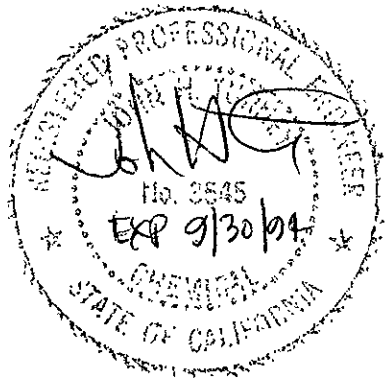
Prepared by:

Ruary Allan
Staff Geologist

Reviewed by:

Scott D. Kellstedt
Operations Manager

Reviewed by:



John H. Turney P. E.
Senior Engineer

Table 1

SUMMARY OF SOIL SAMPLE ANALYTICAL RESULTS
Tharco Corporation
2222 Grant Avenue
San Leandro, CA

Sample I.D. #	Sampling Depth (feet)	Sampling Date	TPHg (ppm)	B (ppm)	T (ppm)	E (ppm)	X (ppm)	TPHd (ppm)
B-1	6.5	3/25/94	ND<1.0	ND<0.005	0.022	ND<0.005	ND<0.005	ND<5.0
B-2	6.5	3/25/94	710	2.1	3.4	2.8	5.1	200
B-3	8.5	3/25/94	ND<1.0	ND<0.005	ND<0.005	ND<0.005	ND<0.005	ND<5.0

Notes:

TPHg: Total petroleum hydrocarbons as gasoline by EPA Method 8015 (DHS modified)
TPHd: Total petroleum hydrocarbons as diesel by EPA Method 3550/8015
BTEX: Benzene, toluene, ethylbenzene and total xylenes by EPA Method 8020 (DHS-modified)
ppm: Parts per million
ND: Not detected in concentrations exceeding method detection limits

Table 2

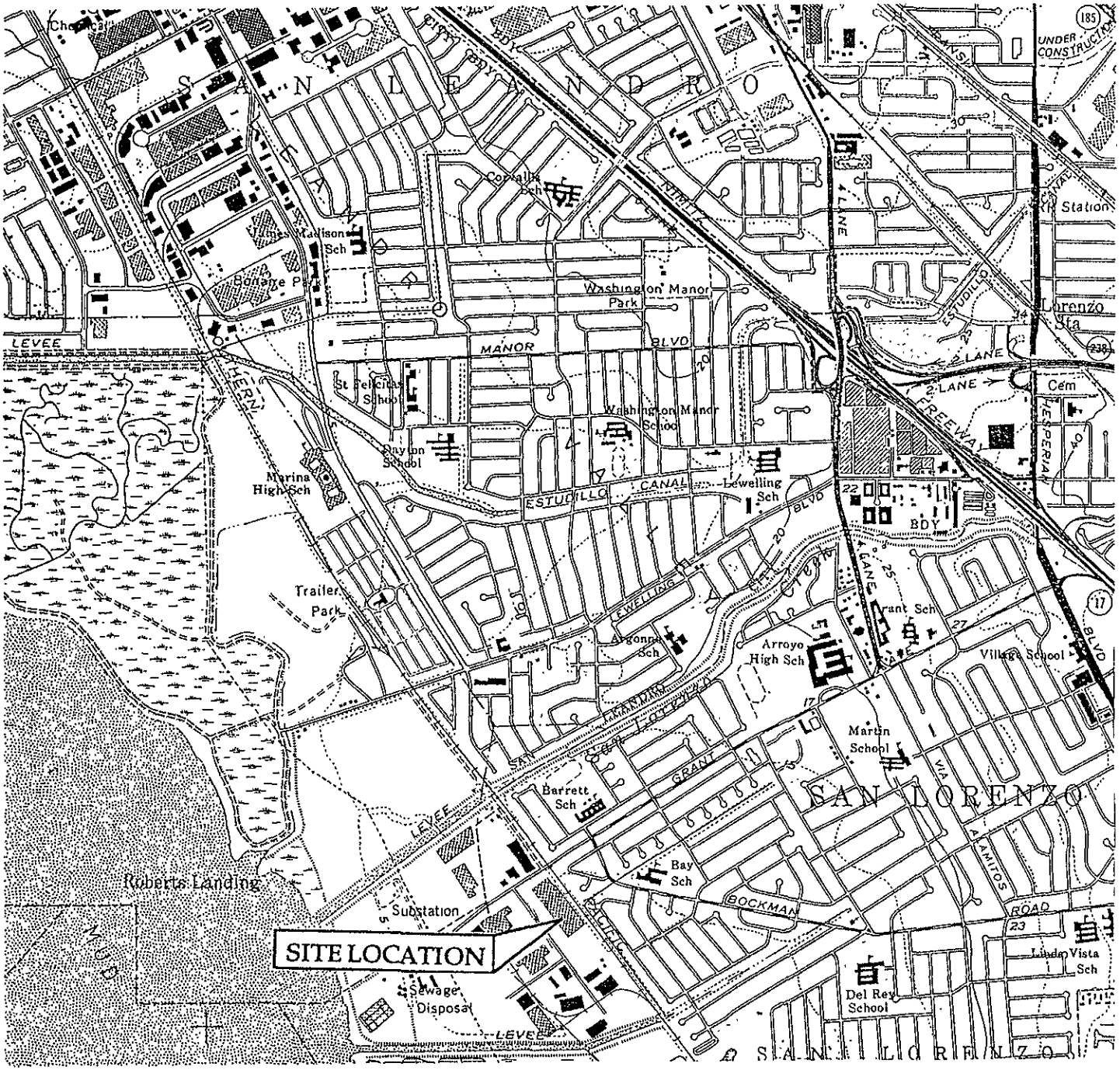
SUMMARY OF GROUND WATER ELEVATIONS AND SAMPLE ANALYTICAL RESULTS

Tharco
2222 Grant Avenue
San Leandro, CA

Sample I.D. #	Sampling Date	TOC (feet)	DTW (feet)	GWE (feet)	TPHg (ppb)	B (ppb)	T (ppb)	E (ppb)	X (ppb)	TPHd (ppb)
MW-1	3/29/94	109.93	5.41	104.52	ND<50	2.4	ND<0.5	ND<0.5	0.6	50
MW-2	3/29/94(1)	109.68	4.81	104.87	460	8.4	0.6	3.4	1.6	1,000(2)
MW-3	3/29/94	109.88	5.34	104.54	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	80

Notes:

TOC:	Top of casing elevation relative to an arbitrary datum
DTW:	Depth to water
GWE:	Ground water elevation
TPHg:	Total petroleum hydrocarbons as gasoline by EPA Method 8015 (DHS modified)
BTEX:	Benzene, toluene, ethylbenzene and total xylenes by EPA Method 8020 (DHS-modified)
TPHd:	Total petroleum hydrocarbons as diesel by EPA Method 3510/8015 (DHS-modified)
ppb:	Parts per billion
(1)	MW-2 resampled for TPHd on 4/12/94: original 3/29/94 sample lost by laboratory
(2)	High boiling point hydrocarbons beyond range of diesel standard were present in sample



SOURCE: USGS 7.5 MINUTE SERIES TOPOGRAPHIC MAP
ENTITLED: SAN LEANDRO, CALIF. QUADRANGLE
PHOTOREVISED: 1979

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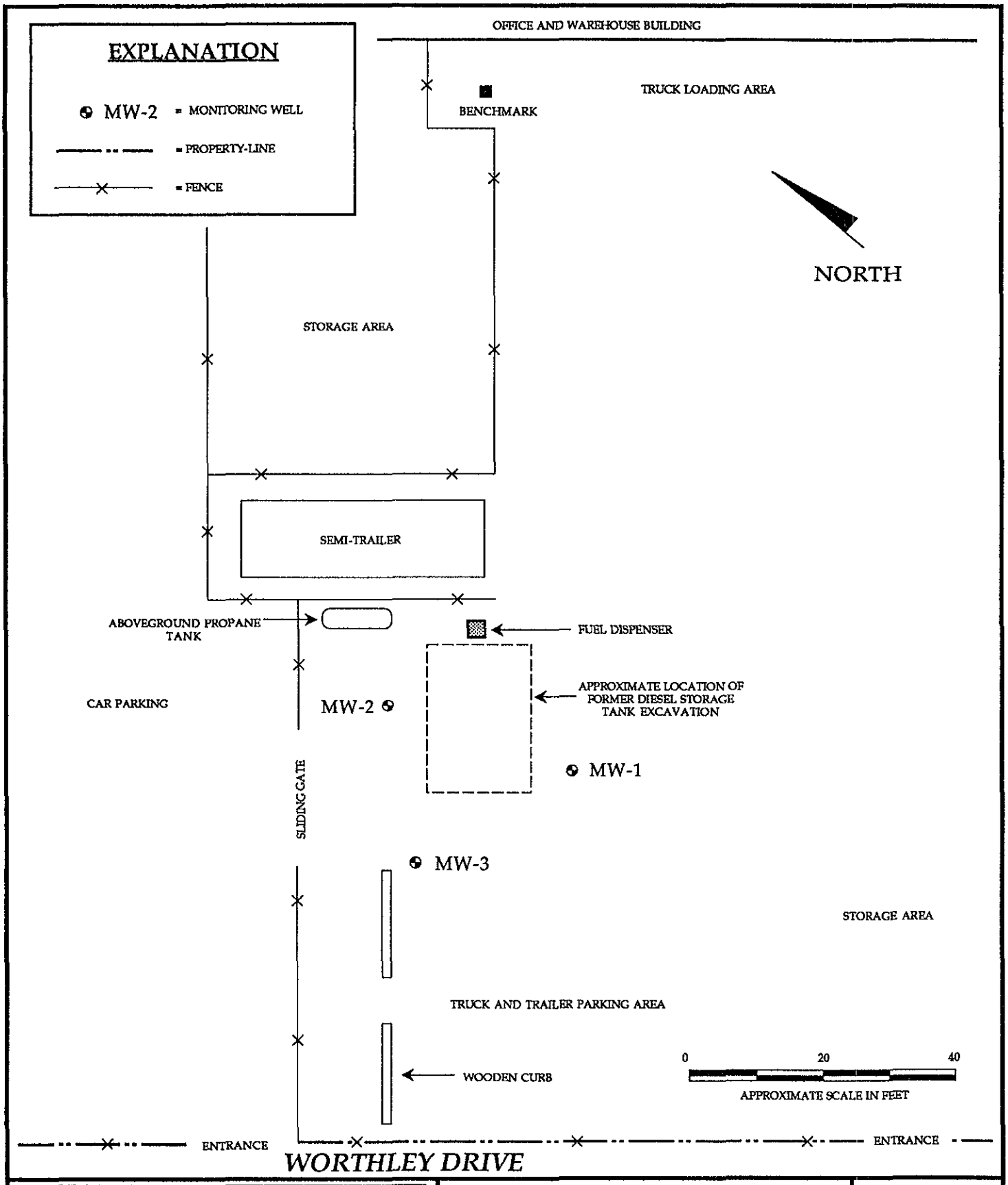
SITE LOCATION MAP

Tharco
2222 Grant Avenue
San Lorenzo, California

Figure
1

7-282 3/94



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SITE PLAN

Tharco Corporation
2222 Grant Avenue
San Lorenzo, California

Figure 2

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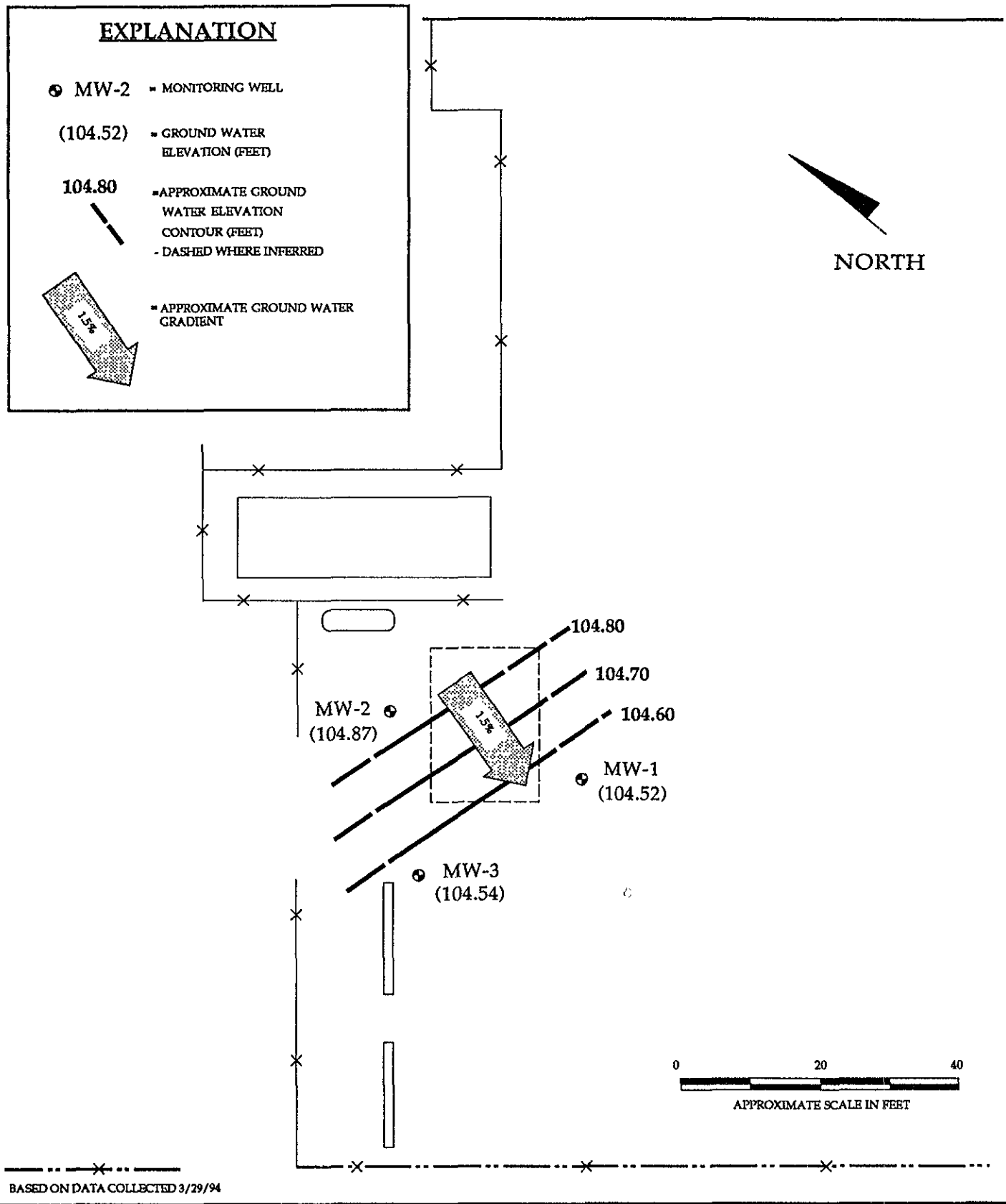
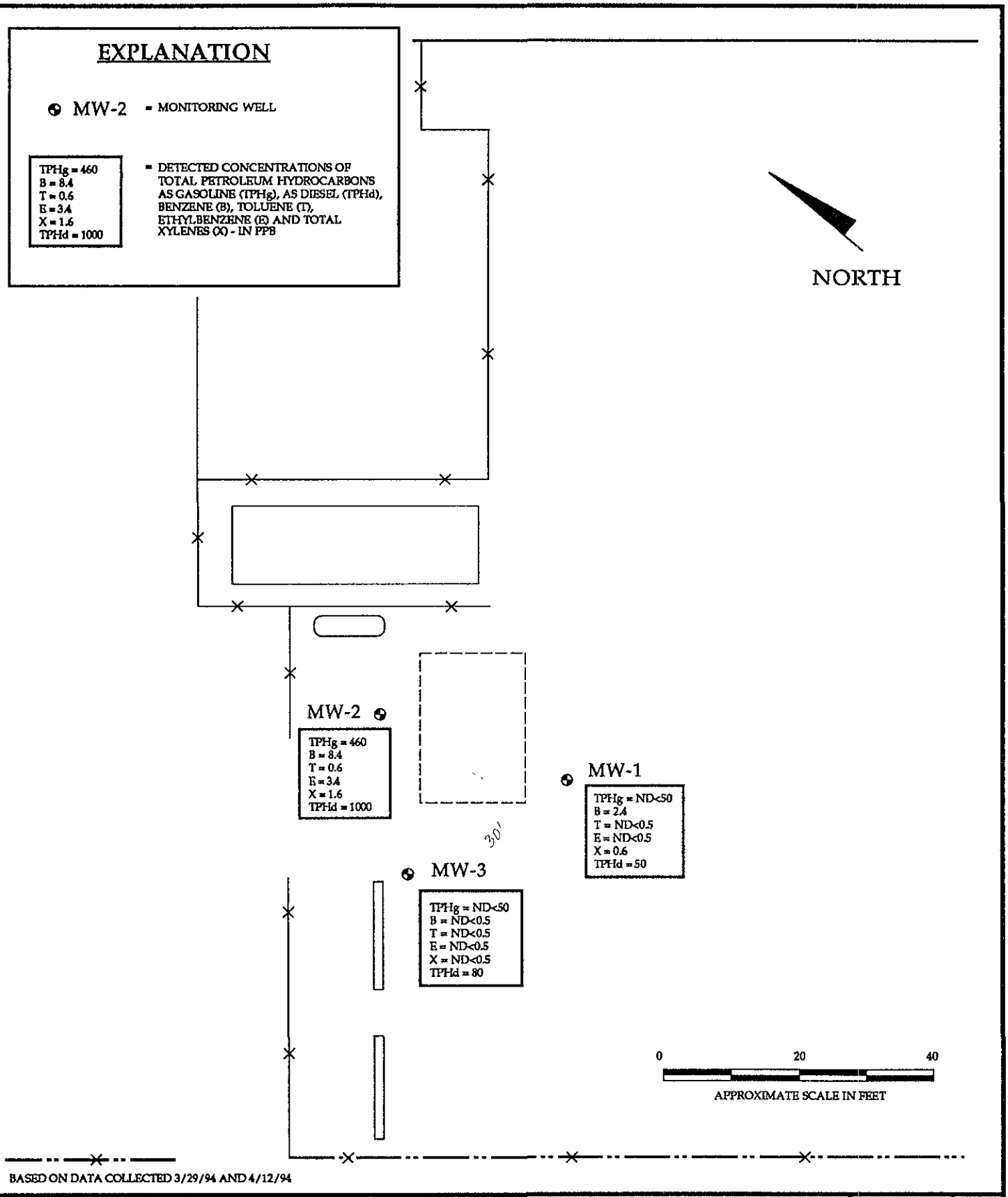


HYDR◆- ENVIR◆NMENTAL TECHN◆LOGIES, INC.	GROUND WATER CONTOUR MAP Tharco Corporation 2222 Grant Avenue San Lorenzo, California	Figure 3 7-282 5/94



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HYDROCARBON CONCENTRATION MAP

Tharco Corporation
2222 Grant Avenue
San Lorenzo, California

Figure 4

7-282 5/94

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CALIFORNIA

DRILLING
WELL CONSTRUCTION
AND
SAMPLING PROTOCOLS

November 1992

HYDRO ENVIRONMENTAL TECHNOLOGIES, INC.

DRILLING, WELL CONSTRUCTION, AND SAMPLING PROTOCOLS

Drilling Protocol

Prior to any drilling activities, Hydro-Environmental Technologies, Inc. (HETI) will verify that necessary drilling permits have been secured.

Prior to drilling, underground and above ground utilities will be located using Underground Service Alert (USA) and site reconnaissance. To the extent possible, drilling will be conducted so that disruptions of normal business activities at the project site are minimized. HETI shall obtain and review available public data on subsurface geology and, if warranted, the location of wells within a quarter mile of the project site will be identified. Drilling equipment will be inspected for suitability and integrity prior to performing work.

Subsurface investigations are typically performed to assess the lateral and vertical extent of petroleum hydrocarbons or other contaminants which may be present in soils and groundwater. Drilling methods will be selected to optimize field data requirements and to be compatible with known or suspected subsurface geologic conditions.

Shallow soil borings will be drilled dry using a truck-mounted hollow-stem auger drilling rig, unless site conditions favor a different drilling method. Drilling and sampling methods will be consistent with ASTM Method D-1452-80. The auger size will be a minimum of 3-inches nominal outside diameter (O.D.) for borings not to be completed as wells. The auger size will be a minimum of 8-inches nominal O.D. for borings to be completed as wells. No drilling fluids will be used during this drilling method. All augers and drill rods will initially be thoroughly steam cleaned before arriving on-site, to prevent the introduction of contaminants from off-site, and augers and drill rods which are used will be steam cleaned between borings away from boring locations. Working components of the drilling rig (subs, collars and all parts of the rig chassis near the borehole) will also be steam cleaned. Cleaned augers, rods and other tools, if required, will be stored and covered when not in use. Decontamination of drilling equipment will consist of steam cleaning, and/or trisodium phosphate wash. Cleaning operations will be observed and supervised by a representative of HETI. The drilling rig will also be inspected by a representative of HETI to ensure that no fluids (hydraulic or lubricant) are leaking from the equipment.

Soil Sampling Protocol

Soil samples are typically collected at 5-foot intervals, from the ground surface to the total depth of the boring, with a California Modified split-spoon sampler driven 18 to 24 inches ahead of the lead auger by a 140-pound hammer falling a minimum of 30 inches. The sampler will be lined with clean brass or stainless steel tubes. The number of blows necessary to drive the sampler will be recorded on the boring log and well construction diagram (Plate A-1) to help evaluate the consistency of the materials encountered. Additional soil samples may be collected based on significant lithologic changes and/or potential chemical content. All equipment that contacts soil samples will be thoroughly cleaned prior to arrival at the project site and between each individual sample collection point on-site. New and used split-spoon samplers will be steam cleaned or washed with a trisodium phosphate or Alconox solution, rinsed with tap water, air dried or wiped dry with a clean towel. Soil removed from the top two liners (typically each 4 to 6 inches in length) and the end cone will be used for visual logging purposes and disposed with cuttings produced during the drilling operations. The bottom liner, if suitable, will be preserved for laboratory analysis. Soil samples from each sampling interval will be lithologically described, consistent with the Unified Soil Classification System, by a HETI geologist. The exact depth of all borings to the nearest 1/2-

foot will be determined in the field. Exploratory boring logs shall be prepared under the direction of a Registered Geologist or Professional Engineer.

Head-space analysis will be performed in the field to check for the presence of volatile organic compounds. Head-space analysis will be performed using an organic vapor meter (either flame-ionization or photo-ionization). The method used will be consistent with the method described by Fitzgerald (1989). Organic vapor concentrations will be recorded on the HETI Soil Boring Log (Figure 1). The selection of soil samples for chemical analysis are typically based on the following criteria:

a. Soil discoloration
b. Soil odors
c. Visual confirmation of chemical in soil
d. Depth with respect to underground tanks
e. Depth with respect to groundwater
f. Organic vapor meter reading

The soil sampler and liners will be cleaned with a trisodium-phosphate or Alconox solution, rinsed with clean tap water and air dried or wiped dry with a clean towel prior to each sampling event. Soil samples (full liners) selected for chemical analyses will be covered with aluminum foil or teflon tape and the ends will be sealed with plastic end caps. The end caps will then be taped to ensure a more secure seal. The samples will then be labeled and entered onto a Chain-of-Custody document, and placed in a cooler on blue ice (hard shell) for transport to a state certified analytical laboratory.

Where copper and zinc contamination are the subject of the investigation, stainless steel liners will be used in lieu of brass liners. Stainless steel liners will also be used when the client, additional sampling protocol or regulatory agencies require.

Soil borings will be backfilled (sealed) to the ground surface using either a neat cement or cement-bentonite grout mixture in accordance with appropriate local regulations.

Pending the outcome of the results of the laboratory analyses, excess drill cuttings will remain on-site and, when deemed necessary, covered with a plastic tarp or drummed. Confirmed uncontaminated soils may be appropriately disposed of on-site by the client. Soils found to contain concentrations of contaminants above applicable local or state limits will be placed in appropriately labeled 55-gallon D.O.T. drums or in a hazardous materials drop bin and left on-site for proper disposal by the client. At the clients request, HETI will act as the client's agent by assisting in the disposal of the contained material. In no case will HETI personel sign a Hazardous Waste Manifest.

Well Construction

Monitoring wells shall be installed using a truck-mounted hollow-stem auger drilling rig or an air or mud-rotary drilling rig. Typically, the hollow stem rig will be used for the installation of wells up to 100 feet deep, if subsurface conditions prove favorable. Wells greater than 100 feet in depth will typically be drilled using air or mud-rotary equipment. Mud-rotary equipment will typically be used when alternate methods have failed or proven ineffective.

Monitoring well casing and screen shall be constructed of a minimum of Schedule 40, flush joint, threaded, polyvinylchloride (PVC) pipe. The well screen will be factory mill-slotted. The screen length shall be determined in the field and shall be placed with the intent of setting the screened interval adjacent to the aquifer material. The screen length shall also be set with the intent of placing the top of the screened interval a minimum of 2 feet above the static water

level. All screens and casings used will be in a contaminant-free condition when placed in the ground. No thread lubrication shall be used, other than teflon tape or distilled water, during the connection of individual lengths of screened and solid well casing. Screen shall not be placed in a borehole that creates hydraulic interconnection of two or more distinctly separate aquifer units. Screen slot size will be chosen to be compatible with the encountered aquifer materials. The screen slot size will be chosen to retain a high percentage of the filter pack or natural formation. The remainder of the well casing, above the screened interval, shall be of solid riser casing. A sand pack shall be placed in the remaining anular space surrounding the well casing to a minimum of 1 foot above the screened interval. Sand pack shall not be placed such that it interconnects two or more distinctly separate aquifer units. Sand pack shall be chosen to be compatible with both the aquifer materials and the screen slot size. Sand pack shall consist of clean, washed, kiln dried silica sand. A minimum 1-foot thick bentonite pellet or bentonite slurry seal shall be placed above the sand pack. All bentonite shall be hydrated by either formation water or steam-distilled water. The remaining annular space above the bentonite seal shall be grouted with a neat cement or bentonite-neat cement mixture and shall be placed from the top of the bentonite pellet seal to within 6 inches of the top of the well. If used, the bentonite content of the mixture shall not exceed 5 percent by weight. Sand pack, bentonite, and cement seal levels will be confirmed during construction by measuring the remaining anular space with a calibrated weighted tape. If shallow water table conditions prevail, the screen interval will be placed such that the screen height above the static water level is reduced and a maximum possible surface seal can be achieved. A field boring log and well construction diagram (Plate A-1) shall be prepared by a representative of HETI for each well completed. Monitoring and extraction wells shall be constructed with Class-A cement/bentonite grout or bentonite pellets tremied into position as a base for the well casing if necessary. The well casing will be set within the aquifer according to the proposed function of the well and the chemistry of the potential contaminants.

In the event a monitoring well is required to be installed in an aquifer unit underlying an existing, shallower aquifer, the well will be completed in the lower aquifer such that only water from the lower aquifer is drawn into the well. The upper aquifer will be sealed by installing a steel conductor casing which extends to the base of the shallow aquifer. The steel casing will be tremied into position with an annular neat cement or cement-bentonite grout seal placed between the outside wall of the casing and the wall of the borehole. The cement grout will be allowed a minimum of 72 hours to set prior to advancing the boring beyond the sealed conductor casing and into the next aquifer. After 72 hours, the boring will be advanced below the seal and completed as a well as described above but within the steel conductor casing.

The tops of all well casings will be sealed and placed in a vandal resistant, traffic rated box to prevent entry of surface contamination, unauthorized entry and tampering.

Monitoring wells will be surveyed to obtain north-end casing elevations to the nearest $\pm$ 0.01 foot. Water level measurements will be recorded with an interface probe to the nearest $\pm$ 0.01 foot and referenced to either a project datum or mean sea level (MSL). A project site datum is typically chosen such that it will remain in the event the project site undergoes a physical change as a result of construction or other cultural disturbance. Where required, the wells will be surveyed by a licensed land surveyor relative to the nearest bench mark and relative to mean sea level. Typically, the establishment of a known, on-site reference by a licensed survey, is enough to allow for the remaining well top elevations to be determined using a survey level and rod. Unless directed otherwise by local regulatory agencies, the well top elevations will be established in this manner.

Well Development

After installation, all monitoring wells shall be developed to remove fine grained sediments from the well and to stabilize sand, gravel and disturbed aquifer materials in the annular area around the screened interval. Well development will be accomplished by air-lift pump, suction-lift pump, submersible pump, bladder pump, surge block, bailer or any combination of the above. All well development equipment will be decontaminated prior to development using a steam cleaner and/or trisodium-phosphate solution wash, clean water rinse, and steam distilled water rinse. Well development will continue until each well is relatively free of turbidity. The adequacy of well development will be assessed by a HETI geologist. Where appropriate, indicator parameters (pH, specific conductance, temperature, and turbidity) will be monitored during well development. Field instrument calibrations will be performed prior to use according to manufacturers specifications.

Well Head Completion and Site Clean-up

Monitoring wells shall be completed below grade unless special conditions exist that require above grade design. Monitoring well casing (including the well locking seal and cap) will be completed approximately two inches below the vandal resistant traffic rated road box cover. Except in areas where snow plows might be used, the road box cover shall be completed approximately one inch above the existing grade surface to allow for precipitation runoff. All concrete work, both inside and outside the road box, shall be completed with a smooth finish.

Above ground completions will be set inside a 2 to 3 foot tall locking steel protective casing. If traffic conditions dictate, three 4-inch diameter steel pipes will be set in concrete in a triangular pattern to act as bumper posts. The posts will be set 2 feet deep and will be filled with concrete. A four foot square, 3-inch thick concrete pad which slopes away from the well will be set around each well. Both the protective steel well casing and the bumper posts will be painted yellow.

The project site shall be left as clean as possible. All soils and excess concrete produced from each monitoring well will be placed in appropriate areas to be disposed as previously described. All monitoring well locations will either be broomed or washed down such that staining of the existing surface cover is minimized.

GROUNDWATER SAMPLING AND ANALYSIS

Quality Assurance/Quality Control Objectives

The sampling and analysis procedures employed by HETI for groundwater sampling and monitoring follow specific Quality Assurance/Quality Control (QA/QC) guidelines. Quality Assurance (QA) objectives have been established by HETI to develop and implement procedures for obtaining field data and evaluating water quality in an accurate, precise and complete manner so that sampling procedures and field measurements provide information that is comparable and representative of the actual field conditions. Quality Control (QC) is maintained by HETI by using specific field protocols and requiring the analytical laboratory to perform internal and external QC checks. It is the goal of HETI to provide data that are accurate, precise, complete, comparable, and representative. The definitions for accuracy, precision, completeness, comparability, and representativeness are as follows:

1. Accuracy - the degree of agreement of a measurement with an accepted reference or true value.

2. Precision - a measure of agreement among individual measurements under similar conditions. Usually expressed in terms of standard deviation.

3. Completeness - the amount of valid data obtained from a measurement system compared to the amount that was expected to meet the project data goals.

4. Comparability - the confidence with which one data set can be compared with another.

5. Representativeness - the degree to which a sample or group of samples reflect the characteristics of a media at a given sampling point. Also includes the degree to which a sampling point represents the actual parameter variations which are under study.

As part of the HETI QA/QC program, applicable federal, state and local reference documents are to be followed. The procedures outlined in these regulations, manuals, handbooks, guidance documents and journals are incorporated into the HETI sampling procedures to assure that: (1) groundwater samples are properly collected, (2) groundwater samples are identified, preserved, and transported in a manner such that they are representative of field conditions, and (3) chemical analyses of samples are accurate and reproducible.

GUIDANCE AND REFERENCE DOCUMENTS USED TO COLLECT GROUNDWATER SAMPLES

U.S.E.P.A. - 339/9-51-002	NEIC Manual for Groundwater/ Subsurface Investigation at Hazardous Waste Sites
U.S.E.P.A. - 503/SW611	Procedures Manual for Groundwater Monitoring at Solid Waste Disposal Facilities (August, 1977)
U.S.E.P.A. - 600/4-79-020	Methods for Chemical Analysis of Water and Wastes (1983)
U.S.E.P.A. - 600/4-82-029	Handbook for Sampling and Sample Preservation of Water and Wastewater (1982)
U.S.E.P.A. - SW-846#, 3rd Edition	Test Methods for Evaluating Solid Waste - Physical/Chemical Methods (November, 1986) and latter additions
40 CFR 136.3e Table II	Required Containers, Preservation Techniques, and Holding Times
Resources Conservation and Recovery Act (OSWER 9950.1)	Groundwater Monitoring Technical Enforcement Guidance Document (September, 1986)
California Regional Water Quality Control Board (Central Valley Region)	A Compilation of Water Quality Goals (September, 1988); Updates (October, 1988)
California Regional Water Quality Control Board (North Coast, San Francisco Bay, and Central Valley)	Regional Board Staff Recommendations for Initial Evaluations and Investigation of Underground Tanks: Tri-Regional Recommendations (June, 1988)
California Regional Water Quality Control Board (Central Valley Region)	Memorandum: Disposal, Treatment, and Refuse of Soils Contaminated with Petroleum Fractions (August, 1986)
State of California Department of Health Services	Hazardous Waste Testing Laboratory Certification List (March, 1987)
State of California Water Resources Board	Leaking Underground Fuel Tank Control (LUFT) Field Manual (May, 1988), and LUFT Field Manual Revision (April, 1989)

State of California Water Resources 85), Control Board	Title 23 (Register #85.#33-8-17-Subchapter 16: Underground Tank Regulations; Article 3, Sections 2632 and 2634; Article 4, Section 2647 (October, 1986)
Santa Clara Valley Water District	Guidelines for Investigating Fuel Leaks (March, 1989)
Santa Clara Valley Water District	Guidelines for Preparing or Reviewing Sampling Plans for Soil and Groundwater Investigation of Fuel Contamination Sites (January, 1989)
Alameda County Water District	Groundwater Protection Program: Guidelines for Groundwater and Soil Investigations at Leaking Underground Fuel Tank Sites (most recent revision)
American Public Health Association	Standard Methods for the Examination of Water and Wastewaters, 16th Edition
Analytical Chemistry (journal)	Principles of Environmental Analysis Volume 55, pages 2212-18,December, 1983
American Petroleum Institute Environmental Affairs Dept., June, 1983	Groundwater Monitoring & Sample Bias
The Bay Area Air Quality Management District	Regulation 8 - Rule 40 & Rule 48

Because groundwater samples collected by HETI are analyzed in the parts per billion (ppb) range for many analytes, care is exercised to prevent contamination of samples. When volatile or semivolatile organic compounds are included for analysis, HETI sampling crew members will adhere to the following precautions in the field:

1. A new pair of clean, disposable, latex (or comparable material) gloves are to be worn for each well to be sampled.

2. When possible, samples will first be collected from wells known or suspected to contain the fewest contaminants, followed by wells in increasing order of degree of contamination.

3. All sample bottles and equipment are to be kept away from fuels and solvents. When possible, gasoline (used in generators and water pumps) is to be shipped to the project site in separate compartments of the same vehicle or in a separate vehicle as that in which sample bottles are shipped.

4. Sampling bailers are to be composed of polyethylene (when dedicated to the well), Teflon or stainless steel. Other materials, such as acrylic, may contain phthalate esters which can interfere with gas chromatography (GC) analyses. Well purging may be performed with PVC bailers.

5. Volatile organic groundwater samples are collected so that air passage through the sample does not occur or is minimal (to prevent volatiles from being stripped from the samples). Sample bottles are filled by slowly running the sample down the side of the bottle until there is a positive convex meniscus over the neck of the bottle. The Teflon side of the septum (in cap) is positioned against the meniscus and the cap is screwed on tightly. The sample is then inverted and lightly tapped while the sampler inspects the contents of the bottle for an air bubble. The absence of an air bubble indicates a successful seal. If a bubble is evident, the cap is removed and more water is added to the sample. The inspection procedure is repeated and if bubbles persist, the vial is discarded in a container designated for used and broken vials and bottles and the sample filling procedure is repeated with another vial.

6. Extra vials shall be available for use in the event of dropped bottles and/or caps. Any bottle which has come in contact with the ground shall be considered contaminated and shall not be used. When replacing septa, or if septa become inverted, care shall be taken to assure that the Teflon seal faces the interior of the bottle.

7. All preservatives shall be provided by the contract analytical laboratory.

Laboratory and field handling procedures of samples may be monitored by including QC samples for analysis with sample lots from a project site. QC samples may include any combination of the following:

1. Trip Blank - Used for purgable organic compounds only; QC samples shall be collected in 40 milliliter (ml) sample vials filled in the analytical laboratory with organic free water. Trip blanks should be sent to the project site, and travel with the samples from the project site. Trip blanks are <u>not</u> opened, and are returned from the project site with the samples from the project site for analysis.

2 Field Blank - Prepared in the field using steam-distilled water. Field blank QC samples shall accompany project site samples to the laboratory and shall be analyzed for the same chemical parameters as those samples taken from the project site.

3. Equipment Blank - Equipment Blank QC samples shall be prepared in the field using field equipment rinsate between two different wells after the equipment has been washed and rinsed. The equipment blank will consist of deionized water retained in the sampling equipment. These QC samples will only be taken when a dedicated bailer is not used for sampling.

4. Duplicates - Duplicate QC samples shall be collected "second samples" from a selected well and project site. Duplicates shall be collected as either split samples or second-run samples (i.e. later date) from the same well.

The number and types of QC samples shall be determined by HETI on a site-specific basis.

GROUNDWATER SAMPLE COLLECTION

This section describes the routine procedures followed by HETI while collecting groundwater samples for chemical analysis. These procedures include decontamination, water level measurements, well purging, physical parameter measurements, sample collection, sample preservation, and sample handling. Critical sampling objectives for HETI are to:

1. Collect groundwater samples which are representative of the sampled matrix.

2. Maintain sample integrity from the time of sample collection to delivery to the analytical laboratory.

Sample analyses, methods, containers, preservation, and holding times are presented in Table A-1.

Decontamination Procedures

All physical parameter measuring and sampling equipment shall be decontaminated prior to measurement and sample collection using a trisodium phosphate or Alconox solution wash, followed by two separate rinses in tap water, followed by one rinse in steam-distilled water. Any sampling equipment surfaces or parts that might absorb specific contaminants, such as plastic pump valves, impellers, etc., are to be cleaned in the same manner.

Sample bottles, bottle caps, and septa used for sampling volatile organics are thoroughly pre-cleaned in either the laboratory or the factory. All appropriate measures shall be taken to assure continued sterility of the containers issued by the contract laboratory prior to usage at the project site.

During field sampling, equipment which has been placed in a well shall be decontaminated by washing with a trisodium-phosphate or Alconox solution followed by two rinses in tap water and one rinse in steam-distilled water.

Water Level Measurements

Prior to purging and sampling any wells, the static-water level shall be measured by use of an electronic sounder and/or calibrated portable oil-water interface probe. Both static water level and separate phase product thickness shall be measured and noted to the nearest $\pm$0.01 foot. Interface probe results shall be confirmed by sampling the top of the water column with a clear bailer and measuring any floating product thickness to the nearest $\pm$0.01 foot with an engineers scale tape. In all cases a clear bailer sample will be taken from each well to check for color, sheen and undetected floating product. If floating product of any measureable thickness is observed, no sampling will be performed for that well. If visible product sheen is observed, sampling shall proceed under normal protocols.

The line used to lower the bailer shall be discarded after each use to preclude the possibility of cross contamination. Field observations (e.g., well integrity, product odor, turbidity, water color, odors, etc.) shall be recorded on the HETI Purge/Sample Sheet (Plate A-2). Before and after the use of the electric sounder, interface probe, non-dedicated bailer, or any other down well equipment, each will be decontaminated by washing in a trisodium phosphate or Alconox solution, followed by a double rinse with tap water, followed by a rinse with steam-distilled water.

Well Purging

Before sampling commences, well casing storage water and interstitial water in the artificial sand pack shall be purged from the well using: (1) a positive displacement bladder pump constructed of inert non-wetting Teflon and stainless steel; (2) a pneumatic-airlift pumping system; (3) a centrifugal pumping system; or (4) a PVC, Teflon or stainless steel bailer. Methods of purging will be assessed based on the well size, location, depth, accessibility, and known chemical conditions. Individual well purge volumes are calculated from the casing volumes. In general, a minimum of 3 to 5 casing volumes will be purged. Wells which dewater or demonstrate slow recharge capacities (i.e., low yield wells which only recover to 70 percent of initial water column height after 1 hour) during purging activities may be sampled after fewer than 3 to 5 purging cycles. If a low yield well is to be sampled, sampling shall not take place until at least 70 percent of the previously measured water column has been replaced by recharge. Monitoring wells shall be purged according to the protocol flowchart presented in Plate A-3. Water removed from the wells will either be disposed or stored in 55-gallon DOT drums for future disposal according to proceedures outlined for contaminated soil cuttings in the Soil Sampling Protocol section above. Where appropriate, physical parameters (pH, specific conductance, and temperature) will be monitored by HETI field crew during well purging operations. If necessary, purging may continue until all three physical parameters have stabilized. Stability shall be defined as a change of less than 0.2 pH units, less than 10 percent in micro mhos, and less than 1.0 degree Centigrade. The pH meters shall be read to the nearest $\pm$ 0.1 pH units. Specific conductance meters shall be read to the nearest $\pm$ 10 micro-mhos per centimeter. Both types of meters shall be calibrated daily to manufacturer's specifications. Temperature shall be read to the nearest $\pm$ 0.1 degree centigrade. Field data collected while developing, purging and sampling the wells will be entered onto the HETI Purge/Sample Sheet (Plate A-2). Copies of the Purge/Sample Sheets will be reviewed for accuracy and completeness for each well sampled.

DOCUMENTATION

Sample Container Labels

Each sample container shall be labeled immediately after the sample is collected and sealed. The label shall include:

- Company Name (HETI)
- Source (i.e., well number or code)
- Sampler's identification
- Project number
- Date and time of collection
- Type of preservation (if any) used

Field Sampling Data Sheets

In the field, the HETI sampling crew will record the following information on the Purge/Sample Sheet (Plate A-2) for each well sampled:

- Project number
- Client
- Location
- Source (i.e., well number or code)
- Time and date of development, purging and sampling
- Well accessibility and integrity
- Pertinent well data (e.g., total depth, product thickness, static water level)
- Physical parameters when appropriate (e.g., specific conductance, pH, temperature) - may be more than one reading
- Gallons and well casing volumes purged

Chain-of-Custody

A chain-of-custody record shall be completed and will accompany every shipment of samples to the analytical laboratory in order to establish documentation tracing sample possession from the time of collection until delivery to the laboratory. The record will contain the following information:

- Sample or station number or code (ID)
- Signature of the collector, sampler, or recorder
- Date and time of collection
- Place of collection (project address and name of business)
- Sample type (soil or water)
- Type of analysis requested
- Signatures of persons involved in chain of possession (in chronological order)
- Dates and times of individual possession (inclusive)
- Laboratory comments regarding the sample receptacle conditions

Samples will always be accompanied by a Chain-of-Custody record. When transferring the samples, the individuals relinquishing and receiving the samples will sign, date and note the time on the Chain-of-Custody record.

Sample Collection, Handling, Storage and Transport

All water samples will be collected in an order such that those parameters most sensitive to volatilization will be sampled first. A general order of collection for some common groundwater parameters is as follows:

- Volatile Organic Compounds (VOC's)
- Total Organic Halogens (TOH)
- Total Organic Carbon (TOC)
- Extractable Organics
- Total Metals
- Dissolved Metals
- Phenols
- Sulfate and Chloride
- Nitrate and Ammonia
- Turbidity

All samples from the same well shall be collected immediately after purging or when the well recovers to 70 percent of the original water column height. All samples from one sampling set from a single well should be collected on the same day.

All chemical sample handling and storage will be conducted under the direction of HETI's consulting analytical chemist. All laboratory chemical testing will be accomplished by a state approved analytical laboratory.

All water samples will be held at 4°C by packing them in a water-tight container inside an ice chest and covering with hard shelled "blue ice™". In no event shall the time between sample collection and delivery to the contract laboratory be greater than 72 hours. Preservatives will not be added to any sample by the sampling crew, unless instructed by the consulting analytical chemist. If added in the field, preservatives shall be supplied by the contract analytical laboratory. No one will open the samples other than laboratory personnel who will perform the specified chemical analyses.

If it is necessary for samples or sample ice chests to leave the immediate control of the sampling crew prior to delivery to the laboratory or laboratory courier, such as shipment by a common carrier (e.g., UPS™), a custody seal will be placed on each sample container and/or sample chest. Custody seals will be placed to ensure that the samples have not been tampered with during shipment and will contain the samplers signature, the date and time the seal was emplaced.

TABLE A-1

SAMPLE ANALYSIS METHODS, CONTAINERS, PRESERVATIVES, AND HOLDING TIMES

Parameter	Analytical Method	Reporting Units	Container*	Preservation†	Maximum Holding Time
Total Petroleum Hydrocarbons (low to med. b.p. i.e. gasoline)	EPA 8015 (DHS modified)	ppb ug/l	40ml glass vial, Teflon lined septum	4°C HCl to pH<2**	14 days
Benzene Toluene Ethylbenzene Xylenes (BTEX)	EPA 8020	ppb ug/l	40ml glass vial, Teflon lined septum	4°C HCl to pH<2**	7 days(w/o preservative) 14 days (w/preservative)
Oil & Grease	SM 503A&E	ppb ug/l	1L glass jar, Teflon lined cap	4°C H2SO4 to pH<2	28 days
Total Petroleum Hydrocarbons (high. b.p. i.e. diesel)	EPA 8015 (DHS modified)	ppb ug/l	1L glass jar, Teflon lined cap	4°C	14 days
Halogenated Volatile Organics (chlorinated solvents)	EPA 8010	ppb ug/l	40ml glass vial, Teflon lined septum	4°C	14 days
Non-Chlorinated Solvents	EPA 8020	ppb ug/l	as above	4°C	14 days
Volatile Organics (GC/MS)	EPA 8240	ppb ug/l	as above	4°C	14 days
Semi-Volatile Organics (GC/MS)	EPA 8270	ppb ug/l	as above	4°C	14 days
Metals	ICP-EPA 200.7 or A.A.EPA-	ppb ug/l	100 ml	4°C HNO3 to pH<2	6 months

* Containers listed are for water - soil containers are to be brass or stainless steel tubes with plastic end caps.

† Applies only to liquid samples.

** May vary depending on lab requirements.

SITE/LOCATION	BEGUN	BORING DIAMETER	ANGLE/BEARING	BORING NO
DRILLING CONTRACTOR	COMPLETED	FIRST ENCOUNTERED WATER DEPTH		
OPERATOR	LOGGED BY	STATIC WATER DEPTH/DATE		
DRILL MAKE & MODEL	SAMPLING METHOD			BOTTOM OF BORING
WELL MATERIAL	SLOT SIZE FILTER PACK	BORING SEAL		WELL NO.

BLOWS/FOOT	FIELD HEAD-SPACE *	DEPTH	SAMPLE	WATER LEVEL	WELL CONSTR.	GRAPHIC LOG	MATERIAL CLASSIFICATION & PHYSICAL DESCRIPTION
		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30					

*PID (ppm)

HYDRO-ENVIRONMENTAL TECHNOLOGIES, INC.

SOIL BORING LOG AND WELL CONSTRUCTION DIAGRAM MW-4

PLATE A-1

JOB NO.

DATE:

APPROVED BY:

PURGED/SAMPLED BY: _____ DATE: _____

GAUGING DATA:

Depth to bottom: _____ ft.

Depth to water: _____ ft.

Saturated Thickness: _____ ft.

Conversion	
diam.	gals/ft.
2 in.	x 0.16
4 in.	x 0.65
6 in.	x 1.44

Well casing volume _____ gallons

volumes to purge x_____ vols.

*Total volume to purge = _____ gallons

* unless chemical parameters stabilize earlier

PURGING DATA:

Purge method: PVC bailer/ Submersible pump/ Suction lift pump/ _____
(circle one)

Time	Volume (gallons)	Temp. (°F)	Conductivity (mS/cm)	pH

Color: _____ Turbidity: _____

Recharge: _____ SPP_____ft.

SAMPLING DATA:

Sampling method: Dedicated bailer /_____

Sample for: (circle)

TPHg/BTEX	METALS	TOG	8010	
TPHd	O-Pb	TEL	8020	
TPH mo	Total Pb	EDB	8240	
601	602	Nitrates	8260	8270

Other: _____

HYDRO-
ENVIRONMENTAL
TECHNOLOGIES, INC.

PURGE/SAMPLE SHEET

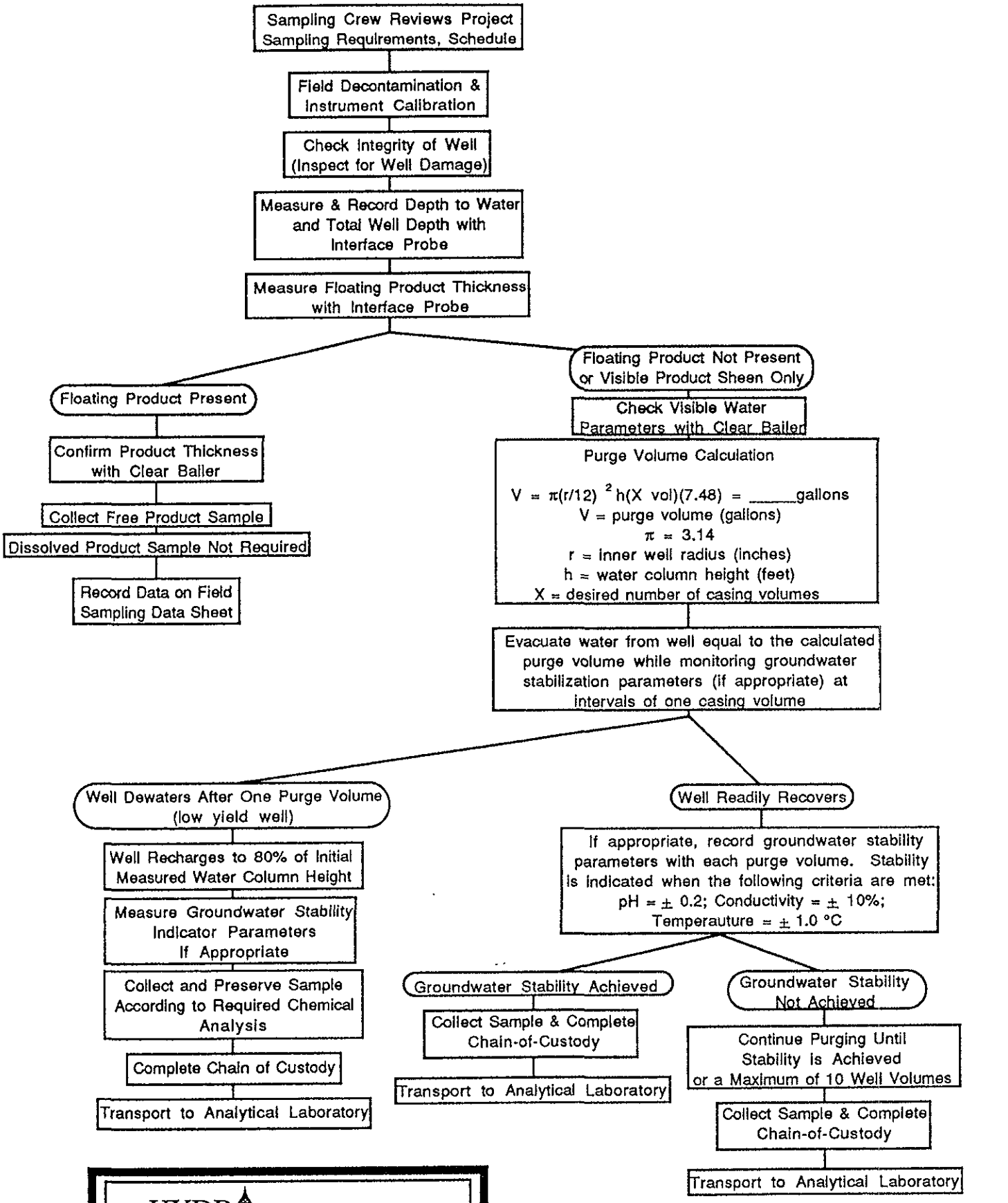
WELL # _____

LOCATION: _____

Job No.

SHEET

of



HYDRO-ENVIRONMENTAL TECHNOLOGIES, INC.

PLATE A-3
WATER SAMPLING FLOWCHART

file 7-282
Rpts.

HYDRO ENVIRONMENTAL TECHNOLOGIES, INC.

SITE SAFETY PLAN
FOR

CLIENT: Tharco HETI Job No: 7-282

ADDRESS: 2222 Grant Avenue,
San Lorenzo, CA 94580

SCOPE OF WORK (Check all that apply):

Soil Excavation	☐	Soil Stockpile Sampling	☒
Drilling	☒	Monitoring Well Sampling	☒
Testing		System Installation	
Aquifer	☐	Ground Water	☐
Vapor Extraction	☐	Vapor Extraction	☐
Air Sparging	☐	Air Sparging	☐
System Operation and Maintenance	☐		

PURPOSE AND SCOPE

This Site Safety Plan (SSP) establishes the basic safety guidelines and requirements for the above scope(s) of work at the above site (see Site Location Map - Figure 1). This SSP addresses the expected potential hazards that may be encountered during this project.

The provisions set-forth in this SSP will apply to Hydro-Environmental Technologies, Inc. (HETI) employees and any subcontractors working for HETI at the job site. All personnel working for HETI, including subcontractors, at the job site must read this SSP, and sign the attached Compliance Agreement (Appendix A) before entering the work area.

I. FACILITY BACKGROUND / WORKPLAN

SITE BACKGROUND AND HISTORY:

An underground diesel fuel storage tank was removed from the yard behind the referenced facility in July, 1993. Ground water collected in the excavation, and was observed to stabilize at approximately seven to eight feet below grade. Results of analysis of soil and ground water samples collected during tank removal activities indicated the presence of petroleum hydrocarbons (TPH as gasoline and BTEX). At the request of the ACDEH, Tharco has contracted the completion of a limited environmental assessment to further evaluate subsurface conditions.

WORK ACTIVITIES:

The methodologies recommended for utilization during the site investigation are presented below.

Task 1 - Drill Exploratory Borings.

Three (3) additional borings (MW-1 through MW-3) will be drilled in the locations shown on the attached map. The borings will be drilled with minimum 8-inch diameter continuous flight hollow stem auger drilling equipment. The borings will be advanced to a depth of 20 feet below ground surface (bgs).

All drilling activity will be supervised by a HETI Field Geologist, operating under the supervision of a California Registered Geologist. Driven samples and drill cuttings will be examined in the field, with all observations recorded in a bound field notebook. Notes taken in the field will be utilized to generate a detailed Well Log for each boring completed.

Soil samples will be collected from each boring at a depth of five feet bgs. Soil samples will be appropriately labeled, stored, and transported under chain of custody control to the project laboratory for analysis of concentrations of TPH as gasoline and BTEX.

Task 2 - Install Ground Water Monitoring Wells.

Three ground water monitoring wells will be constructed following boring completion. The wells will be constructed of 2-inch diameter materials, and will be completed flush with grade in standard 8-inch manholes. The wells will be constructed of 0.020 slotted PVC, which will extend from approximately three feet above the water saturated zone to 10 feet below the top of the water table. Solid PVC riser will be coupled to the slotted section.

The wells will be developed following installation. The wells will be developed until the discharge water is clear and temperature, pH, and turbidity have stabilized.

Task 3 - Monitoring Well Sampling.

Ground water samples will be collected from all three monitoring wells following development. Methods to be employed during sampling/decontamination are presented in the attached Protocols.

Well head elevations will be surveyed. Following surveying, the depth from the top of the well casing to the top of ground water in each well will be measured with an electronic probe prior to pre-sample well purging. Water samples will be collected from each well with a clean, dedicated Teflon^{TM} bailer, transferred to appropriately sized and preserved glass (borosilicate) containers, and forwarded under chain of custody control to the project lab for analysis. As with the samples collected during the exploratory drilling phase of this project, all water samples will be analyzed for concentrations of TPH as gasoline and BTEX.

Task 4 - Prepare and Submit Investigative Report.

A brief report of investigation will be prepared following receipt of laboratory analysis. This report will be entitled Monitoring Well Installation Report in order to accurately present the tasks completed and described therein.

Task 5- Water Level Monitoring/Quarterly Sampling

A complete set of quarterly samples will be collected and analyzed three months following the initial sampling event. An evaluation regarding tidal influence on ground water movement and the utility of increasing the frequency of water level monitoring will be made following the completion of two or three monitoring events. No changes in monitoring frequency will be recommended if it is apparent that the ground water gradient beneath the subject site is not influenced by tidal action.

II. KEY SAFETY PERSONNEL AND RESPONSIBILITIES

All personnel working for HETI at the job site are responsible for project safety. Specific individual responsibilities are listed below:

Project Manager: Scott Kellstedt_____

The Project Manager is responsible for preparation of this SSP. He/she has the authority to provide for the auditing of compliance with the provisions of this SSP, suspend or modify work practices, and to report to the Regional Manager any individuals whose conduct does not meet the provisions presented in this SSP. The Project Manager can be reached at (510) 521-2684.

Site Safety Officer: Ruary Allan_____

The Site Safety Officer (SSO) is responsible for the dissemination of the information contained in this SSP to all HETI personnel working at the job site, and to the responsible representative(s) of each subcontractor firm working for HETI at the job site.

The SSO is responsible for ensuring the following items are adequately addressed:

- Inspection of tools, drilling equipment and safety equipment
- Safety supplies & equipment inventory
- Site-specific training/hazard communication
- Accident/incident reporting
- Decontamination/contamination reduction procedures

The Site Safety Officer shall be responsible to take necessary steps to ensure that employees are protected from physical hazards, which could include;

- Falling objects such as tools or equipment
- Falls from elevations
- Tripping over hoses, pipes, tools, or equipment
- Slipping on wet or oily surfaces
- Insufficient or faulty protective equipment
- Insufficient or faulty operations, equipment, or tools
- Noise

The SSO has the authority to suspend work anytime he/she determines the safety provisions set-forth in this SSP are inadequate to ensure worker safety. The SSO or Project Manager must be present during all phases of the site work.

SSO Pager Number: (415) 708-8070

III. JOB HAZARD ANALYSIS / SITE CHARACTERIZATION

CHEMICAL HAZARDS:

The hazardous chemicals which may be encountered at the site are petroleum hydrocarbons, including benzene, toluene, ethylbenzene, and xylene. A summary of relevant chemical, physical and toxicological properties for each chemical hazard is discussed below:

Benzene:

Colorless liquid with an aromatic odor.

Vapor pressure	75 mm Hg @ 68 °F
Flash point	12 °F
Hazard classification	flammable liquid
Permissible exposure limit (PEL)	none

Benzene is recognized by the National Institute of Occupational Safety and Health (NIOSH) as a potential human carcinogen.

Benzene can enter the body through all four routes of exposure: (1) inhalation; (2) adsorption; (3) ingestion; and (4) injection. Target organs are the blood, central nervous system, skin, bone marrow, eyes, and respiratory system. Acute exposure effects include irritation of the eyes, nose, and respiratory system as well as headache, nausea, staggered gait, depression, and abdominal pain. The chronic effect of over-exposure is the potential for cancer.

Toluene:

Colorless liquid with an aromatic odor.

Vapor pressure	22 mm Hg @ 68 °F
Flash point	40 °F
Hazard classification	flammable liquid
Permissible exposure limit (PEL)	100 ppm

Toluene can enter the body through all four routes of exposure: (1) inhalation; (2) adsorption; (3) ingestion; and (4) injection. Target organs are the central nervous system, liver, kidneys, and skin. Acute exposure effects include fatigue, dizziness, headache, euphoria, dilated pupils, paralysis.

Ethylbenzene:

Colorless liquid with an aromatic odor.

Vapor pressure	7.1 mm Hg @ 68 °F
Flash point	55 °F
Hazard classification	flammable liquid
Permissible exposure limit (PEL)	100 ppm

Ethylbenzene can enter the body through all four routes of exposure: (1) inhalation; (2) adsorption; (3) ingestion; and (4) injection. Target organs are the eyes, upper respiratory system, skin and central nervous system. Acute exposure effects include

irritation of the eyes and mucous membranes, nose, and respiratory system as well as headache, nausea, staggered gait, headache, dermatitis, narcosis and coma.

Xylenes: Colorless liquid with an aromatic odor.

Vapor pressure	8 mm Hg @ 68 °F
Flash point	63° F to 81 °F
Hazard classification	flammable liquid
Permissible exposure limit (PEL)	100 ppm

Xylenes can enter the body through all four routes of exposure: (1) inhalation; (2) adsorption; (3) ingestion; and (4) injection. Target organs are the central nervous system, eyes, gastrointestinal tract, blood, liver, kidneys and skin. Acute exposure effects include dizziness, excitement, drowsiness, incoordination, abdominal pain, vomiting, and irritation of the eyes, nose and throat.

Other Potentially Hazardous Chemicals:

_____ _____.

Vapor pressure	____ mm Hg @ 68 °F
Flash point	____ °F
Hazard classification	_____.
Permissible exposure limit (PEL)	_____ ppm
Potential carcinogen	☐

Potential exposure routes:

inhalation ☐ adsorption ☐ ingestion ☐ injection ☐

Exposure effects include: _____

_____

_____

_____

The controls to limit potential for exposure to the above chemical hazards is addressed below:

o Inhalation of contaminants will be controlled by See Sections V and VI

_____

_____

_____

- o Ingestion of contaminants will be controlled by prohibiting eating, drinking, smoking, and chewing in the work area. In addition, workers shall wash their hands and face before engaging in any of the above activities.

- o Absorption of contaminants will be controlled by see Section VI.

- o Injection of contaminants will be controlled by wearing work gloves in the work area.

FIRE HAZARDS:

The potential for fire or explosion exists whenever flammable liquids or vapors are present above lower explosions limit (LEL) concentrations and sufficient oxygen is present to support combustion. These potential fire hazards are addressed below:

- o The potential exists for petroleum hydrocarbon vapors to exceed LEL concentrations within the wells. However, well-gas generally does not contain sufficient oxygen to support combustion.

- o Other potential fire hazards associated with the scope of work have been mitigated by: N/A

- o In addition to the above, the HETI truck shall have an operative fire extinguisher on board. All personnel shall be familiar with its location and use.

ELECTRICAL HAZARDS:

The potential electrical hazards expected on the job site are addressed below:

- o Expected voltages: NA
- o No electrical enclosures will be opened unless power is disconnected. Power will be verified disconnected with a meter prior to working on any circuits.

PHYSICAL HAZARDS:

The potential physical hazards expected at the job site are addressed below:

- The potential for physical injury exists from the operation of moving equipment such as drill rigs, forklifts and trucks. Use of steel toe boots, hard hats, and safety glasses will be required when in the work area. Backup alarms are required on all trucks and forklifts.
- The potential for physical injury exists from public traffic on the site. The site is ☒ is not ☐ open to public vehicles. Work will ☐ will not ☒ be performed in the public right-of-way. If work is performed in the public right-of-way, orange vests shall be worn, a traffic control plan is attached and an encroachment permit from the appropriate government agency shall be obtained.
- The potential for burns from hot surfaces exist from the operation of an internal combustion engine ☐, an air compressor ☐. Compressed air piping is hot. All hot surfaces shall be allowed to cool and/or be handled with thick cloth work gloves.
- The potential for noise hazards exist at the site from the operation of DRILL RIG. It is not expected that noise levels will exceed the acceptable CAL-OSHA permissible exposure level of 90 dB. However, workers should be aware of the presence of these hazards and take steps to avoid them. Ear / noise protection, though not required, shall be available to all personnel within the job site in the event noise levels exceed worker comfort or protection levels.
- Personnel should be cognizant of the fact that when protective equipment such as respirators, gloves, and/or protective clothing are worn, visibility, hearing, and manual dexterity are impaired.

HEAT STRESS:

The anticipated weather conditions will be: MILD, DRY (<80F).

The potential for heat stress is present if the temperature exceeds 80°F. Some signs and symptoms of heat stress are presented below:

- Heat rash may result from continuous exposure to heat or humid air.
- Heat cramps are caused by heavy sweating with inadequate electrolyte replacement. Signs and symptoms include: muscle spasms, heavy sweating, dizziness, nausea and fainting.
- Heat exhaustion occurs from increased stress on various body organs including inadequate blood circulation due to cardiovascular insufficiency or dehydration. Signs and symptoms include: pale, cool, moist skin; heavy sweating; dizziness; nausea and fainting.

- Heat stroke is the most serious form of heat stress. Temperature regulation fails and the body temperature rises to critical levels. Immediate action must be taken to cool the body before serious injury and death occurs. Competent medical help must be obtained. Signs and symptoms are: red, hot, unusually dry skin; lack of or reduced perspiration; nausea; dizziness and confusion; strong, rapid pulse and coma.

Preventing heat stress is particularly important because once someone suffers from heat stroke or heat exhaustion, that person may be predisposed to additional heat injuries. To avoid heat stress the following steps shall be taken whenever the ambient temperature is over 80 °F:

1) Field personnel shall have a work/rest cycle of 2 hours work, 15 minutes rest.

2) The Site Safety Officer shall mandate work slowdowns as needed.

IV. JOB HAZARD SUMMARY

In summary, the expected potential hazards to personnel working in the work area are (Check all that apply):

(1) Over exposure to chemical contaminants ☐

(2) Physical injury from equipment being operated at job site ☒

(3) Public traffic ☒

(4) Hot surfaces ☐

(5) Heat stress ☐

(6) Fire ☐

(7) Electrical shock ☐

(8) Other ☐

As described in Section III - Job Hazard Analysis, these potential hazards have been mitigated for the protection of both the worker health and safety. The proposed work does not appear to present any potential health risk to workers, the surrounding community, or the environment.

V. EXPOSURE MONITORING PLAN

Periodic monitoring for organic vapors is ☐ is not ☐ required. The Site Safety Officer shall monitor the ambient air in the work area with an organic vapor photoionization meter (Thermo Environmental Model 580B OVM, or equivalent) should their presence be detected by odor. If the meter indicates petroleum

hydrocarbon concentrations in the area exceed 300 ppm, the Site Safety Officer shall require personnel in the work area to wear respirators with organic vapor cartridges (MSA 464046, or equivalent).

The manufacturer's calibration procedures for the Model 580B OVM are located within the instrument case. Field calibration shall be performed daily during use.

All personnel working for HETI at the job site shall be monitored for heat stress. Because workers at the job site are expected to be wearing permeable clothing (e.g. standard cotton or synthetic work clothes), monitoring for heat stress will consist of personnel constantly observing each other for any of the heat stress symptoms discussed in Section III.

Field personnel shall be cautioned to inform each other of non-visual effects of the presence of toxins, such as: headaches, dizziness, nausea, blurred vision, cramps, irritation of eyes, skin, or respiratory tract, changes in complexion or skin discoloration, changes in apparent motor coordination, changes in personality or demeanor, excessive salivation or changes in pupillary response or changes in speech ability or pattern.

VI. PERSONAL PROTECTIVE EQUIPMENT

Level D personal protection equipment is expected to be the highest protective level required to complete the field activities for this project. Modified Level C protection may also be required at the discretion of the Site Safety Officer. The following lists summarize the personal protective equipment that shall be available to all field personnel working in the work area:

Level D Protection (shall be worn at all times)

- Boots, steel toe
- Safety glasses, chemical splash goggles, or face shield
- Hard hat
- Work gloves required ☒ optional ☐
- Long leg trousers
- Long sleeves required ☒ optional ☐

Modified Level C Protection (available at all times.)

- Half-face air purifying respirator with organic vapor cartridges to be used should organic vapor concentrations exceed 300 ppm as discussed in Section V of this SSP.
- Hearing protection

VII. SITE CONTROL

The exclusion, contamination reduction, and support zones are shown in Figure 2. these zones shall be marked with natural barriers, cones or tape as appropriate. Personnel without the proper training, personal protective equipment or who have not agreed to follow this SSP shall not be allowed into the exclusion or contamination reduction zones.

VIII. DECONTAMINATION MEASURES

Field personnel shall wash hands and face before entering a clean area. Additional decontamination measures are discussed under General Safe Work Practices (section IX).

IX. GENERAL SAFE WORK PRACTICES

The project operations shall be conducted with the following minimum safety requirements employed:

- Eating, drinking, and smoking shall be restricted to a designated support zone.
- All personnel shall wash hands and face before eating, drinking, or smoking.

X. SANITATION

The location of the nearest running water source and toilet is THARCO BUILDING

A portable potable water cooler or other source of drinking water shall be maintained on site.

XI. STANDARD OPERATING PROCEDURES

The following HETI protocols apply to this scope of work:

Drilling, Well Construction and Sampling Protocols	☒
Soil Vapor Extraction Protocol	☐
Air sparging Protocol	☐

XII EMERGENCY RESPONSE PLAN

In the event of an accident resulting in physical injury, first aid will be administered and the injured worker will be transported to

SAN LEANDRO HOSPITAL, 13855 E. 14TH ST. SAN LEANDRO

In the event of a fire or explosion, local fire or response agencies will be called by dialling 9-1-1. The Project Manager shall also be notified.

Emergency Telephone Numbers:

Fire and Police 911
Hospital ..... (510) 357 6500

Directions to Hospital: See Figure 3

TRAVEL EAST ON GRANT AVE. TO WASHINGTON AVE. TURN LEFT. TRAVEL NORTH ON WASHINGTON TO 139TH AVE. TURN RIGHT. TRAVEL NORTH ON 139TH AVE TO E. 14TH ST. TURN LEFT. HOSPITAL IS ON LEFT AT 13855 E. 14TH ST.

A fire extinguisher, located in the HETI vehicle will be located on-site during all installation, testing and servicing activities.

Additional Contingency Telephone Numbers:

HETI ..... (510) 521-2684
All cases where an accident has occurred will require filling out an incident / accident report and submitting it within 48 hours of the accident.

XIII. TRAINING REQUIREMENTS

All site personnel will be required to have completed the 40 hours of basic OSHA-SARA training for personnel assigned to hazardous waste sites in compliance with OSHA Standard 29 CFR 1910.120, Hazardous Waste Operations and Emergency Response, and all are required to participate in the annual OSHA-SARA 8-hour refresher courses.

XIV. MEDICAL SURVEILLANCE PROGRAM

HETI personnel and subcontractors engaged in field operations shall be participants in their company Medical Surveillance program, and must be cleared by the examining physician(s) to wear respiratory protection devices and protective clothing for working with hazardous materials. The applicable requirements under California Administrative Code (CAC) Title 8, Section 5216, which is available at the HETI office for review, shall be observed. Project-specific medical surveillance is ☐ is not ☒ required.

XV. DOCUMENTATION

All personnel shall sign the compliance agreement (Appendix A).

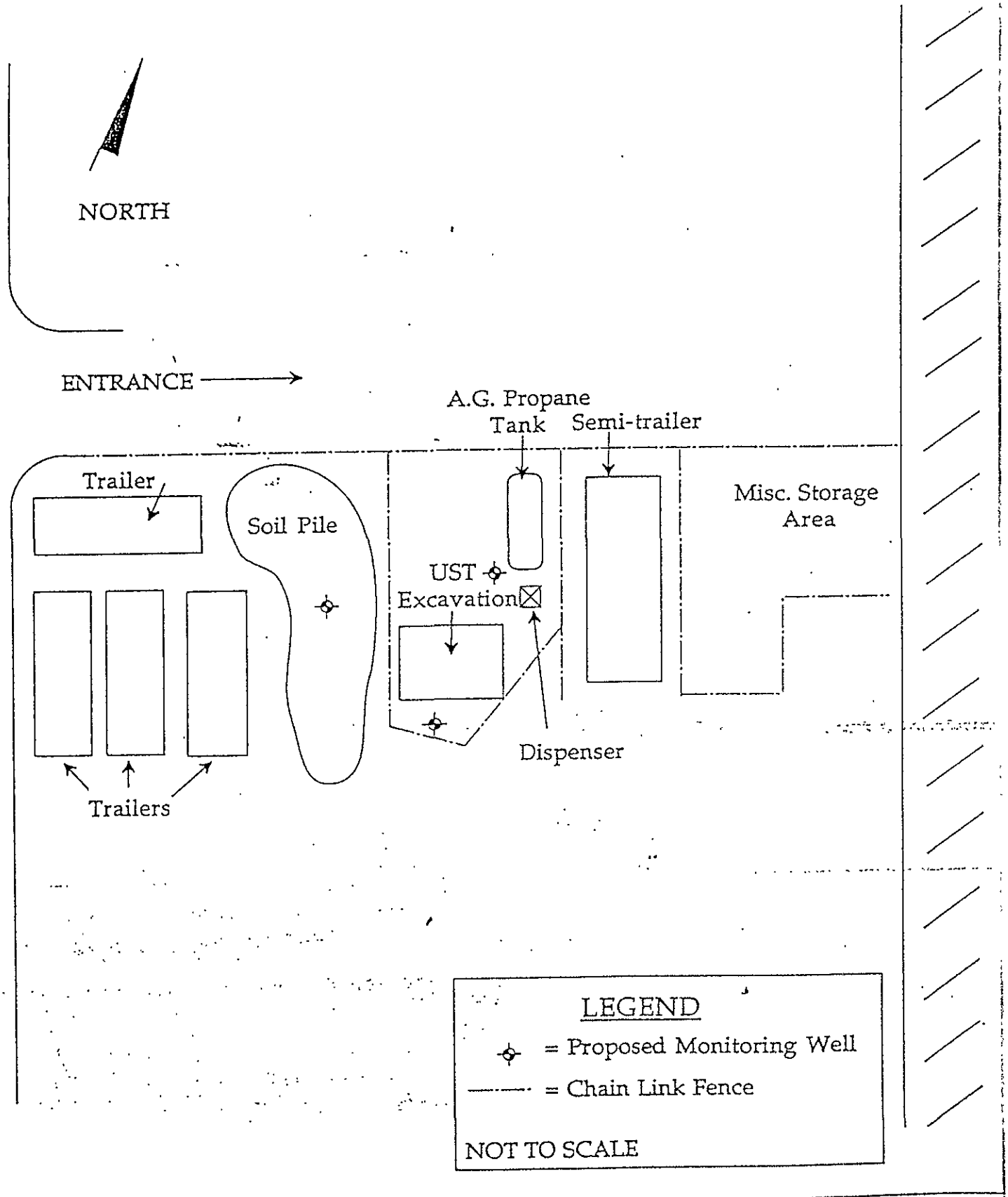
Daily documentation shall be provided by a daily log, completed by the Site Safety Officer in his/her field notebook. The Site Safety Officer shall record the names of all personnel working for HETI and any site visitor(s). (S)he shall also record accidents, illness and other safety related matters. In the case of an accident, or injury, during field operations, (s)he will prepare and submit an Incident/Accident Report.

In case air monitoring is implemented, OVM readings (including times) shall be recorded in the daily log.

SSP prepared by: RUARY J. ALLAN Date: 3-10-94

SSP Approved by: [signature] Date: 3/10/94

Project Manager



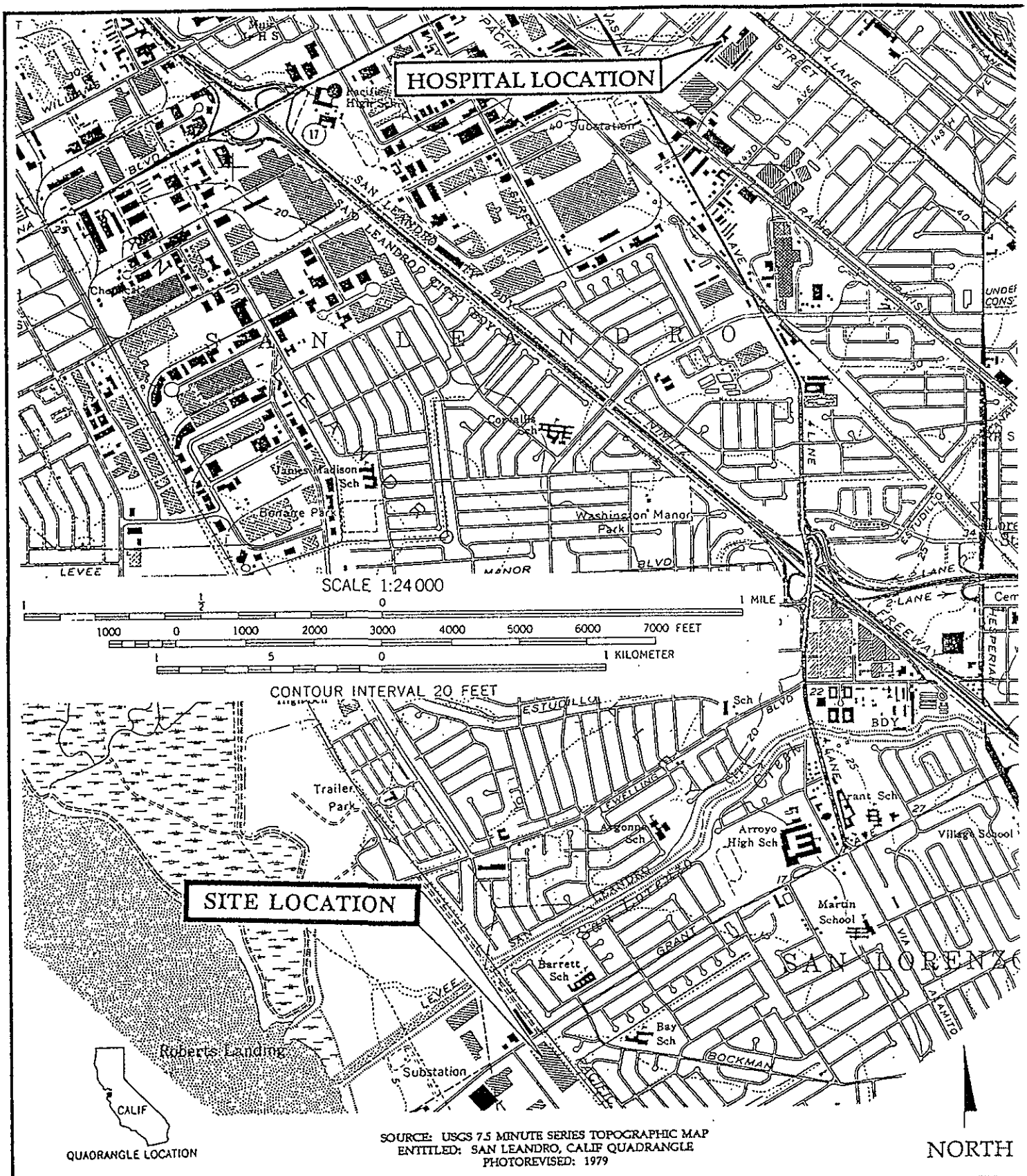
HYDRO-ENVIRONMENTAL TECHNOLOGIES, INC.

SITE PLAN

THARCO
2222 Grant Avenue
San Lorenzo, California

Figure 2

7-282 12/93



SOURCE: USGS 7.5 MINUTE SERIES TOPOGRAPHIC MAP
ENTITLED: SAN LEANDRO, CALIF QUADRANGLE
PHOTOREVISED: 1979

HYDRO-
ENVIRONMENTAL
TECHNOLOGIES, INC.

HOSPITAL LOCATION MAP

Tharco
2222 Grant Avenue
San Lorenzo, California

Figure
3

7-282 3/94

COMPLIANCE AGREEMENT

I have read and understand the Site Safety Plan.

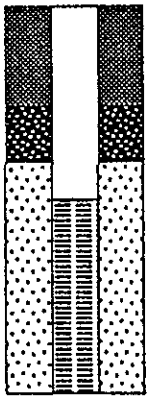
I will comply with the minimum safety requirements set forth in this Site Safety Plan. I agree to notify the responsible employee of HETI should any unsafe acts be witnessed by me while I am on this site.

Print Name	Company	Signature	Date
RUARY ALLAN	HETI		3-25-94
Adam Hurjardo	Bayland		3-25-94
MARC R BROOKE	"		3/25/94

UNIFIED SOIL CLASSIFICATION SYSTEM - VISUAL CLASSIFICATION OF SOILS
(ASTM D-2488)

MAJOR DIVISIONS		GROUP SYMBOL	GROUP NAME	DESCRIPTION
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	GW	Well-graded gravel Well-graded gravel with sand	Well-graded gravels or gravel-sand mixtures, little or no fines.
		GP	Poorly-graded gravel Poorly-graded gravel with sand	Poorly-graded gravels or gravel sand mixture, little or no fines.
		GM	Silty gravel Silty gravel with sand	Silty gravels, gravel-sand-silt mixtures.
		GC	Clayey gravel Clayey gravel with sand	Clayey gravels, gravel-sand-clay mixtures.
	SAND AND SANDY SOILS	SW	Well-graded sand Well-graded sand with gravel	Well-graded sands or gravelly sands, little or no fines.
		SP	Poorly-graded sand Poorly-graded sand with gravel	Poorly-graded sands or gravelly sands, little or no fines.
		SM	Silty sand Silty sand with gravel	Silty sands, sand-silt mixtures.
		SC	Clayey sand Clayey sand with gravel	Clayey sands, sand-clay mixtures.
FINE GRAINED SOILS	SILTS AND CLAYS	ML	Silt; Silt with sand; Silt with gravel; Sandy silt; Sandy silt with gravel; Gravelly silt; Gravelly silt with sand	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity.
		CL	Lean clay; Lean clay with sand; Lean clay with gravel Sandy lean clay; Sandy lean clay with gravel Gravelly lean clay; Gravelly lean clay with sand	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
	ELASTIC SILTS AND CLAYS	MH	Elastic silt; Elastic silt with sand; Elastic silt with gravel Sandy elastic silt; Sandy elastic silt with gravel Gravelly elastic silt; Gravelly elastic silt with sand	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.
		CH	Fat clay; Fat clay with sand; Fat clay with gravel Sandy fat clay; Sandy fat clay with gravel Gravelly fat clay; Gravelly fat clay with sand	Inorganic clays of high plasticity, fat clays.
HIGHLY ORGANIC SOILS		OL/OH	Organic soil; Organic soil with sand; Organic soil with gravel Sandy organic soil; Sandy organic soil with gravel Gravelly organic soil; Gravelly organic soil with sand	Organic silts and organic silt-clays of low plasticity. Organic clays of medium to high plasticity.
		Pt	Peat	Peat and other highly organic soils.

WELL CONSTRUCTION DETAILS



= Cement

= Bentonite

= Filter pack

= PVC Screen

= PVC Blank

Approximate first encountered water level

Approximate stabilized water level

Retained for Analysis } Sample Interval

NOTE: Blow count represents the number of blows of a 140-lb hammer falling 30 inches per blow required to drive a sampler through the last 12 inches of an 18-inch penetration.

No warranty is provided as to the continuity of soil strata between borings. Logs represent the soil section observed at the boring location on the date of drilling only.

S = Sampler sank into medium under the weight of the hammer (no blow count)

P = Sampler was pushed into medium by drilling rig (no blow count)

NR = No Recovery

SANDS & GRAVELS	BLOWS/FT
VERY LOOSE	0 - 5
LOOSE	5 - 12
MED. DENSE	12 - 37
DENSE	37 - 62
VERY DENSE	OVER 62

SILTS & CLAYS	BLOWS/FT
SOFT	0 - 5
FIRM	5 - 10
STIFF	10 - 20
VERY STIFF	20 - 40
HARD	OVER 40

HYDRO-ENVIRONMENTAL TECHNOLOGIES, INC.

SOIL BORING AND WELL CONSTRUCTION LOG LEGEND

APPENDIX C

PLATE C-1

SITE/LOCATION		BEGUN	BORING DIAMETER	ANGLE/BEARING	BORING NO
Tharco, San Lorenzo		3/25/94	8 Inches	90 Degrees	B-1
DRILLING CONTRACTOR		COMPLETED	FIRST ENCOUNTERED WATER DEPTH		BOTTOM OF BORING
Bayland Drilling		3/25/94	7 Feet		19 Feet
DRILL MAKE & MODEL	OPERATOR	LOGGED BY	STATIC WATER DEPTH/DATE		WELL NO.
CM 70	Adam Huajardo	Ruary Allan	5.41 Feet - 3/29/94		MW-1
WELL MATERIAL	SLOT SIZE	SAMPLING METHOD			BOTTOM OF WELL
2" SCH 40 PVC	0.020"	CA-modified split spoon			19 Feet
FILTER PACK	WELL SEAL				PLANNED USE
#2/12 sand	Neat cement over hydrated bentonite pellets				Monitoring

BLOWS/FOOT	PID FIELD HEADSPACE (ppm)	DEPTH	SAMPLE	WATER LEVEL	WELL CONSTR.	GRAPHIC LOG	MATERIAL CLASSIFICATION & PHYSICAL DESCRIPTION
		1					6" Concrete pad.
		2					
		3					
		4					
6	10	5		▼			Lean CLAY (CL); gray, soft, high plasticity; damp.
4	3	6					
		7		▽			Gravelly lean CLAY with sand (CL); gray mottled black, soft, high plasticity; approximately 30% fine grained gravel; approximately 15% fine to coarse grained sand; wet.
4	0.2	8					
		9					
10		10					Lean CLAY (CL); gray, firm, salt crystals in cavities; trace of coarse grained sand.
		11					
		12					
		13					
		14					
15	0	15					Sandy lean CLAY (CL); gray, firm, low plasticity, intermittent iron-staining; 30% fine to medium grained sand. Grades to clayey sand at 15.5'.
		16					
		17					Clayey GRAVEL with sand (GC); multicolored, fine to coarse grained (up to 2" diameter), angular to rounded; approximately 15% clay; approximately 25% fine to coarse grained sand.
26		18					
		19					
		20					

HYDRO-ENVIRONMENTAL TECHNOLOGIES, INC.

DATE: June 1, 1994

APPROVED BY: Gary Pischke, C.E.G.

SOIL BORING LOG AND WELL CONSTRUCTION DIAGRAM MW-1

Tharco
2222 Grant Avenue
San Lorenzo CA

PLATE
C-2
SHEET 1 OF 1

JOB NO.
7-282

SITE/LOCATION		BEGUN	BORING DIAMETER	ANGLE/BEARING	BORING NO
Tharco, San Lorenzo		3/25/94	8 Inches	90 Degrees	B-2
DRILLING CONTRACTOR		COMPLETED	FIRST ENCOUNTERED WATER DEPTH		BOTTOM OF BORING
Bayland Drilling		3/25/94	6 Feet		19 Feet
DRILL MAKE & MODEL	OPERATOR	LOGGED BY	STATIC WATER DEPTH/DATE		WELL NO.
CM 70	Adam Huajardo	Ruary Allan	4.81 Feet - 3/29/94		MW-2
WELL MATERIAL	SLOT SIZE	SAMPLING METHOD			BOTTOM OF WELL
2" SCH 40 PVC	0.020"	CA-modified split spoon			19 Feet
FILTER PACK	WELL SEAL				PLANNED USE
#2/12 sand	Neat cement over hydrated bentonite pellets				*Monitoring*

BLOWS/FOOT	PID FIELD HEADSPACE (ppm)	DEPTH	SAMPLE	WATER LEVEL	WELL CONSTR.	GRAPHIC LOG	MATERIAL CLASSIFICATION & PHYSICAL DESCRIPTION
		1					6" Concrete pad.
		2					Pea gravel fill.
		3					
		4					
2	0	5		▼			
0	11	6		▽			Lean CLAY (CL); light-gray, soft, high plasticity; trace of medium to coarse grained sand; wet. (1)
		7					
		8					
		9					
7	0.2	10					Lean CLAY (CL); dark-gray, firm, low plasticity, trace of plant debris and organic material, salt crystals in cavities; trace of medium to coarse grained sand; trace of fine grained, angular, gray gravel; wet. (2)
		11					
		12					
		13					
		14					Lean CLAY (CL); 13.5' to 14.5'- transitional contact from lithology (1) to lithology (2) (above).
22	0	15					Lean CLAY (CL); gray, very stiff, low plasticity, red iron-staining; approximately 10% silt and fine grained sand.
		16					
		17					
7		18					Lean CLAY with sand (CL); gray, firm, light red iron-staining; approximately 50% silt and fine grained sand; wet.
		19					
		20					

HYDRO-ENVIRONMENTAL TECHNOLOGIES, INC.

DATE: June 1, 1994

APPROVED BY: Gary Pischke, C.E.G.

SOIL BORING LOG AND WELL CONSTRUCTION DIAGRAM MW-2

Tharco
2222 Grant Avenue
San Lorenzo CA

PLATE
C-3
SHEET 1 OF 1

JOB NO.
7-282

SITE/LOCATION		BEGUN	BORING DIAMETER	ANGLE/BEARING	BORING NO
Tharco, San Lorenzo		3/25/94	8 Inches	90 Degrees	B-3
DRILLING CONTRACTOR		COMPLETED	FIRST ENCOUNTERED WATER DEPTH		BOTTOM OF BORING
Bayland Drilling		3/25/94	9 Feet (uncertain)		20.5 Feet
DRILL MAKE & MODEL	OPERATOR	LOGGED BY	STATIC WATER DEPTH/DATE		WELL NO.
CM 70	Adam Huajardo	Ruary Allan	5.34 Feet - 3/29/94		MW-3
WELL MATERIAL	SLOT SIZE	SAMPLING METHOD			BOTTOM OF WELL
2" SCH 40 PVC	0.020"	CA-modified split spoon			19 Feet
FILTER PACK	WELL SEAL				PLANNED USE
#2/12 sand	Neat cement over hydrated bentonite pellets				Monitoring

BLOWS/FOOT	PID FIELD HEADSPACE (ppm)	DEPTH	SAMPLE	WATER LEVEL	WELL CONSTR.	GRAPHIC LOG	MATERIAL CLASSIFICATION & PHYSICAL DESCRIPTION
		1					6" Concrete pad.
		2					
		3					
		4					
		5		▼			No sample collected at 4.5' - 5'; sampler blocked by cobble.
0		6					Lean CLAY (CL); dark gray; trace of medium to coarse grained sand; moist.
0		7					
		8					Lean CLAY (CL); dark gray, soft, high plasticity, salt crystals in cavities, red iron-staining, grading into light gray, firm, moderately plastic; trace of medium grained sand; wet.
	0	9		▽			
7		10					
		11					
		12					
		13					
		14					
14	0	15					Lean CLAY (CL); tan, stiff, moderate plasticity; approximately 30% silt; trace of fine grained sand.
		16					
		17					
	0	18					
		19					Poorly-graded SAND (SP); yellow to brown, 5 to 10% black organic material, fine grained, loose.
		20					

HYDRO-ENVIRONMENTAL TECHNOLOGIES, INC.

DATE: June 1, 1994

APPROVED BY: Gary Pischke, C.E.G.

SOIL BORING LOG AND WELL CONSTRUCTION DIAGRAM
MW-3

Tharco
2222 Grant Avenue
San Lorenzo CA

PLATE
C-4

SHEET 1 OF 1

JOB NO.
7-282

ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

5997 PARKSIDE DRIVE ♦ PLEASANTON, CALIFORNIA 94588 ♦ (415) 484-2600

DRILLING PERMIT APPLICATION

FOR APPLICANT TO COMPLETE

LOCATION OF PROJECT 2222 GRANT AVE
SAN LORENZO, CA

CLIENT
Name THARCO
Address 2222 GRANT Phone
City SAN LORENZO Zip 94580-8600

APPLICANT
Name HYDRO-ENVIRONMENTAL TECHNOLOGIES INC.
FAX (510) 521 2664
Address 2363 MARINER SQUARE Phone (510) 521 2664
City ALAMEDA Zip 94501

TYPE OF PROJECT

Well Construction		Geotechnical Investigation	
Cathodic Protection	___	General	___
Water Supply	___	Contamination	___
Monitoring	✓	Well Destruction	___

PROPOSED WATER SUPPLY WELL USE
Domestic ___ Industrial ___ Other ___
Municipal ___ Irrigation ___

DRILLING METHOD:
Mud Rotary ___ Air Rotary ___ Auger ✓
Cable ___ Other ___

DRILLER'S LICENSE NO. C57 370152

WELL PROJECTS
Drill Hole Diameter 8 in. Maximum
Casing Diameter 2 in. Depth 20 ft.
Surface Seal Depth 3 ft. Number 3

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

ESTIMATED STARTING DATE 3-25-94
ESTIMATED COMPLETION DATE 3-25-94

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

APPLICANT'S

FOR OFFICE USE

PERMIT NUMBER 94177
LOCATION NUMBER

PERMIT CONDITIONS

Circled Permit Requirements Apply

A. GENERAL
1. A permit application should be submitted so as arrive at the Zone 7 office five days prior proposed starting date.
2. Submit to Zone 7 within 60 days after completi of permitted work the original Department Water Resources Water Well Drillers Report equivalent for well projects, or drilling lo and location sketch for geotechnical projects.
3. Permit is void if project not begun within days of approval date.

(B.) WATER WELLS, INCLUDING PIEZOMETERS
1. Minimum surface seal thickness is two inches cement grout placed by tremie.
2. Minimum seal depth is 50 feet for municipal a industrial wells or 20 feet for domestic an irrigation wells unless a lesser depth specially approved. Minimum seal depth f monitoring wells is the maximum depth practicab or 20 feet.

C. GEOTECHNICAL. Backfill bore hole with compacted cu tings or heavy bentonite and upper two feet with co pacted material. In areas of known or suspect contamination, tremied cement grout shall be used place of compacted cuttings.

D. CATHODIC. Fill hole above anode zone with concre placed by tremie.

E. WELL DESTRUCTION. See attached.

Approved Wyman Hong Date 22 Mar 9
Wyman Hong

HYDRO-ENVIRONMENTAL TECHNOLOGIES, INC.

WELL WATER DEVELOPMENT DATA

Location: Tharco, 2222 Grant Avenue, San Lorenzo

Client: Tharco Date: 3-28-94

MW No.	DTW	DTB	Date Developed	Well Gallons Removed	Well Volume Removed	Remarks/Observations
MW-1	4.50	19.0	3-28	24	10	Remained highly turbid.
MW-2	4.80	19.0		23	10	
MW-3	5.18	19.0		23	10	

DTW = Depth to Water from T. C. (Top of PVC Casing – North Edge)

DTB = Depth to Bottom of Monitoring Well

PURGED/SAMPLED BY: R. ALLAN DATE: 3-29-94

GAUGING DATA:

Depth to bottom: 18.4 ft.

Depth to water: 5.41 ft.

Saturated Thickness: 12.99 ft.

Conversion	
diam.	gals/ft.
(2 in.)	x 0.16
4 in.	x 0.65
6 in.	x 1.44

Well casing volume 2.08 gallons

volumes to purge x ~~3~~ vols.

*Total volume to purge = 6½ gallons

* unless chemical parameters stabilize earlier

PURGING DATA:

Purge method: (PVC bailer) / Submersible pump / Suction lift pump / _____
(circle one)

Time	Volume (gallons)	Temp. (°F)	Conductivity (mS/cm)	pH
3.30	0			
	2	65.9	12.05	7.70
	4	65.1	11.93	7.77
	6½	65.4	11.81	7.69

Color: tan Turbidity: V. high

Recharge: good SPP ~~40~~ ft.

SAMPLING DATA:

Sampling method: (Dedicated bailer) / _____

Sample for: (circle)

(TPHg/BTEX) METALS TOG 8010

(TPHd) O-Pb TEL 8020

TPH mo Total Pb EDB 8240

601 602 Nitrates 8260 8270

Other: _____

HYDRO-ENVIRONMENTAL TECHNOLOGIES, INC.

MONITORING WELL PURGE/SAMPLE SHEET

WELL # MW-1

LOCATION Thasco, San Lorenzo

Job No. 7-282

SHEET 1 of 1

PURGED/SAMPLED BY: R. Allan DATE: 3-29-94

GAUGING DATA:

Depth to bottom: 17.75 ft.

Depth to water: 4.81 ft.

Saturated Thickness: 12.94 ft.

Conversion	
diam.	gals/ft.
2 in.	x 0.16
4 in.	x 0.65
6 in.	x 1.44

Well casing volume 2.07 gallons

volumes to purge x 3 vols.

*Total volume to purge = 6½ gallons

* unless chemical parameters stabilize earlier

PURGING DATA:

Purge method: PVC bailer/ Submersible pump/ Suction lift pump/ _____
(circle one)

Time	Volume (gallons)	Temp. (°F)	Conductivity (mS/cm)	pH
3:00	0			
	2	63.9	2.85	7.69
	4	63.8	2.79	7.59
	6½	63.6	2.32	7.59

Color: olive grey Turbidity: high

Recharge: good SPP 8 ft.

SAMPLING DATA:

Sampling method: Dedicated bailer / _____

Sample for: (circle)

TRHg/BTEX	METALS	TOG	8010
TPHd	O-Pb	TEL	8020
TPH mo	Total Pb	EDB	8240
601	602	Nitrates	8260 8270

Other: _____

HYDRO-ENVIRONMENTAL TECHNOLOGIES, INC.

MONITORING WELL PURGE/SAMPLE SHEET

WELL # MW-2

LOCATION Thrifty, San Lorenzo

Job No. 7-282

SHEET 1 of 1

PURGED/SAMPLED BY: R. Allan DATE: 3-29-94

GAUGING DATA:

Depth to bottom: 17.40 ft.

Depth to water: 5.34 ft.

Saturated Thickness: 12.06 ft.

Conversion	
diam.	gals/ft.
2 in.	x 0.16
4 in.	x 0.65
6 in.	x 1.44

Well casing volume 1.93 gallons

volumes to purge x 3 vols.

*Total volume to purge = 6 gallons

* unless chemical parameters stabilize earlier

PURGING DATA:

Purge method: (PVC bailer) / Submersible pump / Suction lift pump / _____ (circle one)

Time	Volume (gallons)	Temp. (°F)	Conductivity (mS/cm)	pH
2:30	0			
	2	71.0	12.51	7.30
	4	68.1	11.93	7.24
	6	66.5	11.40	7.17
	8	65.7	11.45	7.12

Color: olive-tan Turbidity: high

Recharge: moderate SPP 0 ft.

SAMPLING DATA:

Sampling method: (Dedicated bailer) / _____

Sample for: (circle)

(TPHg/BTEX)	METALS	TOG	8010	
(TPHd)	O-Pb	TEL	8020	
TPH mo	Total Pb	EDB	8240	
601	602	Nitrates	8260	8270

Other: _____

HYDRO-ENVIRONMENTAL TECHNOLOGIES, INC.

MONITORING WELL PURGE/SAMPLE SHEET

WELL # MW-3

LOCATION Chasco, San Lorenzo

Job No. 7-282

SHEET 1 of 1

PURGED/SAMPLED BY: RA DATE: 4-12-94

GAUGING DATA:

Depth to bottom: 15.82 ft.

Depth to water: 4.96 ft.

Saturated Thickness: 10.86 ft.

Conversion	
diam.	gals/ft.
~~2 in.~~	x 0.16
4 in.	x 0.65
6 in.	x 1.44

Well casing volume 1.74 gallons

volumes to purge x 3 vols.

*Total volume to purge = 5½ gallons

* unless chemical parameters stabilize earlier

PURGING DATA:

Purge method: PVC bailer/ Submersible pump/ Suction lift pump/ _____
(circle one)

Time	Volume (gallons)	Temp. (°F)	Conductivity (mS/cm)	pH
5.30	0			
	1½	69.9	1.98	8.07
	3½	67.9	2.03	7.90
5.37	5½	66.6	1.80	7.78

Color: gray-brown Turbidity: high

Recharge: fair SPP ∅ ft.

SAMPLING DATA:

Sampling method: Dedicated bailer _____

Sample for: (circle)

TPHg/BTEX	METALS	TOG	8010	
TPHd	O-Pb	TEL	8020	
TPH mo	Total Pb	EDB	8240	
601	602	Nitrates	8260	8270

Other: _____

HYDRO-ENVIRONMENTAL TECHNOLOGIES, INC.

MONITORING WELL PURGE/SAMPLE SHEET

WELL # MW-2

LOCATION Tharco, San Lorenzo

Job No. 7-282

SHEET 1 of 1

pace INCORPORATED
THE ASSURANCE OF QUALITY

REPORT OF LABORATORY ANALYSIS

Hydro-Evironmental
2363 Mariner Square Dr., Suite 243
Alameda, CA 94501

April 07, 1994
PACE Project Number: 44032850

Attn: Mr. Scott Kellstedt

Client Reference: Tharco/San Lorenzo 7-282

Parameter	Units	MDL		DATE ANALYZED
PACE Sample Number:			70 0294304	
Date Collected:			03/25/94	
Date Received:			03/28/94	
Client Sample ID:			B-1	
ORGANIC ANALYSIS				
PURGEABLE FUELS AND AROMATICS				
TOTAL FUEL HYDROCARBONS, (LIGHT):			-	04/01/94
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/kg wet	1000	ND	04/01/94
PURGEABLE AROMATICS (BTXE BY EPA 8020M):			-	04/01/94
Benzene	ug/kg wet	5.0	ND	04/01/94
Toluene	ug/kg wet	5.0	22	04/01/94
Ethylbenzene	ug/kg wet	5.0	ND	04/01/94
Xylenes, Total	ug/kg wet	5.0	ND	04/01/94
EXTRACTABLE FUELS EPA 3550/8015				
Extractable Fuels, as Diesel	mg/kg	5.0	ND	04/01/94
Date Extracted			03/30/94	

11 Digital Drive
Novato, CA 94949
TEL: 415-883-6100
FAX: 415-883-2673

REPORT OF LABORATORY ANALYSIS

April 07, 1994
PACE Project Number: 440328502

Client Reference: Tharco/San Lorenzo 7-282

PACE Sample Number:			70 0294312	
Date Collected:			03/25/94	
Date Received:			03/28/94	
Client Sample ID:			B-2	
Parameter	Units	MDL		DATE ANALYZED
ORGANIC ANALYSIS				
PURGEABLE FUELS AND AROMATICS				
TOTAL FUEL HYDROCARBONS, (LIGHT):			-	04/05/94
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/kg wet	80000	710000	04/05/94
PURGEABLE AROMATICS (BTXE BY EPA 8020M):			-	04/05/94
Benzene	ug/kg wet	400	2100	04/05/94
Toluene	ug/kg wet	400	3400	04/05/94
Ethylbenzene	ug/kg wet	400	2800	04/05/94
Xylenes, Total	ug/kg wet	400	5100	04/05/94
EXTRACTABLE FUELS EPA 3550/8015				
Extractable Fuels, as Diesel	mg/kg	5.0	200	04/01/94
Date Extracted			03/30/94	

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FAX: 415-883-2673

REPORT OF LABORATORY ANALYSIS

April 07, 1994
PACE Project Number: 440328502

Client Reference: Tharco/San Lorenzo 7-282

PACE Sample Number:			70 0294320	
Date Collected:			03/25/94	
Date Received:			03/28/94	
Client Sample ID:			B-3	
Parameter	Units	MDL		DATE ANALYZED
ORGANIC ANALYSIS				
PURGEABLE FUELS AND AROMATICS				
TOTAL FUEL HYDROCARBONS, (LIGHT):			-	04/02/94
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/kg wet	1000	ND	04/02/94
PURGEABLE AROMATICS (BTXE BY EPA 8020M):			-	04/02/94
Benzene	ug/kg wet	5.0	ND	04/02/94
Toluene	ug/kg wet	5.0	ND	04/02/94
Ethylbenzene	ug/kg wet	5.0	ND	04/02/94
Xylenes, Total	ug/kg wet	5.0	ND	04/02/94
EXTRACTABLE FUELS EPA 3550/8015				
Extractable Fuels, as Diesel	mg/kg	5.0	ND	04/01/94
Date Extracted			03/30/94	

These data have been reviewed and are approved for release.

Darrell C. Cain
Regional Director

11 Digital Drive
Novato, CA 94949
TEL: 415-883-6100
FAX: 415-883-2673

Client Reference: Tharco/San Lorenzo 7-282

MDL Method Detection Limit
ND Not detected at or above the MDL.

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REPORT OF LABORATORY ANALYSIS

QUALITY CONTROL DATA

April 07, 1994
PACE Project Number: 440328502

Client Reference: Tharco/San Lorenzo 7-282

EXTRACTABLE FUELS EPA 3550/8015
Batch: 70 29210
Samples: 70 0294304, 70 0294312, 70 0294320

METHOD BLANK:

Parameter	Units	MDL	Method Blank
Extractable Fuels, as Diesel	mg/kg	5.0	ND

LABORATORY CONTROL SAMPLE AND CONTROL SAMPLE DUPLICATE:

Parameter	Units	MDL	Reference Value	Recv	Dupl Recv	RPD
Extractable Fuels, as Diesel	mg/kg	5.0	33.3	79%	81%	3%

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Mr. Scott Kellstedt
Page 6

QUALITY CONTROL DATA

April 07, 1994
PACE Project Number: 44032850

Client Reference: Tharco/San Lorenzo 7-282

PURGEABLE FUELS AND AROMATICS
Batch: 70 29452
Samples: 70 0294320

METHOD BLANK:

Parameter	Units	MDL	Method Blank
TOTAL FUEL HYDROCARBONS, (LIGHT):			-
Purgeable Fuels, as Gasoline (EPA 8015M	ug/kg wet	1000	ND
PURGEABLE AROMATICS (BTXE BY EPA 8020M)			-
Benzene	ug/kg wet	5.0	ND
Toluene	ug/kg wet	5.0	ND
Ethylbenzene	ug/kg wet	5.0	ND
Xylenes, Total	ug/kg wet	5.0	ND

SPIKE AND SPIKE DUPLICATE:

Parameter	Units	MDL	700294320 B-3	Spike	Spike Recv	Spike Dupl Recv	RP
Benzene	ug/kg wet	5.0	ND	40.0	94%	85%	10
Toluene	ug/kg wet	5.0	ND	40.0	96%	84%	13
Ethylbenzene	ug/kg wet	5.0	ND	40.0	96%	85%	12
Xylenes, Total	ug/kg wet	5.0	ND	120	94%	83%	12

LABORATORY CONTROL SAMPLE AND CONTROL SAMPLE DUPLICATE:

Parameter	Units	MDL	Reference Value	Recv	Dupl Recv	RPD
Benzene	ug/kg wet	5.0	40.0	102%	96%	6
Toluene	ug/kg wet	5.0	40.0	101%	97%	4
Ethylbenzene	ug/kg wet	5.0	40.0	104%	98%	6
Xylenes, Total	ug/kg wet	5.0	120	101%	96%	5

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Mr. Scott Kellstedt
Page 7

QUALITY CONTROL DATA

April 07, 1994
PACE Project Number: 44032850

Client Reference: Tharco/San Lorenzo 7-282

PURGEABLE FUELS AND AROMATICS
Batch: 70 29461
Samples: 70 0294304, 70 0294312

METHOD BLANK:

Parameter	Units	MDL	Method Blank
TOTAL FUEL HYDROCARBONS, (LIGHT):			-
Purgeable Fuels, as Gasoline (EPA 8015M	ug/kg wet	1000	ND
PURGEABLE AROMATICS (BTXE BY EPA 8020M)			-
Benzene	ug/kg wet	5.0	ND
Toluene	ug/kg wet	5.0	ND
Ethylbenzene	ug/kg wet	5.0	ND
Xylenes, Total	ug/kg wet	5.0	ND

SPIKE AND SPIKE DUPLICATE:

Parameter	Units	MDL	700292492	Spike	Spike Recv	Spike Dupl Recv	RP
Purgeable Fuels, as Gasoline (EPA 8015M	ug/kg wet	1000	ND	5000	85%	76%	11

LABORATORY CONTROL SAMPLE AND CONTROL SAMPLE DUPLICATE:

Parameter	Units	MDL	Reference Value	Recv	Dupl Recv	RPD
Purgeable Fuels, as Gasoline (EPA 8015M	ug/kg wet	1000	5000	87%	86%	1

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FAX: 415-883-2673

Client Reference: Tharco/San Lorenzo 7-282

MDL	Method Detection Limit
ND	Not detected at or above the MDL.
RPD	Relative Percent Difference

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Novato, CA 94949
TEL: 415-883-6100
FAX: 415-883-2673

CHAIN OF CUSTODY RECORD

SAMPLER

Printed Name: RUARY ALLAN

Signature: Ruary Allan

DELIVER TO: PACE, INC

ATTENTION:

SEND RESULTS TO:

HYDRO-ENVIRONMENTAL TECHNOLOGIES, INC.
2363 MARINER SQUARE DR., SUITE 243
ALAMEDA, CA 94501
(510) 521-2684, (FAX) 521-5078
ATTENTION: SCOTT KELLSTEDT

SEND INVOICE TO: AS ABOVE

HETICAL JOB No.: 7-252

Relenquished by: (Signature)	Received by: (Signature)	Date	Time
Ruary Allan	Ed Kelly-Pace	3/28/94	945
Relenquished by: Ed Kelly-Pace	Received by: Shirley Grover	3/28/94	1100
Relenquished by:	Received by: LABORATORY Pace		

PROJECT NAME: Tharco / San Lorenzo

PAGE 1 OF 1

Sample Number	DATE & TIME	No. & Type Container	Analysis Requested: TPHg+BTEX (DHS mod)	Analysis Requested: TPHd (DHS mod)	Analysis Requested: Organic Lead	Lab Remarks
B-1	3-25-94	6" Brass	X	X		29430.4
B-2	↓	↓	X	X		29431.2
B-3	↓	↓	X	X		29432.0

Special Instructions:

Turnaround:

- ☐ 5 DAY
- ☒ 10 DAY
- ☐ 72 HOURS
- ☐ 24 HOURS

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THE ASSURANCE OF QUALITY

REPORT OF LABORATORY ANALYSIS

Hydro-Evironmental
2363 Mariner Square Dr., Suite 243
Alameda, CA 94501

April 12, 1994
PACE Project Number: 440330509

Attn: Mr. Scott Kellstedt

Client Reference: Tharco/7-282

PACE Sample Number:			70 0295491	
Date Collected:			03/29/94	
Date Received:			03/30/94	
			MW-1	
Parameter	Units	MDL		DATE ANALYZED
ORGANIC ANALYSIS				
PURGEABLE FUELS AND AROMATICS			-	04/01/94
TOTAL FUEL HYDROCARBONS, (LIGHT):				
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/L	50	ND	04/01/94
PURGEABLE AROMATICS (BTXE BY EPA 8020M):			-	04/01/94
Benzene	ug/L	0.5	2.4	04/01/94
Toluene	ug/L	0.5	ND	04/01/94
Ethylbenzene	ug/L	0.5	ND	04/01/94
Xylenes, Total	ug/L	0.5	0.6	04/01/94
EXTRACTABLE FUELS EPA 3510/8015				
Extractable Fuels, as Diesel	mg/L	0.05	0.05	04/05/94
Date Extracted			04/01/94	

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FAX: 415-883-2673

REPORT OF LABORATORY ANALYSIS

April 12, 1994
PACE Project Number: 44033050

Client Reference: Tharco/7-282

PACE Sample Number:			70 0295505	
Date Collected:			03/29/94	
Date Received:			03/30/94	
Client Sample ID:			MW-2	
Parameter	Units	MDL		DATE ANALYZED
ORGANIC ANALYSIS				
PURGEABLE FUELS AND AROMATICS				
TOTAL FUEL HYDROCARBONS, (LIGHT):			-	04/04/94
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/L	50	460	04/04/94
PURGEABLE AROMATICS (BTXE BY EPA 8020M):			-	04/04/94
Benzene	ug/L	0.5	8.4	04/04/94
Toluene	ug/L	0.5	0.6	04/04/94
Ethylbenzene	ug/L	0.5	3.4	04/04/94
Xylenes, Total	ug/L	0.5	1.6	04/04/94

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THE ASSURANCE OF QUALITY

REPORT OF LABORATORY ANALYSIS

Mr. Scott Kellstedt
Page 3

April 12, 1994
PACE Project Number: 440330509

Client Reference: Tharco/7-282

PACE Sample Number:			70 0295513	
Date Collected:			03/29/94	
Date Received:			03/30/94	
Client Sample ID:			MW-3	
Parameter	Units	MDL		DATE ANALYZED
ORGANIC ANALYSIS				
PURGEABLE FUELS AND AROMATICS				
TOTAL FUEL HYDROCARBONS, (LIGHT):			-	04/01/94
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/L	50	ND	04/01/94
PURGEABLE AROMATICS (BTXE BY EPA 8020M):			-	04/01/94
Benzene	ug/L	0.5	ND	04/01/94
Toluene	ug/L	0.5	ND	04/01/94
Ethylbenzene	ug/L	0.5	ND	04/01/94
Xylenes, Total	ug/L	0.5	ND	04/01/94
EXTRACTABLE FUELS EPA 3510/8015				
Extractable Fuels, as Diesel	mg/L	0.05	0.08	04/05/94
Date Extracted			04/01/94	

These data have been reviewed and are approved for release.

Gabriel J. LaBonne for

Darrell C. Cain
Regional Director

11 Digital Drive
Novato, CA 94949
TEL: 415-883-6100
FAX: 415-883-2673

Client Reference: Tharco/7-282

MDL Method Detection Limit
ND Not detected at or above the MDL.

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Mr. Scott Kellstedt
Page 5

QUALITY CONTROL DATA

April 12, 1994
PACE Project Number: 44033050

Client Reference: Tharco/7-282

EXTRACTABLE FUELS EPA 3510/8015
Batch: 70 29462
Samples: 70 0295491, 70 0295513

METHOD BLANK AND SAMPLE DUPLICATE:

Parameter	Units	MDL	Method Blank	700295297	Duplicate of 70 0295297	RPI
Extractable Fuels, as Diesel	mg/L	0.05	ND	0.06	ND	NC
n-Pentacosane (Surrogate Recovery)	%			88	87	1

LABORATORY CONTROL SAMPLE AND CONTROL SAMPLE DUPLICATE:

Parameter	Units	MDL	Reference Value	Recv	Dupl Recv	RPD
Extractable Fuels, as Diesel	mg/L	0.05	1.00	95%	77%	21

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Mr. Scott Kellstedt
Page 6

QUALITY CONTROL DATA

April 12, 1994
PACE Project Number: 44033050S

Client Reference: Tharco/7-282

PURGEABLE FUELS AND AROMATICS
Batch: 70 29418
Samples: 70 0295491, 70 0295513

METHOD BLANK:

Parameter	Units	MDL	Method Blank
TOTAL FUEL HYDROCARBONS, (LIGHT):			-
Purgeable Fuels, as Gasoline (EPA 8015M	ug/L	50	ND
PURGEABLE AROMATICS (BTXE BY EPA 8020M)			-
Benzene	ug/L	0.5	ND
Toluene	ug/L	0.5	ND
Ethylbenzene	ug/L	0.5	ND
Xylenes, Total	ug/L	0.5	ND

SPIKE AND SPIKE DUPLICATE:

Parameter	Units	MDL	700294711	Spike	Spike Recv	Spike Dupl Recv	RPI
Benzene	ug/L	0.5	ND	100	97%	93%	4%
Toluene	ug/L	0.5	ND	100	95%	93%	2%
Ethylbenzene	ug/L	0.5	ND	100	100%	96%	4%
Xylenes, Total	ug/L	0.5	ND	300	100%	96%	4%

LABORATORY CONTROL SAMPLE AND CONTROL SAMPLE DUPLICATE:

Parameter	Units	MDL	Reference Value	Recv	Dupl Recv	RPD
Benzene	ug/L	0.5	100	90%	90%	0%
Toluene	ug/L	0.5	100	91%	91%	0%
Ethylbenzene	ug/L	0.5	100	92%	92%	0%
Xylenes, Total	ug/L	0.5	300	93%	93%	0%

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REPORT OF LABORATORY ANALYSIS

Mr. Scott Kellstedt
Page 7

QUALITY CONTROL DATA

April 12, 1994
PACE Project Number: 44033050

Client Reference: Tharco/7-282

PURGEABLE FUELS AND AROMATICS
Batch: 70 29471
Samples: 70 0295505

METHOD BLANK:

Parameter	Units	MDL	Method Blank
TOTAL FUEL HYDROCARBONS, (LIGHT):			-
Purgeable Fuels, as Gasoline (EPA 8015M	ug/L	50	ND
PURGEABLE AROMATICS (BTXE BY EPA 8020M)			-
Benzene	ug/L	0.5	ND
Toluene	ug/L	0.5	ND
Ethylbenzene	ug/L	0.5	ND
Xylenes, Total	ug/L	0.5	ND

SPIKE AND SPIKE DUPLICATE:

Parameter	Units	MDL	700295777	Spike	Spike Recv	Spike Dupl Recv	R
Purgeable Fuels, as Gasoline (EPA 8015M	ug/L	50	140	1000	77%	83%	

LABORATORY CONTROL SAMPLE AND CONTROL SAMPLE DUPLICATE:

Parameter	Units	MDL	Reference Value	Recv	Dupl Recv	RP
Purgeable Fuels, as Gasoline (EPA 8015M	ug/L	50	1000	89%	83%	

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Client Reference: Tharco/7-282

MDL	Method Detection Limit
NC	No calculation due to value below detection limit.
ND	Not detected at or above the MDL.
RPD	Relative Percent Difference

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150727

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CHAIN-OF-CUSTODY RECORD
Analytical Request

Client: HYDRO-ENVIRON'L TECH, INC.
Address: 2363 MARINER SQ DR #243, ALAMEDA CA 94501
Phone: (510) 521-2684

Report To: HETI / KELLSTEDT
Bill To: HETI
P.O. # / Billing Reference: 7-282
Project Name / No.: Tharco / 7-282

Pace Client No.:
Pace Project Manager: Jim Oys
Pace Project No: 440330.559
*Requested Due Date: STANDARD T.A.T.

Sampled By (PRINT): RUARY ALLAN
Sampler Signature: Ruary Allan
Date Sampled: 3-29-94

ITEM NO.	SAMPLE DESCRIPTION	TIME	MATRIX	PACE NO.	NO. OF CONTAINERS	PRESERVATIVES: UNPRESERVED	H_2SO_4	HNO_3	VOA HCl per label 3/30.	ANALYSES REQUEST: TPH-g/BTEX	TPH-d	REMARKS
1	MW-1		H_2O	29549.1	4	1			3	X	X	Most samples slightly effervescent.
2	MW-2			29550.5								
3	MW-3			29551.3								
4												
5												
6												
7												
8												

Diesel fraction lost due to lab. accident. No results can be provided. Client notified verbally 4/11/94. RDL

COOLER NOS.	BAILERS	SHIPMENT METHOD OUT / DATE	SHIPMENT METHOD RETURNED / DATE

Additional Comments: 9|3, R|3

ITEM NUMBER	RELINQUISHED BY / AFFILIATION	ACCEPTED BY / AFFILIATION	DATE	TIME
All	Ruary Allan HETI	K. Kellstedt	3/29/94	5pm
"	K. Kellstedt	Donald Johanson Pace	3/30/94	KH3
	Donald Johanson Pace	Theresa Loverstall	3/30/94	1545

ORIGINAL

SEE REVERSE SIDE FOR INSTRUCTIONS

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REPORT OF LABORATORY ANALYSIS

HYDRO ENVIRONMENTAL
2363 Mariner Square Dr. #263
ALAMEDA, CA 94501

April 20, 1994
PACE Project Number: 44041351

Attn: Mr. Ruary Allan

Client Reference: THARCO

PACE Sample Number:			70 0302803	
Date Collected:			04/12/94	
Date Received:			04/13/94	
			MW-2	
Parameter	Units	MDL		DATE ANALYZED
ORGANIC ANALYSIS				
EXTRACTABLE FUELS EPA 3510/8015			HB	
Extractable Fuels, as Diesel	mg/L	0.05	1.0	04/18/94
Date Extracted			04/15/94	

These data have been reviewed and are approved for release.

Darrell C. Cain
Regional Director

11 Digital Drive
Novato, CA 94949
TEL: 415-883-6100
FAX: 415-883-2673

Mr. Ruary Allan
Page 2

FOOTNOTES
for page 1

April 20, 1994
PACE Project Number: 440413514

Client Reference: THARCO

HB High boiling point hydrocarbons are present in sample.
MDL Method Detection Limit

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REPORT OF LABORATORY ANALYSIS

Mr. Ruary Allan
Page 3

QUALITY CONTROL DATA

April 20, 1994
PACE Project Number: 44041351

Client Reference: THARCO

EXTRACTABLE FUELS EPA 3510/8015
Batch: 70 29764
Samples: 70 0302803

METHOD BLANK:

Parameter	Units	MDL	Method Blank
Extractable Fuels, as Diesel	mg/L	0.05	ND

LABORATORY CONTROL SAMPLE AND CONTROL SAMPLE DUPLICATE:

Parameter	Units	MDL	Reference Value	Recv	Dupl Recv	RPD
Extractable Fuels, as Diesel	mg/L	0.05	1.00	70%	51%	31

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FAX: 415-883-2673

Mr. Ruary Allan
Page 4

FOOTNOTES
for page 3

April 20, 1994
PACE Project Number: 44041351

Client Reference: THARCO

MDL	Method Detection Limit
ND	Not detected at or above the MDL.
RPD	Relative Percent Difference

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pace INCORPORATED
THE ASSURANCE OF QUALITY

150733

440413.514

CHAIN-OF-CUSTODY RECORD
Analytical Request

Client: HYDRO-ENVIRONMENTAL TECH. INC.
Address: 2363 MARINER SQ DR #243, ALAMEDA CA, 94501
Phone: (510) 521-2682

Report To: HETI
Bill To: HETI
P.O. # / Billing Reference: 7-282
Project Name / No.: THARCO

Pace Client No.
Pace Project Manager
Pace Project No.
*Requested Due Date:

Sampled By (PRINT): RUARY ALLAN
Sampler Signature: Ruary Allan
Date Sampled: 4-12-94

ITEM NO.	SAMPLE DESCRIPTION	TIME	MATRIX	PACE NO.	NO. OF CONTAINERS	PRESERVATIVES: UNPRESERVED	H_2SO_4	HNO_3	VOA	ANALYSES REQUEST: TPHd	REMARKS
1	MW-2	5PM	H_2O	30280.3		X				X	Ph ~ 7
2											
3											
4											
5											
6											
7											
8											

COOLER NOS.	BAILERS	SHIPMENT METHOD OUT / DATE	SHIPMENT METHOD RETURNED / DATE	ITEM NUMBER	RELINQUISHED BY / AFFILIATION	ACCEPTED BY / AFFILIATION	DATE	TIME
				1	Ruary Allan Poco	Elliott Ikze	4/13/94	1230
					Elliott	Linda Post PACO	4/13/94	1730

Additional Comments

REPLACEMENT FOR SAMPLE LOST AT LAB.

SEE REVERSE SIDE FOR INSTRUCTIONS