SUPPLEMENTAL SITE INVESTIGATION PLAN

BECK ROOFING

HAYWARD, CALIFORNIA

Prepared For:

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21123 Meekland Avenue
Hayward, California 94541

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March 19, 1993

TABLE OF CONTENTS

SECTION	PAGE
1.0 INTRODUCTION	1
2.0 BACKGROUND	1
2.1 UST Removal	1
2.2 Soil and Groundwater Investigation	3
2.3 Quarterly Progress Report #1 (to December 31, 1991)	5
2.4 Quarterly Progress Report #2 (to March 31, 1992)	5
2.5 Quarterly Progress Report #3 (to September 30, 1992)	6
2.6 Analytical Results from January 22, 1993	7
2.7 Backfilling	7
2.8 Monitor Well Survey	7
3.0 OBJECTIVES AND SCOPE OF SSIP	10
4.0 SOIL BORING AND SAMPLING	15
5.0 GROUNDWATER MONITORING WELL	16
6.0 HEALTH AND SAFETY	17
7.0 SCHEDULE	17

TABLES

TABLE 1: Groundwater Sampling Analytical Results	8
TABLE 2: Groundwater Elevation Data	11

FIGURES

FIGURE 1: Site Location Map
FIGURE 2: Site Map
FIGURE 3: Groundwater Elevations - September 9, 1992
FIGURE 4: Groundwater Elevations - January 22, 1993
FIGURE 5: Proposed SSIP Boring and Monitoring Well Location

APPENDICES

APPENDIX A: Land Survey
APPENDIX B: Methodology
APPENDIX C: Health and Safety Plan

1.0 INTRODUCTION

Clement International Corporation (Clement) has been contracted by Beck Roofing (Beck) to evaluate the degree and nature of soil and groundwater contamination at their property in Hayward, California. Clement's work follows that previously done by other consultants at the site, as described below. Because the site is in Alameda County it is under the jurisdiction of the Alameda County Health Care Services, Department of Environmental Health (DEH), Hazardous Materials Division. This document represents a Supplemental Site Investigation Plan (SSIP), the purpose of which is to further delineate the vertical and lateral extent of soil contamination at the property. This conforms to the requirements of DEH's June 18, 1992 letter to Beck Roofing with regard to additional soil investigations at the site.

2.0 BACKGROUND

The Beck Roofing site is located at 21123 Meekland Avenue, Hayward, Alameda County, California. Figure 1 depicts the site location. The site formerly housed a 1,000-gallon capacity underground storage tank (UST) that was used to store gasoline. Soil and groundwater investigations at the site have indicated that gasoline-range petroleum hydrocarbons, including benzene, are present in the subsurface in both media. The previous investigations performed at the site are summarized below prior to presenting the details of the proposed SSIP.

2.1 UST Removal

Beck Roofing had its 1,000-gallon gasoline UST tightness-tested on January 11, 1990 by R.L. Stevens Co., who reported that the tank system was "tight at this time". About 16 months later, on May 20, 1991, the UST was removed from the yard at Beck Roofing by R.L. Stevens Co., who subcontracted with Blaine Tech Services (Blaine) to collect the post-excavation soil samples. According to their June 4, 1991 report, Blaine collected a post-excavation soil sample from beneath either end of the former UST location and a

FIGURE 1

SITE LOCATION MAP

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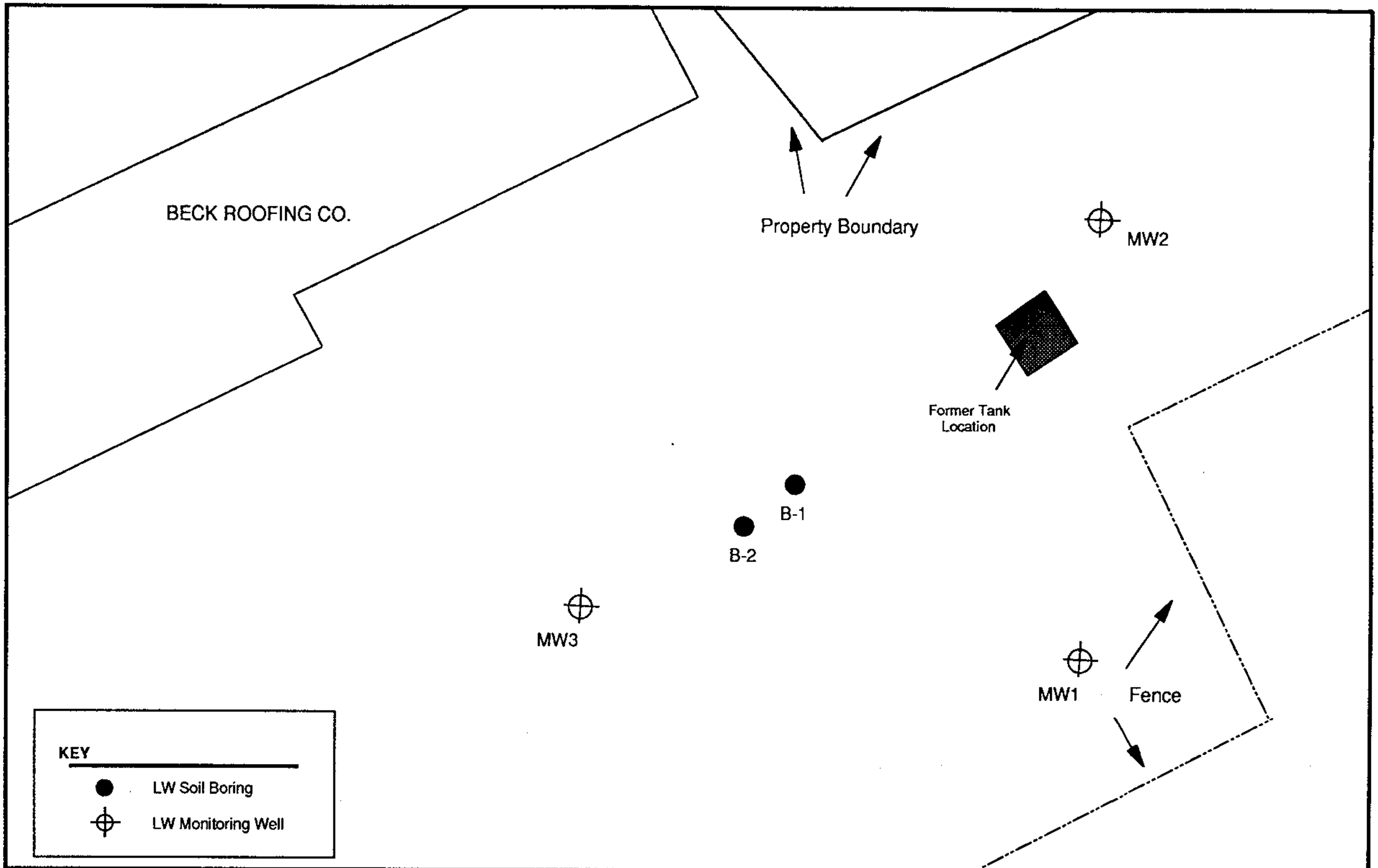
composite soil sample from the stockpile of excavated material. The UST was inspected on removal and Blaine reported "two small holes in the bottom of the tank at each end".

The laboratory results showed that the two samples taken from under the tank were contaminated with 1,300 ppm and 1,800 ppm of gasoline-range hydrocarbons, exceeding the commonly-applied state action level for hydrocarbons of 100 ppm. Benzene, toluene, ethylbenzene, and xylenes (BTEX - aromatic hydrocarbons characteristic of gasoline) were also detected at concentrations above state action levels in addition to minor amounts of organic lead (less than 1 ppm). The composite stockpile soil sample contained 11 ppm of gasoline-range hydrocarbons and no organic lead (it was not analyzed for BTEX compounds). The results indicated that a release of gasoline from the tank to the surrounding soil had potentially occurred.

2.2 Soil and Groundwater Investigation

In an August 5, 1991 letter, the DEH required that further investigation of soils and groundwater be carried out at the former gasoline UST site. Beck Roofing contracted the work to LW Environmental Services Inc. (LW), San Francisco, CA. LW prepared a work plan, dated October 10, 1991, and a work plan addendum, dated October 29, 1991.

The work plan and addendum basically involved excavation of gasoline-contaminated soil, drilling and sampling two soil borings (B-1 and B-2), and the installation and sampling of three groundwater monitoring wells (MW1, MW2, and MW3). The borings and wells were completed on October 30 and 31, 1991. Figure 2 shows the Beck Roofing site and the locations of the excavation, soil borings, and monitoring wells. Two phases of additional soil excavation took place on October 30, 1991 and on November 6 and 7, 1991. During this work, 20 post-excavation soil samples and 34 soil boring samples were collected. All samples were analyzed for gasoline-range hydrocarbons (TPH-G), BTEX, and organic lead. In addition, two of the post-excavation samples were analyzed for total oil and grease. Three groundwater samples were collected on November 4, 1991 and analyzed



Approximate Scale 1" = 20"

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FIGURE 2
SITE MAP
BECK ROOFING CO. - 21123 MEEKLAND AVE.
HAYWARD, CALIFORNIA

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file:\beck\	bkst-map.drw
job no.:	05085-001-00
drawn by:	rhc
approved:	cgw
date:	02-25-93

for the same three chemical parameters. The data generated during the work was presented by LW in their Quarterly Progress Report #1, dated January 7, 1992.

2.3 Quarterly Progress Report #1 (to December 31, 1991)

The analytical results from the post-excavation sampling at the former UST location indicated that the limits of soil contamination had not been defined and that further remedial excavation would be necessary. Although the analytical results for the soil samples collected from the two borings and three wells showed constituent concentrations below applicable state action levels for 32 of 34 samples, samples from 25 feet and 30 feet in boring B-2 showed slightly elevated levels of benzene (0.44 ppm and 0.27 ppm vs. action level of 0.3 ppm) and xylenes (1.8 ppm and 2.1 ppm vs. action level of 1.0 ppm). However, each of the groundwater samples was free of all analytes. State action levels are determined by the California Water Resources Control Board.

2.4 Quarterly Progress Report #2 (to March 31, 1992)

A second round of groundwater samples was collected on December 23, 1991; a third on January 22, 1992; and a fourth on February 24, 1992. The groundwater sampling and monitoring was in response to the DEH's August 5, 1991 letter. In addition, in an effort to remove the remaining contaminated soil, a third phase of excavation was undertaken at the UST site on January 30, 1992. Eight post-excavation soil samples were collected following the Phase 3 work and analyzed, as before, for TPH-G, BTEX, and organic lead.

Eight soil samples collected from the Phase 3 excavation contained TPH-G ranging from below detection limit to 3,820 ppm and from below detection limit to 16 ppm of benzene. Toluene was detected between 0.15 ppm and 180 ppm, ethylbenzene ranged from below detection limit to 16 ppm, and xylene was detected between 0.005 ppm and 440 ppm. In addition, soil samples contained lead ranging from below detection limit to 10.8 ppm.

The third excavation phase failed to define the limits, either laterally or vertically, of the soil contamination. With the exception of two samples, six samples contained concentrations of petroleum hydrocarbons above applicable state action levels, in excess of 1,000 ppm.

The results of the second groundwater sampling round (December 23, 1991) indicated that wells MW1 and MW2 were uncontaminated. MW3, though, contained 0.150 ppm TPH-G, 0.060 ppm benzene, and trace amounts of toluene, ethylbenzene, and xylenes. The results of the third groundwater sampling round (January 22, 1992) indicated that all three wells were contaminant-free. However, the fourth sampling round (February 24, 1992) produced results that showed petroleum hydrocarbon contamination in each well, with a maximum TPH-G value of 4.36 ppm in the sample from MW3. The results of the most recent sampling round (September 9, 1992) show increased concentrations of TPH-G and benzene in MW3.

2.5 Quarterly Progress Report #3 (to September 30, 1992)

In the third quarter, groundwater samples were collected and analyzed in June 16, July 15, August 13, and September 9, 1992. Sampling results collected from MW1 in June and July revealed trace levels of benzene, 0.0005 ppm and 0.0013 ppm, respectively. No other chemicals were detected in MW1 from the four sampling rounds. MW2 contained benzene at concentrations ranging from 0.0028 (September) to 0.024 (July) in addition to 0.05 ppm of TPH-G (July). No other chemicals were detected in MW2 during this period. Analytical results from samples collected in MW3 revealed increasing levels of TPH-G and benzene. TPH-G was detected in MW3 at concentrations ranging from 4.90 ppm (June) to 7.40 ppm (September). Benzene was detected at concentrations ranging from 0.770 ppm (June) to 1.20 ppm (September). Toluene, ethylbenzene, and total xylenes, if detected, were present at concentrations below 0.03 ppm. The third quarter groundwater monitoring report summarizes the results of the third quarter in addition to the previous sampling rounds.

2.6 Analytical Results from January 22, 1993

At the time of this report, groundwater samples collected in January 22, 1993 have been analyzed. Analytical results revealed non detects and 0.0043 ppm of benzene in samples collected from MW1 and MW2, respectively. No other chemicals were detected in MW2. MW3 contained 13.0 ppm TPH-G, 2.0 ppm benzene, 0.0032 ppm toluene, 0.280 ppm ethylbenzene, and 0.980 ppm total xylenes. Table 1 presents a summary of the analytical results from groundwater samples collected to date.

2.7 Backfilling

After the third excavation phase on January 30, 1992, the enlarged excavation was backfilled with 189 cubic yards of "Controlled Density Fill", which was described by LW as "a proprietary material composed of cement, sand, water and fly ash ..." LW did not do any further work at the site following the backfilling.

2.8 Monitor Well Survey

As requested by the DEH, in a letter dated November 24, 1992, the monitoring wells were surveyed to a benchmark mean sea level (MSL) elevation at the corners of Grove Way and Meekland Avenue, as established by the Unites States Department of Interior Geological Survey (USGS), by a licensed land surveyor in December 1992. The survey data is presented in Appendix A.

It should be noted that there are minor differences with respect to the well locations and well elevations between the December 1992 survey and from information contained in LW's investigative reports. This document which includes information pertaining to the well locations and elevations, are based on the December 1992 survey.

TABLE 1 GROUNDWATER SAMPLING ANALYTICAL RESULTS

WELL	Sample Date	TPH-G	Benzene	Toluene	Ethylbenzene	Total Xylenes	Lead
MW1	11/04/91	ND	ND	ND	ND	ND	ND
MW1	12/23/91	ND	ND	ND	ND	ND	ND
MW1	01/22/92	ND	ND	ND	ND	ND	ND
MW1	02/24/92	0.09	0.0004	0.001	ND	ND	ND
MW1	**06/16/92**	**ND**	**0.0005**	**ND**	**ND**	**ND**	**ND**
MW1	**07/15/92**	**ND**	**0.0013**	**ND**	**ND**	**ND**	**ND**
MW1	**08/13/92**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**
MW1	**09/09/92**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**
MW1	**01/22/93**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**

WELL	Sample Date	TPH-G	Benzene	Toluene	Ethylbenzene	Total Xylenes	Lead
MW2	11/04/91	ND	ND	ND	ND	ND	ND
MW2	12/23/91	ND	ND	ND	ND	ND	ND
MW2	01/22/92	ND	ND	ND	ND	ND	ND
MW2	02/24/92	0.33	0.11	0.002	ND	0.0009	ND
MW2	**06/16/92**	**ND**	**0.0077**	**ND**	**ND**	**ND**	**ND**
MW2	**07/15/92**	**0.05**	**0.024**	**ND**	**ND**	**ND**	**ND**
MW2	**08/13/92**	**ND**	**0.0065**	**ND**	**ND**	**ND**	**ND**
MW2	**09/09/92**	**ND**	**0.0028**	**ND**	**ND**	**ND**	**ND**
MW2	**01/22/93**	**ND**	**0.0043**	**ND**	**ND**	**ND**	**ND**

All analytical results in parts per million (ppm).
TPH-G: Total Petroleum Hydrocarbons as Gasoline
ND: Non Detect

TABLE 1 GROUNDWATER SAMPLING ANALYTICAL RESULTS (continued)

WELL	Sample Date	TPH-G	Benzene	Toluene	Ethylbenzene	Total Xylenes	Lead
MW3	11/04/91	ND	ND	ND	ND	ND	ND
MW3	12/23/91	0.15	0.06	0.0005	0.0006	0.0097	ND
MW3	01/22/92	ND	ND	ND	ND	ND	ND
MW3	02/24/92	4.36	0.710	0.016	0.069	0.4	ND
MW3	**06/16/92**	**4.90**	**0.770**	**ND**	**0.061**	**0.240**	**ND**
MW3	**07/15/92**	**5.50**	**0.840**	**0.010**	**0.085**	**0.290**	**ND**
MW3	**08/13/92**	**6.60**	**1.10**	**ND**	**0.097**	**0.270**	**ND**
MW3	**09/09/92**	**7.40**	**1.20**	**0.0077**	**0.095**	**0.170**	**ND**
MW3	**01/22/93**	**13.0**	**2.0**	**0.032**	**0.280**	**0.980**	**ND**

All analytical results in parts per million (ppm).
TPH-G: Total Petroleum Hydrocarbons as Gasoline
ND: Non Detect

3.0 OBJECTIVES AND SCOPE OF SSIP

Based upon the results from the investigations to date, there are two objectives of the supplemental site investigation. The first is to delineate the horizontal extent and vertical depth of soil contamination at the Beck Roofing site. Second, to explore the extent of groundwater contamination downgradient from MW3.

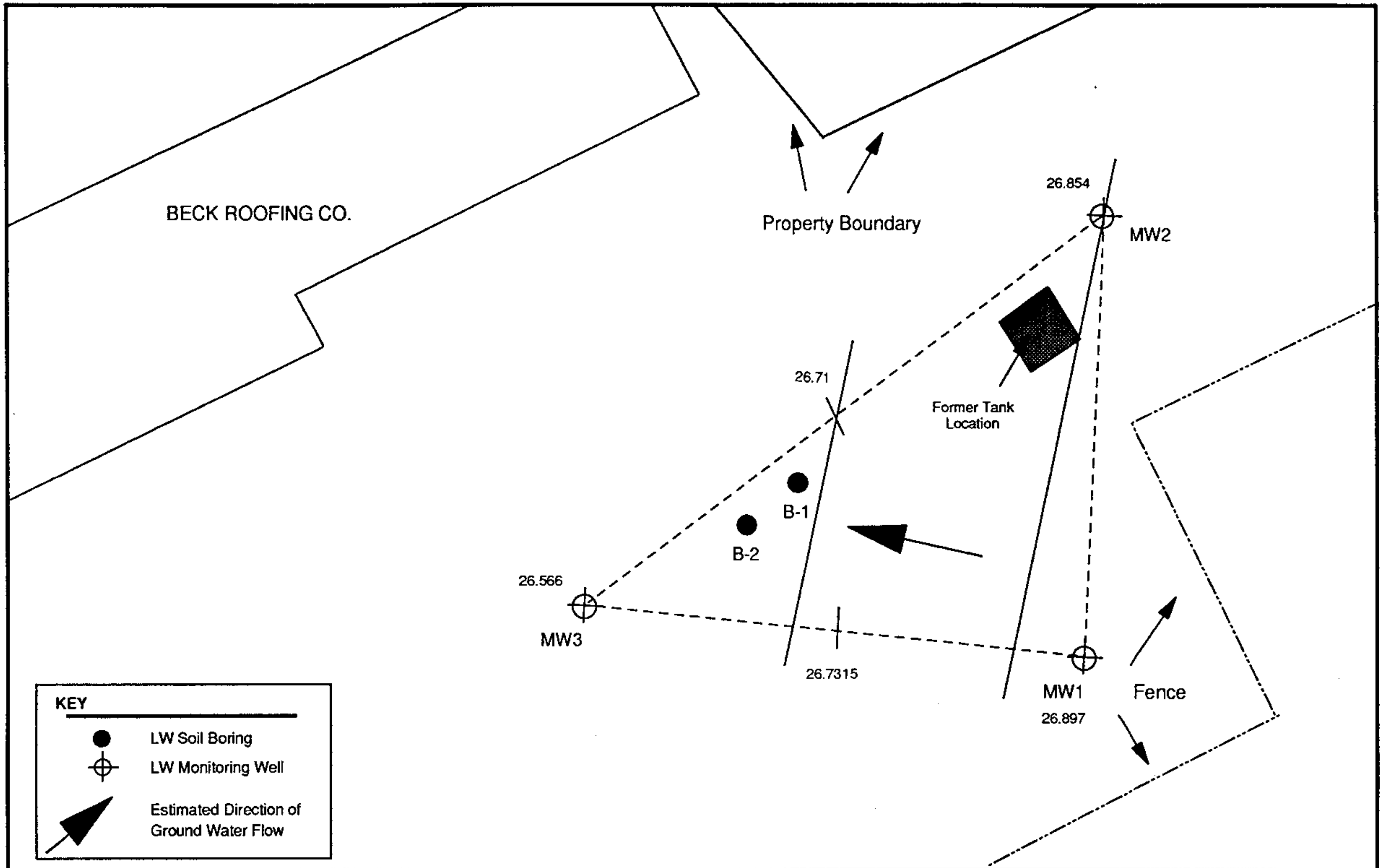
The scope of the supplemental soils investigation consists of drilling and sampling four additional soil borings in the vicinity of the former gasoline UST location. These borings will be located within the area bounded by the previously-drilled MW1, MW2, MW3, B-1, and B-2, none of which showed soil contaminant concentrations (as TPH-G) above the state action level of 100 ppm. (However, soil samples collected from a depth of 25 feet in boring B-2 showed slightly elevated levels of benzene (0.44 ppm vs. action level of 0.3 ppm)). The four borings will be located around the perimeter of the former tank location. Soil samples will be collected from each boring and analyzed for TPH-G, BTEX, and organic lead, in conformance with applicable State and County guidelines.

Based on recent hydrologic data (September 1992, and January 1993), as shown below in Table 2, and groundwater contour maps (Figures 3 and 4), a monitoring well will be installed downgradient from MW3 and will be located as close to the property line as possible. Historical groundwater levels are presented in the third quarter monitoring report. Figure 5 shows the proposed locations of the four soil borings and the monitoring well.

TABLE 2 GROUNDWATER ELEVATION DATA

WELL	SAMPLE DATE	TOP OF CASING *	DEPTH TO GROUNDWATER	GROUNDWATER ELEVATION
MW1	09/09/92	58.547	31.65	26.897
MW1	01/22/93	58.547	27.9	30.647
MW2	09/09/92	58.654	31.8	26.854
MW2	01/22/93	58.654	28.0	30.654
MW3	09/09/92	58.516	31.95	26.566
MW3	01/22/93	58.516	28.5	30.016

* Based on December monitoring well survey.
All Groundwater Levels in Feet (ft)



Approximate Scale 1" = 20"

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FIGURE 3
GROUND WATER ELEVATIONS * - SEPTEMBER 9, 1992
BECK ROOFING CO. - 21123 MEEKLAND AVE.
HAYWARD, CALIFORNIA

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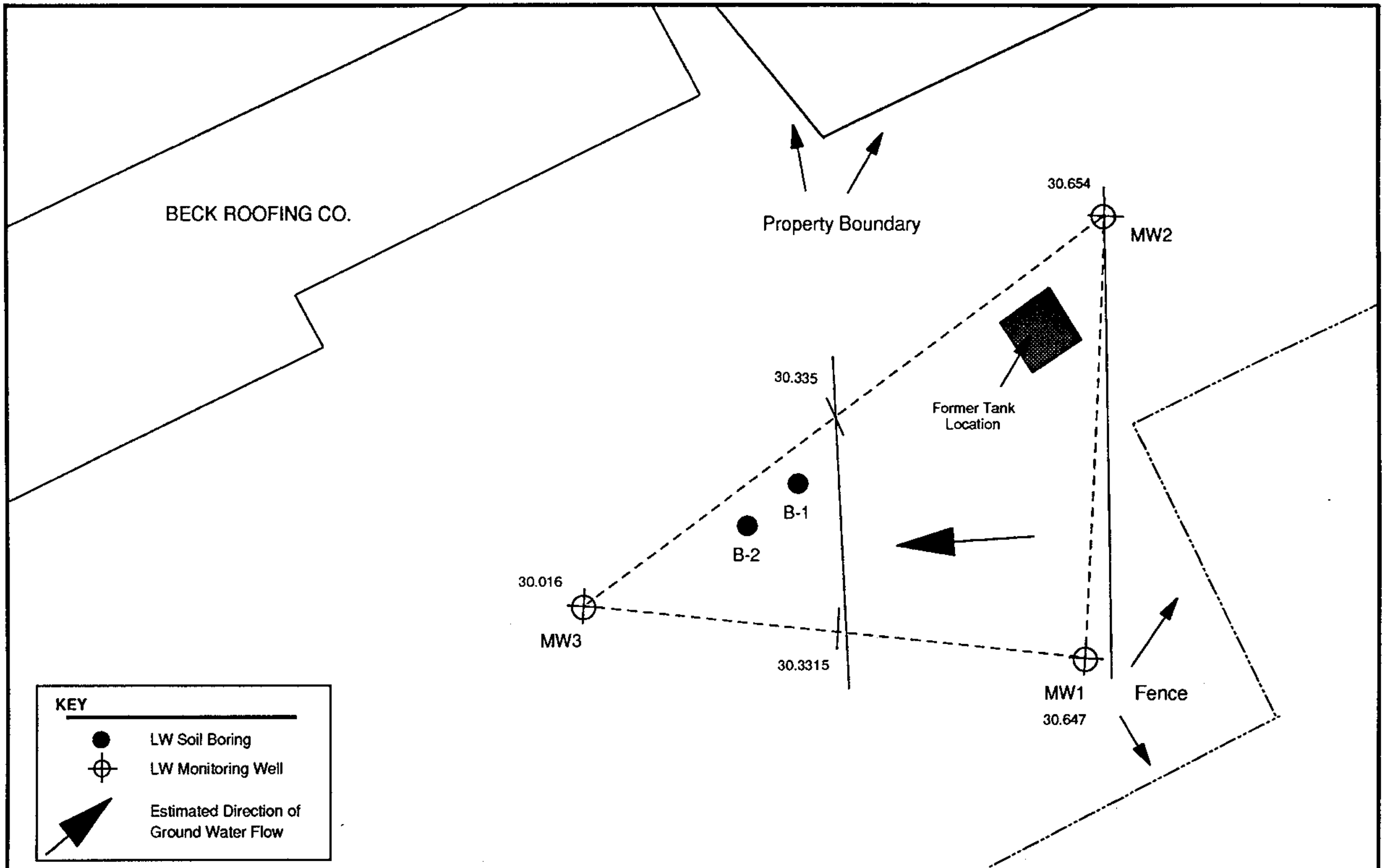
file:\beck\	0992gwgr.drw
job no.:	05085-001-00
drawn by:	rhc
approved:	cgw
date:	02-25-93

* Well elevations based on December 1992 land survey.



Approximate Scale 1" = 20"

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FIGURE 4
GROUND WATER ELEVATIONS * - JANUARY 22, 1993
BECK ROOFING CO. - 21123 MEEKLAND AVE.
HAYWARD, CALIFORNIA

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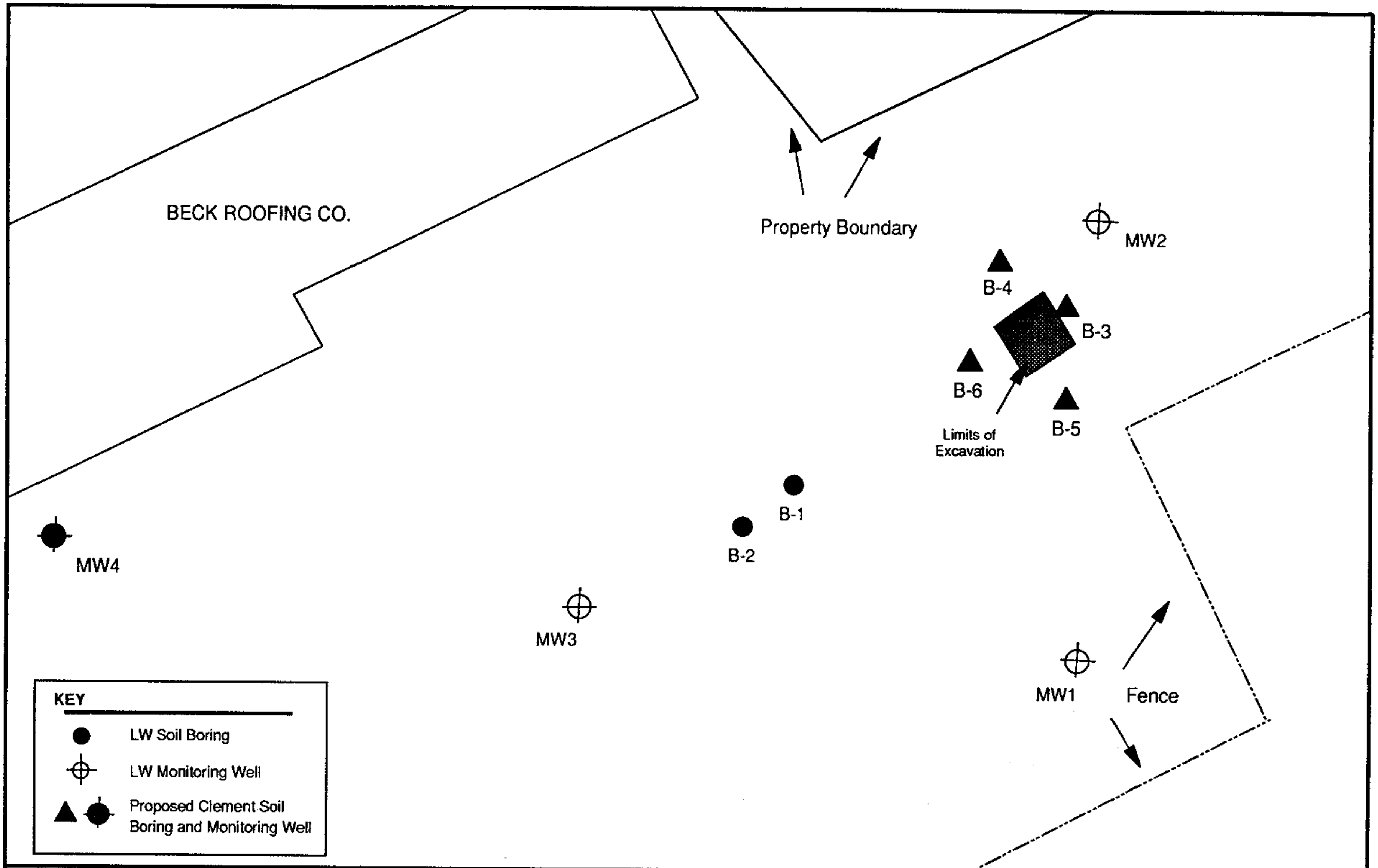
file:\beck\	0193gwgr.drw
job no.:	05085-001-00
drawn by:	rhc
approved:	cgw
date:	02-24-93

* Well elevations based on December 1992 land survey.



Approximate Scale 1" = 20"

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FIGURE 5

PROPOSED SOIL BORING AND MONITORING WELL LOCATIONS

BECK ROOFING CO. - 21123 MEEKLAND AVE.

HAYWARD, CALIFORNIA

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file:\beck\	ssip-loc.drw
job no.:	05085-001-00
drawn by:	rhc
approved:	cgw
date:	02-24-93

4.0 SOIL BORING AND SAMPLING

Soil borings will be advanced using a rotary drill rig and hollow-stem augers. The borings will be logged in the field based upon soil type (according to the Unified Soil Classification), field screening results, and drilling characteristics. Samples will be inspected, field screened, capped and sealed, logged, and placed in an ice-chest prior to delivery to a State-certified analytical laboratory. Sample management will include strict observance of standard chain-of-custody protocols.

Four soil borings, designated B-3 through B-6, will be drilled at the locations shown above in Figure 5. Borings B-4 and B-5 will be advanced 5-feet north and 5-feet south of the present north and south excavation margins; borings B-3 and B-6 will be located 5-feet east and 5-feet west of the present east and west excavation margins. Borings B-3 through B-6 are intended to help delineate the horizontal limits of hydrocarbon soil contamination. Because the northeast perimeter of the former gasoline UST location revealed the most discernible soil contamination during the excavation, boring B-3 will be drilled as close as possible to the existing concrete slab in an attempt to obtain soil samples from beneath the slab.

The subsurface soils will be sampled for chemical analyses by using a split spoon or California sampler. If visual contamination or a noticeable gasoline odor is found in the proposed borings, additional borings will be drilled approximately 3 feet further out in order to encircle and characterize the contaminant plume. If this is conducted, the soil samples collected from the stepped out borings will be sent to a certified laboratory for analysis in place of the samples collected from the proposed borings. Discovered soil contamination will be specifically documented in the boring logs of the site assessment report which will include cross-sections showing lithology and sample locations.

Soil samples will be obtained at 5-foot intervals to a depth of 15 feet using three successive 18-inch drives of the drive sampler. The boring will then be continuously cored from 15 feet to a depth of approximately 35 feet. Below a depth of 15 feet, an attempt will be made to obtain samples from the 10 to 12-foot thick clay layer. As shown on Cross Section A-A from the March

Why continuous coring in this interval?

1992 report by LW, the clay layer occurs at a depth of approximately 17 to 19-feet below ground surface. An attempt will be made to collect one soil sample each from the top, middle, and bottom section of the clay layer in each soil boring. The next soil sample will be collected as close to the capillary zone as possible (as this is where the maximum TPH-G concentrations may be).

Thus, starting at the top of the clay, the succession would be as follows (with necessary modifications made to obtain samples at the bottom of the clay layer and the top of the capillary zone): (1) an 18-inch drive sample will first be taken; (2) the hole will be advanced 18 inches with the hollow stem augers; (3) the next 3.5-feet will sampled for lithology with the core device; and (4) the hole will be advanced to the bottom of the cored interval with the hollow stem auger. All borings and soil samples will be field screened for VOCs using an organic vapor analyzer (OVA) or similar device. Recovered soils will be characterized according to the Unified Soil Classification System (USCS - ASTM D-2487), and the information will be recorded on a boring log.

5.0 GROUNDWATER MONITORING WELL

Based upon the results of the groundwater gradient, one new groundwater monitoring well (MW4) will be constructed approximately downgradient from MW3 and as close to the property line as possible (Figure 5) in order to further delineate the extent of the groundwater contaminant plume. The regional gradient is to the west towards San Francisco Bay, which is consistent with the sloped topographic ground surface in the area.

The direction of the gradient was evaluated by taking static water level measurements from the three monitoring wells. Table 2 presents the most recent groundwater levels from each well. Groundwater levels measurements taken in September indicated that the gradient is to the west, northwest (Figure 3). The January 1993 measurements show that the gradient is to the west, southwest (Figure 4). As a result, MW4 will be installed at an approximate location west of MW3 and as close to the west property line as possible.

should be 5 feet above + 10 feet below water table

The monitoring well will be completed with a 10-foot screen that straddles the surface of the water table to help detect any free products. Based on available information, it is estimated that the monitoring well will be completed to a depth of 40 feet. After construction, the new monitoring well will be properly developed and sampled for TPH-G and BTEX compounds using the same analytical methods used for the existing monitoring wells. The methodologies for both soil and groundwater sampling are described in more detail in Appendix B.

6.0 HEALTH AND SAFETY

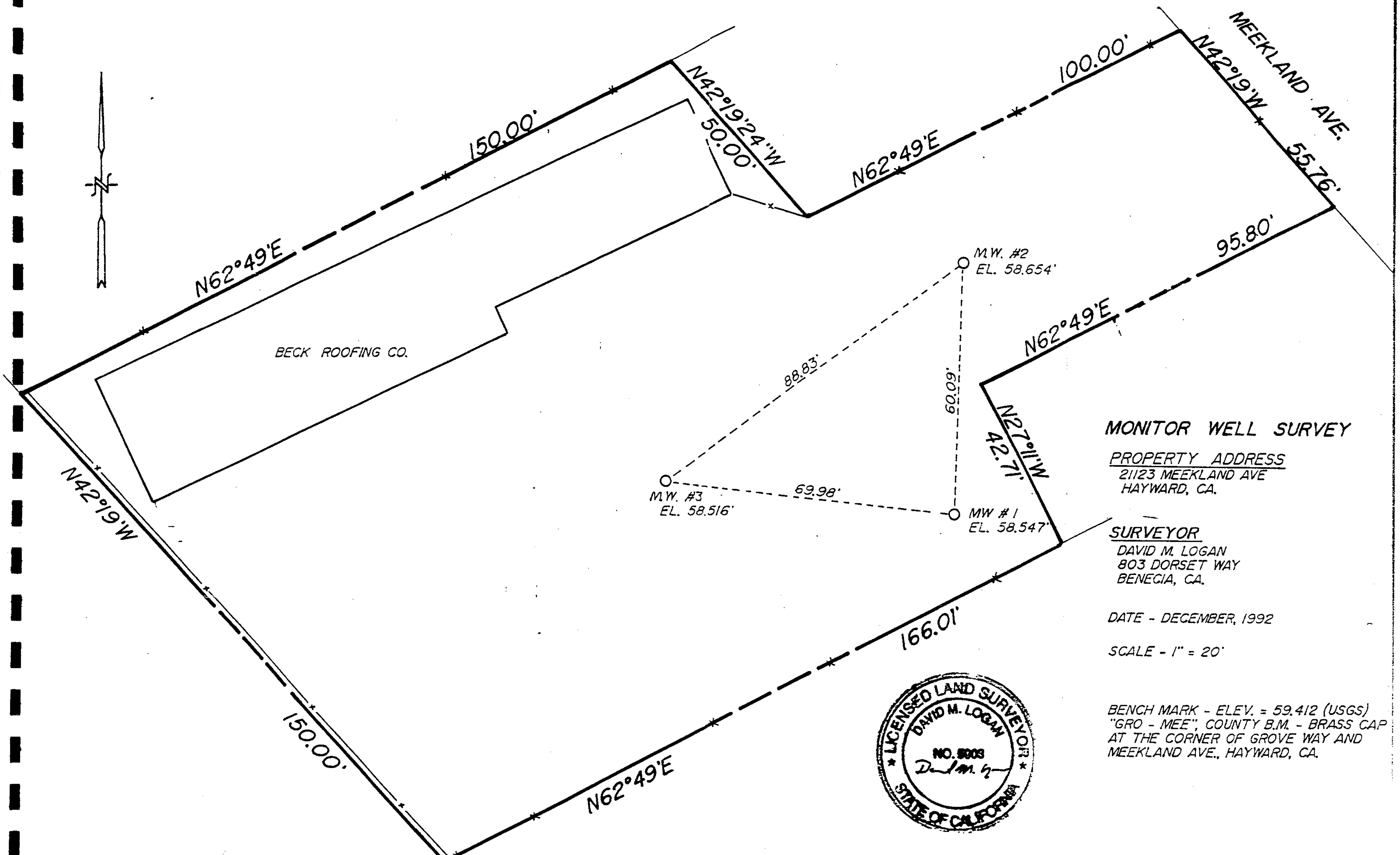
The site-specific Health and Safety Plan (HSP) is provided as Appendix C to this SSIP. Details of field equipment decontamination procedures are included in the HSP.

7.0 SCHEDULE

The SSIP will be implemented within 30 days of Agency approval, subject to the availability of State-licensed drillers. Following the completion of field work, a Site Assessment Report (SAR) will be submitted to the DEH within 60 days.

APPENDIX A

MONITORING WELL SURVEY



MONITOR WELL SURVEY

PROPERTY ADDRESS
21123 MEEKLAND AVE
HAYWARD, CA.

SURVEYOR
DAVID M. LOGAN
803 DORSET WAY
BENECIA, CA.

DATE - DECEMBER, 1992

SCALE - 1" = 20'

BENCH MARK - ELEV. = 59.412 (USGS)
"GRO - MEE", COUNTY B.M. - BRASS CAP
AT THE CORNER OF GROVE WAY AND
MEEKLAND AVE., HAYWARD, CA.

APPENDIX B

METHODOLOGY

APPENDIX B: METHODOLOGY

INTRODUCTION

This Appendix describes the methodology to be used by contractors at the Beck Roofing Site. The investigation includes the installation of soil borings and one monitoring well, and the collection and analysis of subsurface soil and groundwater samples. Sampling locations have been selected based on a review of historical information.

Proposed well and boring sampling locations are shown on Figure 5. Activities will consist of the following:

- Four soil borings will be advanced to the water table at a depth of approximately 30 to 35 feet. Unless otherwise specified, soil samples will be obtained at 5-foot intervals for chemical analyses and lithologic description. All borings will be continuously cored below a depth of 15 feet to total depth (approximately 35 feet).

- If visible contamination or a noticeable gasoline odor is found in the proposed borings, additional borings will be drilled approximately 3 feet further out in order to encircle and characterize the contaminant plume. If this is conducted, the soil samples collected from the stepped out borings will be sent to a certified laboratory for analysis in place of the samples collected from the proposed borings.

- One new groundwater monitoring well (MW4) will be constructed approximately downgradient from MW3 and as close to the property line, as shown in Figure 5, in order to further delineate the extent of the groundwater contaminant plume. The monitoring well will be completed with a 10-foot screen that straddles the surface of the water table to help detect any free products. Based on available information, it is estimated that the monitoring well will be completed to a depth of 40 feet. After construction, the new monitoring well will be properly developed and sampled for TPH-G and BTEX compounds using the same analytical methods used for the existing monitoring wells

- Groundwater samples will be collected from the existing and new monitoring wells and submitted to a State certified analytical laboratory for analysis.

SUBSURFACE SOILS

Four soil borings will be advanced under the supervision of a California-registered geologist. The borings will be drilled using a continuous flight hollow stem auger. A nominal 12-inch outside diameter auger will be used for the boring that will be converted to a monitoring well. A smaller diameter hollow stem auger (7 to 8 inch outside diameter) will be used for the other three soil borings.

The augers and auger plug will be decontaminated before, between, and after use with a steam cleaner. Subsurface soils will be sampled at 5-foot intervals to a depth of 15 feet using three successive 18-inch drives of the drive sampler. The boring will be advanced between drives with the hollow stem auger. The hole will then be continuously cored from 15 feet to total depth estimated at approximately 35 feet.

Below a depth of 15 feet, an attempt will be made to obtain samples from the 10 to 12-foot thick clay layer. As shown on Cross Section A-A in the March 1992 report by L&W Environmental Services, the clay layer occurs at a depth of approximately 17 to 19-feet below ground surface. An attempt will be made to collect one soil sample for chemical analyses each from the top, middle, and bottom section of the clay layer in each soil boring. The next soil sample for chemical analysis will be collected as close to the top of the capillary zone as possible (as this is where the maximum TPH-G concentration may be).

Thus, starting at the top of the clay, the succession would be as follows (with necessary modifications made to obtain samples at the bottom of the clay layer and the top of the capillary zone): (1) an 18-inch drive sample will first be taken; (2) the hole will be advanced 18 inches with the hollow stem augers; (3) the next 3.5 feet will be sampled for lithology with the core device; and (4) the hole will be advanced to the bottom of the cored interval with the hollow stem auger.

Recovered soils will be characterized according to the Unified Soil Classification System (USCS - ASTM D-2487), and the information will be recorded on boring logs.

Borings not completed as monitoring wells will be backfilled in accordance with Alameda County specifications using a tremmie to emplace a bentonite-cement grout that meets County specifications.

TABLE A-1

SUMMARY OF ANALYTICAL TESTING

	EPA Method No.	
PARAMETER	SOIL	GROUNDWATER
Required:		
BTEX	5030/8020*	5030/8020*
Total Petroleum Hydrocarbons (gasoline)	5030/8015*	5030/8020*
* As modified by the LUFT Manual		

Soil samples to be submitted for chemical analysis will be collected at target sampling depths in 2-inch by 4-inch diameter long brass liner sleeves using the California Modified split spoon drive sampler. The sampler will be driven 18 inches into the bottom of the borehole using the drop hammer of the drill rig. The blow counts for each 6 inches of the drive will be recorded. The sample sleeve will be trimmed flat at both ends (to the extent possible), capped at both ends with teflon film and plastic end caps, labeled, and placed immediately on ice in a cooler.

However, if visible contamination or noticeable odors are found in soil samples collected from the proposed borings, additional borings will be drilled approximately 3 feet further out in order to encircle and characterize the contaminant plume. The soil samples collected from the stepped out borings will then be sent to a certified laboratory for analysis in place of the samples collected from the proposed borings. The discovered soil contamination will be specifically documented in the boring logs of the site assessment report.

All sampling equipment will be decontaminated prior to use by steam cleaning. The body of the samplers will be also cleaned before each use with a non-phosphate detergent solution, a tap water rinse, and a distilled or deionized water rinse. Brass liners used for sample collection will be cleaned prior to and between uses using the detergent solution, and the tap and distilled or deionized water rinses.

GROUNDWATER

Monitoring Well Installation and Development

The monitoring wells will be constructed using flush-threaded, 4-inch diameter, Schedule 40 polyvinyl chloride (PVC) pipe and flush-threaded, 4-inch diameter factory-slotted PVC screen. If available, sieve analyses conducted on samples from an adjacent site may be used to select the screen opening width and annular sand pack. If such analyses are not readily available, the selection of the screen opening width and annular sand selection will be based on a field inspection of the cored material. The top of the well screen is to be located approximately 3 feet above the groundwater table to accommodate possible water table fluctuations and to allow testing for floating product.

Upon completion of the soil boring, the PVC sections will be placed within the hollow stem auger, the auger drawn back, and the annular space packed with a grade of sand selected based on the procedure described above. Generally, the sand pack will continue from the bottom of the borehole to approximately one to two feet above the screened zone. However, because of the possibility that the overlying clay may contain compounds that could volatilize into the well bore and potentially contaminate the groundwater, the sand pack is to extend only about 0.5 feet above the top of the screen. Approximately one to two feet of bentonite pellets will then be placed in the annular space above the sand, and hydrated with distilled water. The remaining annulus will then be filled to the surface with a bentonite/cement grout mixture that meets Alameda County Standards and the State Codes. For grout packs deeper than 20 feet, a tremmie pipe will be used to place the grout. The monitoring well will be completed at grade with a locking, water-tight cap and a valve box cover (traffic-rated for trafficked areas) to maintain security or above-grade where flooding could possibly occur. Cement or asphalt will be mounded around the well to direct surface runoff away from the well.

Monitoring wells will be developed by surging and/or pumping. Development will occur within about 48 hours after installation. During development, a centrifugal pump or bladder pump will be used to extract a minimum of 10 well volumes of water until the discharge water obtains visual clarity. The pH, temperature, and conductivity of the water will be monitored during development to confirm the stabilization of these parameters. The actual volume removed will be recorded along with field measurements of pH, temperature, and conductivity in the field logbooks. Stability will be reached when three consecutive readings agree to $\pm$ 0.2 pH units, $\pm$ 10% conductivity reading, and $\pm$ 0.2 degrees Fahrenheit.

Groundwater Sampling Procedures

Following development, the well will be allowed to stabilize for at least three days prior to sampling. Then the well will be sampled for free-floating product using a transparent bailer. The water level will be measured using an electric water-level indicator. The water level meter will be cleaned with phosphate-free detergent and rinsed with distilled or deionized water before each use. The depth will be measured from the top of the casing to the surface of the water, and referenced to the well elevation as recorded by a licensed surveyor.

The well will then be purged with a hand-pump. In order to obtain samples of representative water quality, the purged water will be checked periodically with measurements of pH, temperature, and conductivity to monitor for stabilization of these parameters, as described above. A minimum of three well volumes will be purged. The actual purge volumes will be recorded along with field measurements of pH, temperature, and conductivity in the field logbooks. If the well is purged dry before three well volumes are removed, it will be allowed to recover to within eighty percent of the initial volume before proceeding with sample collection.

Groundwater samples will be collected using teflon bailers. The hand-pump and bailers used in sampling will be decontaminated thoroughly with non-phosphate detergent in water, and rinsed with tap water followed by distilled or deionized water prior to sampling. Groundwater samples will be placed in appropriate containers and preserved as required. One trip blank per each cooler of VOC samples will be obtained from the laboratory along with the sample containers, and will accompany the samples throughout sample handling. The trip blank shall be analyzed for both TPH-G and BTEX.

LABORATORY ANALYSES

Soil and water samples will be submitted to a state-certified analytical laboratory for performance of all analytical methods required for this assessment.

Soil Analyses

The rationale for selection of subsurface soil samples was presented previously. All subsurface soil samples collected for chemical analyses will be submitted to the laboratory. Soil samples collected for the analyses are listed in Table A-1. This list of analytical methods is as required by the Alameda Department of Public Health.

Water Analyses

One groundwater sample from the monitoring well will be analyzed for the parameters listed in Table A-1.

WASTE DISPOSAL PLAN

All wastes generated during the field investigation will be collected and properly stored on site. As drilling proceeds, the soils cuttings produced will be placed initially on plastic sheets, shoveled into DOT-specification 55-gallon drums and labelled. The boring or sample number and container number will be written on each drum with a wax crayon. In addition, attached to each drum by wire or tape, will be a waterproof label bearing the following information:

- container number
- boring number
- media type (soil, water, PPE, etc.)
- depths from which soil was taken
- date of sampling
- location of sample (i.e., near storage shed)
- storage location (i.e., Beck site #1)
- sample numbers taken from the borings

The label will also note that analytical results are pending for the medium in the container.

All waste storage containers generated during field investigations will be left onsite for disposal by Beck Roofing.

All wastes determined to be hazardous will be disposed of by Beck in accordance with existing federal, state and local regulations.

Decontamination

All sampling equipment, including stainless steel trowels, sample filtration vessels, and bailers, will be washed in a mixture of non-phosphate detergent and water, rinsed with potable water, followed by deionized rinse water.

Field Analysis

Field analyses include measurements of pH, conductivity and temperature on groundwater samples. These data are used to determine the adequacy of well development and purge volumes. The quality control procedures will be limited to checking the reproducibility (< 25% RPD) of measurements by taking multiple readings and by calibration of instruments (where appropriate).

Instrumentation and equipment to be used during field activities includes:

- organic vapor meter,
- pH, temperature, and conductivity meter,
- electric sounders,and
- submersible pumps.

Specific operating instructions for all instruments and equipment will be available to team members during all field activities. The following preventative maintenance general guidelines will be followed.

- The instruction manual will be followed before operating each instrument or piece of equipment.
- Equipment will be checked for proper operation prior to going to the field.
- Electrical power availability or battery potency will be evaluated prior to going to the field. Batteries will be charged as necessary, or a supply of spare batteries will be maintained.

- pH electrodes will be kept moist.
- All personnel will be trained in the operation of equipment prior to their use.
- Equipment will be decontaminated carefully so as not to cause damage.
- In the event of damaged equipment, repair will be attempted in the field. Spare parts will be maintained as indicated by the particular equipment (i.e. extension cords, pH electrodes, etc.)
- If repair is not possible, the field team leader will judge if the use of the equipment is essential to meet the objectives of the investigation and health and safety requirements. If the equipment is essential, replacement equipment will be obtained from the contractors.

APPENDIX C

HEALTH AND SAFETY PLAN

JULY 10, 1992

DRAFT REVISION 3

UNDERGROUND STORAGE TANK OPERATIONS

HEALTH AND SAFETY PLAN

PREPARED FOR: BECK ROOFING

PREPARED BY: ICF KAISER ENGINEERS/CLEMENT INTERNATIONAL

DATE PREPARED: November 3, 1992

PROJECT NUMBER: 05085 001 00

CONTENTS

		Page No.
PART 1.	**GENERAL REQUIREMENTS**	1
I.	PURPOSE	1
II.	REFERENCES	1
III.	ASSIGNMENT OF RESPONSIBILITIES	1
IV.	DISCUSSION	1
V.	DEFINITIONS	2
VI.	MEDICAL EXAMINATIONS	4
VII.	EMPLOYEE TRAINING AND INDOCTRINATION	4
VIII.	PROCEDURE - UNDERGROUND STORAGE TANK REMOVAL AND CLOSURE REQUIREMENTS	11
PART 2.	**SITE-SPECIFIC REQUIREMENTS**	12
I.	SITE IDENTIFICATION	12
II.	SCOPE OF WORK	12
III.	EMERGENCY INFORMATION	13
IV.	TANK CHARACTERIZATION	14
V.	CHEMICAL HAZARDS	15
VI.	AIR MONITORING	16
VII.	PHYSICAL HAZARDS	17
VIII.	PERSONAL PROTECTIVE EQUIPMENT	18
IX.	DECONTAMINATION	19
X.	DISPOSAL	19

PART 1. GENERAL REQUIREMENTS

I. **PURPOSE**

To set forth minimum requirements and procedures for the safety and health of employees involved in underground storage tank removal and closure projects.

II. **REFERENCES**

A. National Fire Protection Association, Flammable and Combustible Liquids Code, NFPA 30

B. American Petroleum Institute, API Publication 2015, 1985, "Cleaning Petroleum Storage Tanks"

C. American Petroleum Institute, Supplement to API Publications 2015A, 1982, "A Guide for Controlling the Lead Hazard Associated with Tank Entry and Cleaning"

D. American Petroleum Institute, Petroleum Safety Data 2202, 1982, "Dismantling and Disposing of Steel from Tanks Which Have Contained Leaded Gasoline"

E. New York State Department of Environmental Conservation, 1/83, "Technology for the Storage of Hazardous Liquids: A State of the Art Review"

F. Resource Conservation and Recovery Act, 1984 Amendment, Subtitle I, Sections 9001-9010 (Underground Storage Tanks)

G. Title 23, Subchapter 16, Article 7, California Administrative Code; Water Resources Control Board, Underground Tank Regulations: Closure Requirements

H. Title 49, CFR, Parts 171-177, Department of Transportation Hazardous Materials Regulations

I. Title 29, CFR, Part 1910.120, Hazardous Waste Operations and Emergency Response

J. Title 29, CFR, Part 1926, Construction Industry Standards

III. **ASSIGNMENT OF RESPONSIBILITIES**

A. The Project Manager will be responsible for ensuring that all provisions specified in this plan are appropriately implemented on the project.

B. The Regional Health and Safety Officer will be responsible for providing the Project Manager with the technical assistance necessary to comply with the health and safety requirements of the plan.

IV. **DISCUSSION**

Approximately two million underground storage tanks containing gasoline and other hazardous substances currently exist in the United States. Some have estimated that as many as 75,000 to 100,000 of these are leaking and that 350,000 may develop leaks by 1990. For this reason, Congress enacted amendments to RCRA in 1984 to regulate tank installation, release detection and prevention, and proper closure (in-place or removal). As of 1985, states have designated state or local agencies that are responsible for implementing and enforcing underground tank regulations, including closures.

Steps involved in tank removal and closure include agency notification, permitting, excavation, hazardous substance removal, tank cleaning, tank removal, groundwater and/or soil testing for chemical contamination, backfilling, and post-closure notification (tank delisting).

The protection of ICF KE employees, subcontractors, and the public is a major concern during tank closure project design and implementation. Several health and safety concerns require evaluation and include excavation/trenching hazards; confined space hazards; toxic, flammable and/or oxygen deficient atmospheres; hot work and cold cutting operations; tank removal; physical hazards; and others.

V. DEFINITIONS

A. Cold Cutting

Methods of material cutting that utilize a nonelectric or nonflammable gas system, such as pneumatic chisels or drills, or a high pressure water device.

B. Confined Space

Normally considered to be enclosures having limited means for entry and exit, by reason of location, size or number of openings; and unfavorable natural ventilation which could contain or produce dangerous air contaminants, flammable or explosive atmospheres, and/or oxygen deficiency. Confined spaces may include storage tanks, excavations, or trenches, natural depressions, vaults, and basements.

C. Competent Person - Excavation and Trenching

A person, such as a supervisor or engineer, who is capable of identifying existing and predictable hazards in the excavation/trenching work area and who has the authority to take prompt corrective measures to eliminate them.

D. Excavation

Any manmade cavity or depression in the earth's surface, including its sides, walls or faces, formed by earth removal and producing unsupported earth conditions by reasons of the excavation.

E. Hot Work

Any work involving burning, welding, riveting, or similar fire-producing operations, as well as work which produces a source of ignition, such as drilling, grinding, abrasive blasting, etc.

F. Ignition Source

Refers to a heat source of sufficient energy to cause ignition of flammable vapors. The most commonly encountered categories of ignition sources in industry are open flames, hot surfaces, and electrical or frictional sparks.

G. Inerting

Displacement of the atmosphere by a nonreactive gas (such as nitrogen or carbon dioxide) to such an extent that the resulting atmosphere is noncombustible.

H. Lead Hazard

Refers to the potential for exposure to organic (tetraethyl, tetramethyl) lead in tanks which have been used for leaded petroleum products. Since these tanks will contain residual lead of varying concentrations, they must be regarded as dangerous to the extent that respiratory protective equipment and protective clothing must be used throughout the cleaning process. These tanks must not be considered lead-free unless indicated by analysis.

I. LEL (Lower Explosive Limit)

The minimum concentration of a combustible gas or vapor in air (usually expressed in percent by volume at sea level), which will ignite if an ignition source is present.

J. Oxygen Deficiency

For the purpose of this directive, any atmosphere containing less than 20% oxygen shall be considered oxygen deficient and immediately dangerous to life and health.

K. Purging

The method by which gases, vapors, or other airborne impurities are displaced from a confined space. This may involve such measures as mechanical ventilation, steam ventilation, or introducing another gas, such as nitrogen or carbon dioxide, to control flammable vapors.

L. Qualified Person

1. Qualified Person - Industrial Confined Space

   A person, such as a supervisor or engineer, who by reason of experience or instruction, has successfully demonstrated his ability to anticipate, recognize, and evaluate hazards to employees that may occur during underground storage tank closure projects. Training in the evaluation of employee exposure to toxic substances, confined space entry procedures, and in the use of atmospheric testing instruments is required.

2. Qualified Person - Excavation

   A registered professional engineer, who by extensive knowledge, training, and experience has successfully demonstrated his/her ability to design shoring, sloping/benching, or alternate systems that meet accepted regulatory and engineering requirements.

M. Trench

An excavation made below the surface of the ground. In general, the depth is greater than the width at the bottom, but the width of a trench at the bottom is not greater than 15 feet.

N. Underground Storage Tank

By regulatory definition, a tank with ten percent or more of its volume below ground. Included in the volume is all piping attached to the tank (RCRA, Subtitle I, Section 9001(1)).

VI. MEDICAL EXAMINATION

A. All ICF KE personnel on-site shall have successfully completed a preplacement or periodic/update physical examination in accordance with 29 CFR 1910.120.

B. All subcontractor personnel who, because of their job assignments, may incur exposures to the hazardous materials present at the jobsite, must have successfully completed a physical examination similar to the ICF KE preplacement physical exam unless waived by the ICF KE Regional Health and Safety Officer.

VII. EMPLOYEE TRAINING AND INDOCTRINATION

A. All ICF KE personnel assigned to underground storage tank closure projects shall have completed, at a minimum, the appropriate formal training courses. OSHA has determined that activities related to leaking underground storage tanks, excepting normal repairs to leaking piping systems, falls under the scope of 29 CFR 1910.120. That standard requires 40 or 24 hours of initial training and 8 hours annual refresher training, plus three days supervised on-site training for workers. An additional 8 hours training is required for supervisors.

B. All subcontractor personnel shall have completed minimum training in compliance with 1910.120, as appropriate, or requirements as specified by other regulations, or this plan

C. Daily Safety Meetings, detailing specific hazards of the work to be performed and safety precautions and procedures for each project, shall be conducted by a qualified person at the beginning of each shift and shall be documented in writing.

VIII. PROCEDURE

Underground Storage Tank Removal and Closure Requirements

A. PRELIMINARY REQUIREMENTS

1. Notification/Permits for Underground Storage Tank Closure

   a. State or local agencies mandated to regulate the RCRA Underground Storage Tank Program shall be notified, and applicable permits obtained by the ICF KE project manager or the client.

b. All underground storage tank closure projects shall be reviewed by the Regional Health and Safety Officer. Specific information that a Project Manager shall relay to the Regional Health and Safety Officer includes: tank product identification, concentration or constituents, volume, number of tanks, and the method of tank closure (See Part 2 of this Plan).

c. Tank closure projects that involve trenching or excavation five feet or deeper, or trenches less than five feet in depth where there is potential for cave-in, and into which a person may be required to descend, are subject to the requirements of 29 CFR 1926 Subpart P, Excavation, Trenching and Shoring.

d. The project manager shall identify and communicate anticipated health and safety requirements to the subcontractor(s) as early as possible; and shall complete the appropriate ICF KE Subcontractor Health and Safety Agreement documents.

2. <u>Preparation for Underground Storage Tank Removal</u>

a. The Project Manager shall perform a site reconnaissance and confirm locations of underground storage tanks and all associated piping with the client.

b. Assure, and record in writing, that all existing utility or other underground facilities in the work area are located before commencing excavation. If a utility company cannot be utilized, an appropriate device, such as a cable-avoiding tool or similar device, shall be used to locate gas lines, electrical lines, water lines, etc. All owners of such facilities shall be advised of the proposed work at least two days (excluding Saturdays, Sundays and Holidays) prior to any excavation. **NOTE:** States and local authorities may have specific notification requirements. The project manager shall ensure that all such requirements are identified, and observed.

c. Trees, boulders, poles, and other surface encumbrances located at the work site shall be made safe or removed prior to initiation of the tank closure project.

d. Assure that construction equipment (not in transit) and personnel do not come closer than 20 feet to any energized overhead high voltage conductor such as electric utility lines. The position of heavy equipment shall be pre-determined to minimize loading on excavation walls.

B. OPERATING REQUIREMENTS

1. <u>Hazard Assessment</u>

At the beginning of the project, each work shift, and as often as necessary to ensure safety, a competent person shall conduct an area survey to locate work place hazards and determine appropriate safety control measures.

2. Excavation Safety

a. All work involving excavation or trenching shall be subject to the requirements of 29 CFR 1926 Subpart P, Excavations.

b. Personnel entry into any excavation or trench that is more than five feet deep shall only be permitted if the excavation or trench is properly shored or sloped and is safe for entry as determined by a qualified person. Trenches less than five feet in depth where there is potential for cave-in shall meet the requirements of this paragraph.

c. A determination must be made to assure that the stability of adjacent structures will not be affected by the excavation. Sidewalks, pavements, and appurtenant structures shall not be undermined unless a method of protection is provided to protect employees from the possible collapse of such structures.

d. Daily inspections of an excavation shall be made by a competent person. If there is evidence of possible cave-ins or slides, all work in the excavation shall cease until the necessary safeguards have been taken.

e. Trenches more than four feet deep shall have ladders or steps located so as to require no more than 25 feet of lateral travel between means of egress. Ladders shall be placed at an angle not more than 30 degrees from vertical and secured as necessary. Ladder side rails shall extend at least three feet above the original ground surface.

f. All spoil shall be located at least two feet from the edge of the excavation to prevent spoil from falling back into the excavation. **NOTE:** Since surface subsidence indicators, such as fissures or cracks, usually occur within a four-foot distance from the edge of the excavcation, it is important that consideration be given to placing spoil at a greater distance from the edge so that surface indicators are not obscured. No method that disturbs the soil in place (such as driving stakes) shall be used to contain spoil material. If the spoil is considered contaminated, effective steps to control the spread of contamination shall be taken.

g. Once soil has been removed to the top level of an underground storage tank, all tank cleaning, testing and crane cable hookup that requires personnel to physically be on the tank top surface should be performed prior to excavation of soil along the tank sides

h. Fall protection devices shall be used by personnel when work is performed on top of underground storage tanks that have been excavated around one or more sides. Regional Health and Safety Officers shall be consulted to determine appropriate means of fall protection in these situations.

i. All excavations shall be guarded on all sides by means of wooden or metal barricades spaced no further apart than 20 feet. A minimum of two feet from edges will be maintained.

j. Protection between barricades shall consist of at least 3/4-inch wide nylon yellow, or yellow and black, tape. The tape shall be stretched between barricades.

k. All excavations shall be backfilled as soon as practical after work is completed and all associated equipment removed.

3. Heavy Equipment Operation

a. Only experienced, demonstrably proficient, equipment operators will be used to operate such heavy equipment as backhoes, front-end loaders, cranes, etc. Where certification or licensing requirements exist, such personnel shall possess appropriate certification and/or licensing for operating specified heavy equipment.

b. While operating heavy equipment in the work area, the equipment operator shall maintain communication with a designated signalman through either direct voice contact or approved, standard hand signals. In addition, all site personnel in the immediate work area shall be made aware of the equipment operations.

c. All equipment, such as pipe, rebar, etc., shall be kept out of traffic lanes and access ways. Equipment shall be stored so as not to endanger personnel at any time.

d. A flagman with roadwork vest, signs, cones, and high-level warning signs shall be provided when it is necessary to control normal vehicular traffic due to vehicles, such as end-dumps, entering or leaving the site.

e. Employees shall not be permitted under suspended loads at any time.

4. Fire Safety

a. Hot work shall not be conducted unless all necessary and appropriate requirements have been met.

b. Cold cutting of underground storage tanks to facilitate cleaning shall only be performed under direct supervision of a qualified person.

c. Equipment on-site shall be bonded and grounded, spark-proof, and explosion resistent, as appropriate. Particular attention to bonding/grounding shall be made during transfer of flammable/combustible liquids into vacuum trucks and when ventilation equipment is utilized.

d. A fire extinguisher with a minimum rating of 10B:C shall be strategically located in the area of active work.

e. No smoking shall be allowed in the work area.

5. Sampling

If the contents of the tank(s) are unknown, or in doubt, sampling will be necessary to assess the potential hazards, and to devise an appropriate method of decontamination and disposal. The following general steps shall be followed.

a. When sampling tank contents, the tank atmosphere shall be tested prior to retrieving a bulk sample of the contents. **NOTE:** an oxygen deficient atmosphere will adversely affect the response of a combustible gas indicator. If the tank atmosphere is inconsistent with the presumed contents of the tank, a reassessment of the work plan and protective measures will be made.

b. Bulk sampling of the contents of a tank shall be performed from outside of the tank if at all possible. Commercial devices for collecting liquid, sludge, and solid samples are available, and should be used. If it is necessary to enter the tank, confined space entry procedures must be observed.

c. Sampling soils from around the sides or bottom of a tank excavation presents significant hazards. Preferred methods are to collect the sample from the bucket of the excavator, by some other remote means, or from the outside of the excavated tank (employees may not place themselves under, or in close proximity to, a suspended tank for this purpose). Employees may not enter an excavation more than 5 feet in depth unless an appropriate protection system (ref: 29 CFR 1926, Subpart P) has been properly installed.

6. Underground Storage Tank Decontamination

Underground storage tanks that have been removed, but not cleaned, are considered hazardous waste. These tanks must be transported in accordance with Department of Transportation hazardous material packaging and shipping requirements, including manifesting, and taken to a permitted hazardous waste disposal site.

Minimum decontamination procedures that shall be performed to allow transportation of removed tanks under a bill of lading, disposal at a non-hazardous waste facility, or tank demolition for scrap include:

a. Removal of all residual liquid material, followed by triple rinsing with an appropriate cleaning solution to remove remaining sludge and/or scale from the interior surfaces of the tank.

b. Routine tank testing to determine the effectiveness of the cleansing, flushing and rinsing procedure. Residual liquid in tanks shall not be less than a pH of 3, nor greater than 11. Tanks that have contained flammable or combustible liquids shall be checked with a combustible gas indicator. Readings above 0% LEL shall require additional tank cleansing.

c. A physical examination of the tank interior to confirm that the rinsing process has removed all residual material. When triple rinsing is not sufficient to remove all sludge or scale, tanks shall be entered (once the tank space has been evaluated by a qualified person - industrial confined space) through available manways or cold cut open so that personnel can physically scrape or effectively pressure wash interior surfaces.

d. The proper handling and disposal of all rinsate or residual material which is considered to be hazardous waste, unless an analysis of the materials's hazardous constituents does not warrant this action.

e. An inspection and certification of cleanliness by a certified chemist, in those cities and counties requiring such inspections, for each tank that has been scraped or pressure washed, and then rinsed.

f. An awareness that tank cleaning may not remove all flammable substances in the tank, such as those that have absorbed to or penetrated walls of a container, or those that are retained in seams located at the junction of walls and ends of tanks. Low readings on a combustible gas indicator do not assure that explosive conditions will not occur later under conditions that promote vaporization of such residues.

g. The purging of flammable vapors within the tank, prior to transportation from a site, to levels that preclude potential explosive atmospheres, or such lower levels as may be required by the local agency. A standard method of tank purging, once all liquids have been removed, is placement of fifteen pounds of dry ice (carbon dioxide) per one thousand gallons of tank liquid capacity while simultaneously sealing all tank vents. Nitrogen gas may also be used to purge tanks.

h. The proper disposal at a land-based facility, or demolition for reuse as scrap, of decontaminated storage tanks. Documentation shall be provided to the appropriate local regulatory agency.

7. <u>Air Monitoring</u>

a. Air monitoring for combustible or oxygen-deficient conditions shall be conducted to determine the presence and concentration of chemical contaminants in the tank(s) and surrounding soils. Operations associated with underground storage tank closure that may require air monitoring include:

(1) Excavation of soil
(2) Hot work or cold cutting
(3) Storage tank cleaning and purging
(4) Confined space entry
(5) Tank certification prior to removal from site

b. Additional tests shall be selected and performed to the satisfaction of a qualified person - industrial confined space, based on the recommendations of the Regional Health and Safety Officer. All tests shall be repeated as often as necessary to assure safety since changing conditions may result in varying atmospheric contaminant concentrations.

c. All work activity is prohibited in atmospheres where tests indicate that the concentration of flammable vapors is greater than 10% of the lower explosive limit (LEL), or the concentration of oxygen is less than 20% or greater than 25%. Positive steps, such as ventilation, shall be taken to establish acceptable atmosphere conditions prior to resumption of operations.

d. Tests indicating the presence of toxic contaminants in concentrations at or above the permissible exposure limit (PEL), or threshold limit value (TLV) mandate that work in such an atmosphere proceed only when personal protective equipment appropriate for the specific contaminants is provided to all affected employees, based on recommendations of the Regional Health and Safety Officer.

e. Proper maintenance and operation of air monitoring equipment is an essential component of underground storage tank closure operations. Use of combustible gas/oxygen indicators is subject to the following precautions:

   (1) Combustible gas indicators must be routinely and properly calibrated based on known mixtures of gas (i.e., pentane, methane) in air. Other combustible gases or vapors will read approximately correctly in terms of explosivity, but for maximum accuracy, a calibration curve for the specific substance or mixture of concern should be consulted.

   (2) The presence of certain materials in the sample atmosphere may seriously impair the meter response of a combustible gas indicator. These include tetraethyl lead (TEL), used in leaded gasoline, and silicon compounds, in the form of silanes, silicones and silicates, often found in hydraulic fluids. Certain manufacturers supply inhibitor filaments designed to nullify the effects of TEL on meter response.

   (3) Ambient oxygen concentrations of less than 10% will cause an inaccurately low reading on the combustible gas meter scale.

   (4) Carbon dioxide shortens the life of oxygen meter sensors. Use of an oxygen meter in atmospheres purged with carbon dioxide will have a cumulative effect; therefore, all such tests should be stopped as soon as a constant reading is obtained. Difficulty in adjusting the oxygen meter to 21% oxygen in an ambient environment indicates that the oxygen sensor needs replacement.

(5) All equipment calibration data and field measurements shall be recorded in the project documentation.

8. Confined Space Entry

a. Entry into a confined space, such as an underground storage tank, shall be subject to the provisions of this plan. Steps that must be followed prior to employee entry in a confined space include:

(1) Initial hazard assessment includes atmospheric testing of the confined space for, as a minimum, oxygen content, flammability, and toxic contaminants;

(2) Isolation of the space;

(3) Mechanical ventilation of the space;

(4) Employee training and indoctrination; and

(5) Personal protective equipment use.

b. All air monitoring test results shall be recorded by a qualified person and posted at the work site.

9. General Site Safety Requirements

a. Selection of personnel protective equipment shall be reviewed by the Regional Health and Safety Officer, and shall be subject to the general provisions of 29 CFR Parts 1910 and 1926.

b. Hearing protection shall be utilized when noise levels in the work area exceeds 85 dBA, or when indicated by the Health and Safety Plan.

c. Good housekeeping practices shall be implemented on site.

d. Food articles or smoking materials will not be allowed in the work area.

e. All ICF KE procedures applicable to each specific job are to be followed in addition to these noted underground storage tank closure work practices and conditions.

f. Adequate provisions shall be made for:

(1) Washing of hands and face prior to eating, drinking, or consuming tobacco products.

(2) Providing drinking water to site personnel. During the summer months particularly, electrolyte replacement fluids, such as Gatorade, should be made available.

PART 2 SITE-SPECIFIC REQUIREMENTS

I. SITE IDENTIFICATION

Project Number	05085 001 00
Site Name	Beck Roofing
Site Address	21123 Meekland Avenue Hayward, California 94541
Contact Person	Charlie and Mary Beck
Phone	(510) 581-6750

Proposed Work Dates: Start ______

Stop ______

TYPE OF SITE

(Check all that apply):

___	Active	___	TSDF
X	Inactive	___	R & D Facility
___	Industrial facility	___	Military base
___	Gas station	___	Other (specify) ____________

II. SCOPE OF WORK

(Check all that apply):

New Tank Installation	____
Tank Closure	____
Tank/Pipe Removal	____
Tank/Pipe Disposal	____
Petroleum Release Investigation	X
Tank/Pipe Repair	____
Leak Detection Testing	____
Installation of Monitor Wells/Sampling	X
Other (Describe)	____________________

Briefly Describe Each Task (Use additional sheets).

Number of Tanks at Site One

RELEASE HISTORY

No evidence of leaks or soil contamination	___
Suspected or known leaks and soil contamination	X
Known groundwater contamination	X

III. EMERGENCY INFORMATION

Emergency Contacts:

Fire/Rescue:	911
Ambulance:	911
Police/Sheriff:	911
Poison Control Center:	(800) 962-1253
On-Site Medical Facility (clinic):	YES / NO
Facility Health and Safety Officer:	YES / NO
Name:	N/A
Phone Number:	N/A
Hospital Name and Address:	Eden Hospital 20103 Lake Chabot Road Castro Valley, California
Directions to Hospital (attach a map):	North on Meekland Avenue; west on Highway 238 to Highway 580 east; left on Lake Chabot Road

Utilities

Electric Company:	Pacific Gas & Electric
Water Company:	East Bay Municipal Utility District
Gas Company:	Pacific Gas & Electric

IV. TANK CHARACTERIZATION (Not Applicable; All Tanks Removed)

Tank # ____ Shell Material ____________
Contents* ______________________________
Estimated Volume __________
Product ____ Waste ____ Lead Hazard ____
Liquid ____ Flammable ____
Sludge ____ Corrosive ____
Solid ____ Reactive ____
Empty ____ Toxic ____
Other(Describe): ______________________________

Tank # ____ Shell Material ____________
Contents* ______________________________
Estimated Volume __________
Product ____ Waste ____ Lead Hazard ____
Liquid ____ Flammable ____
Sludge ____ Corrosive ____
Solid ____ Reactive ____
Empty ____ Toxic ____
Other(Describe): ______________________________

Tank # ____ Shell Material ____________
Contents* ______________________________
Estimated Volume __________
Product ____ Waste ____ Lead Hazard ____
Liquid ____ Flammable ____
Sludge ____ Corrosive ____
Solid ____ Reactive ____
Empty ____ Toxic ____
Other(Describe): ______________________________

*** If a mixture, list components.**

V. CHEMICAL HAZARDS

CHEMICALS OF CONCERN

Chemical Name	Highest Observable Concentration (media)	PEL/ TLV	IDLH	Symptoms/Effects of Acute Exposure
Gasoline - automotive, unleaded	7,000 ppm as TPH	300 ppm (900 mg/m) OSHA TWA	Carcinogen (benzene)	Inhalation may cause headache, nausea, vomiting, dizziness, drowsiness, blurred vision, twitching, pulmonary edema, ataxia, delirium, unconsciousness, coma and convulsions. Skin contact may cause irritations with erythema, pain, blistering, and epidermal neurolysis. Eye contact may cause pain, smarting, irritation, conjunctival hyperemia,and edema.
Benzene	60 ppm	10 ppm OSHA TWA 50 ppm OSHA Ceiling	Carcinogen	Inhalation may cause headache, nausea, giddiness, fatigue, anorexia, and lassitude. Vapors may irritate the eyes, nose and respiratory systems. Skin contact may cause dermatitis and irritation.
Ethylbenzene	230 ppm	100 ppm (435 mg/m) OSHA TWA	2000 ppm	Contact may cause dermatitis and irritation of the eyes and mucous membrane. Inhalation may cause headache, narcosis, and coma.
Toluene	450 ppm	200 ppm OSHA TWA 300 ppm OSHA Ceiling	2000 ppm	Inhalation may cause fatizue, weakness, confusion, euphoria, dizziness, headache, dilation of pupils, lacrimation, nervousness, insomnia, photophalia, and paresthia. Contact may cause dermatitis.
Xylene	2000 ppm	100 ppm (435 mg/m)	1000 ppm	Inhalation may cause dizziness, excitement, drowsiness, incoordination, nausea, anorexia, and abdominal pain. Contact may irritate the eyes, nose, and throat.

VI. AIR MONITORING

MONITORING INSTRUMENTATION: (NOTE: Monitoring instruments must be used for all operations unless appropriate rationale or restrictions are provided).

_X_ Organic Vapor Analyzer (FID)

___ Photoionization Detector Lamp Energy _____ev

___ Combustible Gas Indicator (CGI)

___ Oxygen Meter

___ Detector Tubes (specify) ______________________________

___ Other, specify (toxic gas, air sampling pumps, etc.)

____

IF MONITORING INSTRUMENTS ARE NOT USED, SPECIFY RATIONALE OR JUSTIFICATION OR ACTIVITY/AREA RESTRICTIONS

____

____

ACTION LEVELS (Breathing Zone, Constant):

Combustible Gas Indicator

0 - 10%	LEL	No Explosion Hazard
10 - 20%	LEL	Potential Explosion Hazard; Notify Site Health and Safety Officer; Implement Control Measures
> 20%	LEL	Explosion Hazard; Interrupt Task/Evacuate

Oxygen Meter

21%	O_2	Oxygen Normal
<20%	O_2	Oxygen Deficient; Interrupt Task/Evacuate
>22%	O_2	Oxygen Enriched; Interrupt Task/Evacuate

PID/FID

$\geq$ 150 ppm — This applies to petroleum fuel storage tanks only. Tanks used for storage of other petroleum distillates, or solvents must be addressed individually. Tanks containing unknown materials may use $\geq$ 5 ppm as an action level.

VII. PHYSICAL HAZARDS

(Check all that apply, attach description of control measures)

HEAVY EQUIPMENT

Backhoe _X_
Drill Rig _X_ Method __________
Loader ___
Dump Truck ___
Crane ___
Other ___ Describe __________

CONFINED SPACE ENTRY ___ **Requires Specific H&S Procedures**

Tank ___ Excavation/Trench___

MATERIALS HANDLING

Flammable Liquid ___
Spoil _X_
Manual Lifting ___ Of What: Concrete cores

HOT WORK ___ Describe Ignition Control Methods __________

____

____

TRAFFIC HAZARDS ___

THERMAL STRESS

Heat _X_ Cold ___

NOISE EXPOSURE ___

OTHER ___ Describe Fully __________

____

VIII. PERSONAL PROTECTIVE EQUIPMENT

MINIMUM:

Hard Hat	Safety Glasses/Goggles
Steel Toe/Shank Boots	Coveralls
Hearing Protection	

ADDITIONAL: (Specify by Task, Complete Additional Sheets As Needed)

TASK #_____

RESPIRATORY PROTECTION:

SCBA ___________________	
Airline ___________________	
Airline with Egress _________	
Air Purifying (FF) __________	Cartridges ___________
Air Purifying (HF) __________	Cartridges ___________

PROTECTIVE CLOTHING

Heavy Splash Suit	PVC ______	Neoprene _____	Other _______
Medium Splash Suit	PVC _______	Neoprene _____	Other _______
Light Splash Suit	PVC _______	Neoprene _____	Other _______
Tyvek	Saranex ___	Polyethylene ___	Uncoated ___
Gloves	PVC _______	Neoprene _____	Other _______
Boots	PVC _______	Neoprene _____	Other _______
Boot Covers	PVC _______	Other ________	

TASK #_____

RESPIRATORY PROTECTION:

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SCBA ___________________	
Airline ___________________	
Airline with Egress _________	
Air Purifying (FF) __________	Cartridges ___________
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Light Splash Suit	PVC _______	Neoprene _____	Other _______
Tyvek	Saranex ___	Polyethylene ___	Uncoated ___
Gloves	PVC _______	Neoprene _____	Other _______
Boots	PVC _______	Neoprene _____	Other _______
Boot Covers	PVC _______	Other ________	

IX. DECONTAMINATION

DESCRIBE METHODS USED:

Decontamination will take place in the decontamination area identified onsite. Prior to activities, a decontamination station will be set up including at least two 5-gallon buckets; one filled with a clean water and soap mixture and the other with clean water. All workers and PPE will be decontaminated to prevent the spread of hazardous materials. All workers will wash their hands, arms and face after removing PPE and prior to leaving the immediate work area and the site. Disposable items will be bagged for disposal along with other hazardous wastes. Support vehicles are to be left outside the exclusion area so that decontamination will not be necessary. Decontamination water will be contained and packaged for disposal along with other hazardous wastes.

The main decontamination station is located on the paved lot in the southeast corner of the property (northwest corner of the intersection of 36th Street and Industry Avenue). All workers will perform decontamination activities at the end of the day at this location. This location is located upwind of the drilling activities.

X. DISPOSAL

DESCRIBE METHODS:

All spoils and other wastes will be characterized to determine their hazard characteristics. Uncontaminated materials will be returned to the excavations at the end of the project. Contaminated materials will be packaged in accordance with applicable regulations and disposed by Pacific Ford Dealership at an approved disposal facility.