Versar INC.
ENVIRONMENTAL RISK MANAGEMENT

Versar INC.

SUBSURFACE SOIL INVESTIGATION

Fairmont Hospital
15400 Foothill Boulevard
San Leandro, California

Prepared for:

ALAMEDA COUNTY
GENERAL SERVICES AGENCY
4400 MacArthur Boulevard
Oakland, California 94619

Prepared by:

VERSAR, INC.
1255 Harbor Bay Parkway, Suite 100
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Versar Project No. 2241-016

May 24, 1994

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EXECUTIVE SUMMARY

Versar, Inc. (Versar), was retained by the County of Alameda, General Services Agency (County GSA) to investigate and evaluate the extent of petroleum hydrocarbons in the soil surrounding a former underground storage tank (UST) at the Fairmont Hospital (site), located at 15400 Foothill Boulevard in San Leandro, California. In July 1993, Environmental Science & Engineering, Inc. removed a 1,000 gallon UST from the site. The UST had previously been used to store diesel fuel for operation of an emergency generator at the hospital. Upon removal of the UST, a small perforation in the tank wall near the bottom of the southwest end of the UST was observed. Results of the laboratory analytical reports indicated that total petroleum hydrocarbons as diesel (TPH-D) was present in the soil. In the soil sample collected from the bottom of the southwest end of the excavation, TPH-D was detected at a concentration of 12,000 milligrams per kilogram (mg/kg), and TPH-D was present in the sample collected from the bottom of the northeast end of the excavation at a concentration of 1,100 mg/kg. Benzene, toluene, ethylbenzene, and xylenes (BTEX) were not reported in either of these two samples. Toluene was reported to be present in a sample collected from beneath the product supply lines at a concentration of 0.005 mg/kg, but TPH-D was not detected in this sample.

Five borings were drilled on the site to depths of up to 16.5 feet bgs. The soils underlying the site generally consisted of silty sands weathered from metamorphic bedrock and less weathered bedrock. Groundwater was not encountered in any of the borings. Field screening of the collected soil samples did not indicate contamination. Laboratory analyses of selected samples indicated that no chemicals of concern were present in the soil samples above their respective laboratory detection limits, with the exception of xylenes. In six of the nine samples analyzed, xylenes were detected at concentrations ranging from 0.010 to 0.028 mg/kg.

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Based on the information gathered during this investigation, the lateral extent of the petroleum hydrocarbons as diesel that were detected in the soil beneath the former location of the UST appears to be relatively limited. The positions of the borings appear to approximate the maximum lateral extent of the petroleum hydrocarbons in the soil. The vertical extent of the petroleum hydrocarbons in the soil, as approximated by the relatively minor concentrations of xylenes detected in the deepest samples collected, appears to be limited to a depth of approximately 16.5 feet in the soil in the area immediately surrounding the former tank location.

Approved for Release:

John S. Russell
Geologist
Geosciences Program

Michael P. Sellens, R.G. #4714
Geosciences Program Manager

REGISTERED GEOLOGIST
Michael P. Sellens
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STATE OF CALIFORNIA

John Russell for
Robert W. White
Program Manager
Technical Services Group

Versar INC.

1.0 BACKGROUND

Versar, Inc. (Versar), was retained by the County of Alameda, General Services Agency (County GSA) to investigate and evaluate the extent of petroleum hydrocarbons in the soil surrounding a former underground storage tank (UST) at the Fairmont Hospital (site), located at 15400 Foothill Boulevard in San Leandro, California.

1.1 Previous Investigations

In July 1993, Environmental Science & Engineering, Inc. (ESE) removed a 1,000 gallon UST from the site. The UST was removed from the area adjacent to the building housing the boilers (the Power House) and the maintenance shops. The UST had previously been used to store diesel fuel for the operation of an emergency generator at the hospital. Upon removal of the UST, a small perforation in the tank wall near the bottom of the southwest end of the UST was observed. In addition, the fuel distribution lines were reported to have been in poor condition and were suspected of leaking. Hydrocarbon odors were noted during excavation of the soils as well. The resultant excavation was approximately 13 feet long, 7 feet wide and 10 feet deep. At the direction of an Alameda County Health Care Services Agency (ACHCSA) representative, three soil samples were collected from native soils within the UST excavation.

The soil samples were analyzed for total petroleum hydrocarbons as diesel (TPH-D), and for benzene, toluene, ethylbenzene and xylenes (BTEX). Results of the laboratory analytical reports indicated that TPH-D was present in the soil sample collected from the bottom [10 feet below the ground surface (bgs)] of the southwest end of the excavation, at a concentration of 12,000 milligrams per kilogram (mg/kg). The second sample, collected from the bottom (10 feet bgs) of the northeast end of the excavation, was reported to contain TPH-D at a concentration of 1,100 mg/kg. BTEX constituents were not reported in either of these two samples. The third sample was collected from the sidewall of the excavation at a depth of 2.5 feet bgs, beneath the product supply lines, and was reported to contain toluene at a concentration of 0.005 mg/kg; TPH-D was not detected in this sample. Following

completion of the tank removal, the excavation was backfilled with imported pea gravel and the surface paved with asphalt. Soils removed during the excavation process were temporarily stockpiled onsite and subsequently transported to a Class III landfill in Livermore, California.

Based on these results, the ACHCSA requested that an investigation be performed to delineate the lateral and vertical extent of the remaining petroleum hydrocarbons in the soil in the vicinity of the former tank location. Versar was retained by the County GSA to perform the investigation requested by the ACHCSA. The proposed scope of work for this investigation, forwarded to the ACHCSA in Versar's workplan dated February 28, 1994, included drilling four soil borings around the perimeter of the former excavation to a depth of 40 feet, and collecting soil samples for laboratory analysis. The ACHCSA accepted Versar's workplan with the following stipulations: one additional boring be drilled through the southwest end of the excavation to determine the vertical extent of the contamination detected in this area during the tank removal; the first 10 feet of each boring be continuously cored or sampled to substantially evaluate the vertical profile of apparent soil contamination observed in the excavation sidewalls during the tank removal; "step-out" borings should be drilled to define the lateral extent of contamination, if necessary, and; all samples collected which exhibit evidence of soil contamination should be analyzed for the presence of target compounds. Versar submitted a workplan addendum letter to the ACHCSA on April 4, 1994 which modified the proposed scope of work to include the additional work requested by the ACHCSA, with the exception that the additional boring not be drilled through the excavation, but in the native soil near to the excavation limit, due to the pea gravel backfill in the excavation.

1.2 Regional Geology and Hydrogeology

The site is located at an elevation of approximately 120 feet above mean sea level (USGS, 1959), in the foothills of the Northern California Coast Ranges. Locally, the surficial soils consist of the Climara series, silty clays formed in residuum from ultrabasic bedrock (Welch, 1980). Regionally, the subsurface geology consists of Late Quaternary soils

comprising the uppermost deposits, underlain by laterally discontinuous, Cenozoic marine shelf and slope deposits, and terrestrial deposits that primarily consist of sandstone and shale/mudstone (Page, 1966). The Franciscan Complex, a chaotic melange of igneous, sedimentary, and metamorphic rocks, represents the regional bedrock.

The main regional aquifer is located at 50 to 1,000 feet below ground surface (bgs), with groundwater flowing to the west towards San Francisco Bay. No groundwater was encountered during the field activities completed for this investigation.

2.0 FIELD INVESTIGATION

Prior to beginning field work, a site-specific health and safety plan (HSP) was prepared in compliance with federal, California Occupational Safety and Health Administration and ACHCSA requirements. The HSP was developed for the specific conditions at the site to ensure safe work practices are followed by all personnel.

2.1 Soil Sampling

The field investigation consisted of drilling five soil borings and collecting soil samples. The soil borings were drilled using a truck-mounted drill rig (Mobile Drill B-34 for SB-1, and a Mobile Drill B-53 for the remainder of the borings) equipped with eight-inch diameter hollow-stem augers. The locations of the borings are shown on Figure 2. No soil borings were located on the western side of the excavation due to the proximity of an existing, full 12,000 gallon fuel oil UST. Although the location of the this tank was shown to be approximately 5 feet from the the former UST excavation on the basemap provided in ESE's tank removal report (as shown in Figure 2), field evidence (i.e., the locations of the fill port and pump vault along the centerline of the tank) indicated that the tank may have been closer to the excavation than the ESE diagram indicated. The location of boring SB-4 was chosen such that the abandoned product piping, as shown on ESE's basemap, would not be encountered during drilling. The location of the piping on this map was apparently not accurate, however, as SB-4 was drilled to a depth of 2 feet bgs and was subsequently abandoned when the unremoved abandoned product piping was encountered (see Figure 2). It was not possible to relocate this boring to the other side (southeast side) of the product piping due to a stormwater drain located in this area.

Boring SB-1 was drilled to a depth of 11.5 feet bgs, boring SB-2 was drilled to a depth of 13.5 feet bgs, boring SB-3 was drilled to a depth of 11.5 feet, SB-4 was drilled to a depth of 2 feet bgs, and boring SB-5 was drilled to a depth of 16.5 feet bgs. The soils encountered beneath the site were found to be composed primarily of weathered metamorphic bedrock. The first 4 to 6 feet of soil consisted of bedrock which had weathered to a silty sand. Below

Versar INC. SACRAMENTO

May 25, 1994

Mr. Scott Seery
Hazardous Materials Specialist
Alameda County Health Care Services Agency
UST Local Oversight Program
80 Swan Way, Room 200
Oakland, California 94621

Subject: Subsurface Soil Investigation, Fairmont Hospital, 15400 Foothill Boulevard, San Leandro, California; Versar Project No. 2241-016

Dear Mr. Seery:

Please find enclosed a copy of the Subsurface Soil Investigation for the Fairmont Hospital. If you have any questions or require additional information regarding this submittal, please call me at (916) 962-1612.

Sincerely,

Michael P. Sellers

for John Russell
Geologist

cc: Peter Kinney, Alameda County

Enclosures

5330 PRIMROSE DRIVE • SUITE 228 • FAIR OAKS, CALIFORNIA 95628
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this depth, the soils consisted of fractured but less weathered metamorphic bedrock. Weathering of the bedrock decreased with depth. All of the borings were terminated when drilling could not continue further without significant equipment damage ("refusal").

The collection of soil samples was accomplished using a 3.5-inch outside diameter California-modified split-spoon sampler lined with brass sample tubes, and a 1.5-inch outside diameter Standard Penetration Test (SPT) split-spoon. The California-modified split-spoon was used in the upper sampling intervals of each boring, where the weathered bedrock permited its use. The first approximately 3 feet of each boring was not sampled to allow for the location of any unidentified utility lines that may have been present in the subsurface. Continuous sampling was then attempted in each of the borings. Some intervals could not be sampled, however, due to difficulties caused by the hardness of the bedrock substrate. Upon retrieval of the sampler at each sample depth, the lowest sample tube was removed from the split-spoon sampler. The ends of the sample tube were then covered with teflon sheeting and tight-fitting caps. The tube was then labeled for identification purposes and placed on ice in an insulated ice chest pending shipment to a California-certified analytical laboratory for chemical analysis. A second sample tube was retained from each sample interval for field screening purposes.

The SPT sampler was used to sample the less weathered bedrock. This sampler was not lined with brass tubes. Upon retrieval of the sampler at each sample depth, the sampler was carefully split open to expose the core sample, which was quickly examined for staining or hydrocarbon odors. The sample was then immediately transferred to a brass sample tube equipped with teflon sheeting and an end cap. The sample was packed tightly into the tube and the remaining open end was then sealed with teflon sheeting and an end cap. The sample was labeled and preserved for transport to the analytical laboratory as described above.

In the field, a drilling log was generated for each boring. The drilling logs recorded the soil types encountered during drilling, along with sample information, type of sampler used to collect the sample, and any observed significant features related to the presence of petroleum hydrocarbons or other potentially hazardous materials. These drilling logs are contained in

Appendix A. All drilling and sampling was conducted under the supervision of a California state-registered geologist. In order to minimize the potential for cross-contamination of samples between each sampling interval, all sampling equipment was washed in a laboratory-grade detergent solution, rinsed with potable tap water, and received a final rinse of deionized water. In addition, the augers and associated drilling equipment were washed with a hot-water, high-pressure washer between boreholes. All boreholes will be backfilled using a cement-bentonite grout. The final 8 inches of the each borehole were finished to grade with a concrete cap to match the existing concrete apron.

2.2 Field Screening

Versar's field activities included field screening the collected soil samples for preliminary indications of contamination and to aid in the selection of soil samples to be submitted for laboratory analysis. Field screening activities included observing visual indications of potential contamination, such as staining and soil discoloration, and collecting headspace readings of organic vapors from selected samples. Headspace analysis of individual samples was conducted by placing the selected soil sample in a new, clean, resealable plastic bag. The amount of soil used in each test was approximately equivalent to the volume of soil in one brass sample tube. The bag was then closed, the soil in the bag was manually broken up to minimize soil clumps, and allowed to stand for about 10 minutes at the ambient air temperature to allow any volatile organic compounds (VOCs) present in the soil to volatilize. The headspace in the bag was then measured for total VOCs using an organic vapor analyzer (OVA) equipped with a flameionization detector (FID). Headspace readings for each sample were then recorded on the drilling logs included in Appendix A. Because of the narrower diameter of the SPT, there was insufficient sample collected to perform a headspace screening when the SPT sampler was used.

No indications of potential contamination, including hydrocarbon odors, OVA readings or staining, were noted in any of the soil samples that were examined.

3.0 LABORATORY ANALYTICAL PROGRAM

A total of nine soil samples were submitted for laboratory analysis. Since no field indications of potential contamination were noted in the soil samples collected, the samples submitted for laboratory analysis were selected based on their stratigraphic position. Two samples were submitted for analysis from each boring. Both of the samples submitted for analysis from each borings were collected at depths at or below the invert of the former UST. The remainder of the soil samples collected were also submitted to the analyzing laboratory for preservation pending the completion of the investigation. All samples were collected and transported under chain-of-custody protocol to document sample collection, handling and transport to the analytical laboratory. The soil samples were submitted for analysis to McCampbell Analytical Inc., a State-certified (California Department of Health Services Certification Number 1644) analytical laboratory.

The results of the laboratory analyses are presented in Table 1. Appendix B contains copies of the laboratory analytical reports and chain-of-custody forms.

3.1 Soil Sample Analysis

Selected soil samples collected from the borings were analyzed for the following:

- TPH-D by EPA Method 3550/8015M;
- BTEX by EPA Method 5030/8020.

TPH-D, benzene, toluene, and ethylbenzene were not detected in any of the samples above their respective detection limits. Xylenes were the only BTEX compound detected in the samples. Xylene concentrations ranged from 0.010 mg/kg to 0.028 mg/kg.

4.0 SUMMARY

This section provides brief summaries of the findings from Versar's subsurface soil investigation conducted at the site.

- Five borings were drilled on the site to depths of up to 16.5 feet bgs. The soils underlying the site generally consisted of silty sands weathered from metamorphic bedrock and less weathered bedrock.

- Groundwater was not encountered in any of the borings.

- Field screening of the collected soil samples did not indicate any potential contamination. Laboratory analyses of selected samples indicated that no chemicals of concern were present in the soil samples above their respective laboratory detection limits, with the exception of xylenes. Xylenes were detected in 6 of the 9 samples analyzed, at concentrations ranging from 0.010 to 0.028 mg/kg.

5.0 CONCLUSIONS

The lateral extent of the petroleum hydrocarbons as diesel that were previously detected in the soil beneath the former location of the UST appears to be relatively limited, based on the information gathered during this investigation. Although minor concentrations of xylenes were detected in 6 of the soil samples collected from three of the borings, petroleum hydrocarbons as diesel and the aromatic hydrocarbons benzene, toluene, and ethylbenzene were not detected in the soil samples from these borings. This indicates that the positions of the borings approximate the maximum lateral extent of the petroleum hydrocarbons in the soil. The vertical extent of the petroleum hydrocarbons in the soil, as approximated by the relatively minor concentrations of xylenes detected in the deepest samples collected, appears to be limited to a depth of approximately 16.5 feet in the soil in the area immediately surrounding the former tank location.

6.0 RECOMMENDATIONS

We recommend that no further drilling be conducted, as the locations of the borings drilled for this investigation suitably characterize the lateral extent of the petroleum hydrocarbons in the soil. The County GSA has proposed to remediate the remaining contaminated soil in the bottom of the former tank pit through over-excavation. This over-excavation will entail removing the asphalt patch and concrete over the former excavation and then removing the pea gravel backfilling material. The contaminated soil in the bottom of the excavation, along with any residual contamination in the sidewalls, will then be excavated for eventual disposal to a permitted disposal facility. Confirmation samples will be collected from the bottom and sidewalls of the excavation prior to backfilling it with clean fill, to document the cleanup levels achieved. Versar believes that this remediation option, if implemented, has the potential to remove the contaminated soil detected in the excavation during the tank removal. Prior to its implementing this remedial option, we recommend that the County GSA prepare a work plan detailing the proposed site activities for submittal to the ACHCSA for their review and acceptance.

7.0 BIBLIOGRAPHY

Page, B. M. (1966). "Geology of the Coast Ranges of California" in Geology of Northern California: Bulletin 190. California Division of Mines and Geology.

U. S. Geological Survey (1959). Hayward Quadrangle, California, 7.5 minute series (topographic). U. S. Department of the Interior.

Welch, L. E. (1980). Soil Survey of Alameda County, California, Western Part. U. S. D.A.

8.0 STATEMENT OF LIMITATIONS

The data presented and the opinions expressed in this report are qualified as follows:

- The sole purpose of the investigation and of this report is to assess the physical characteristics of the Site with respect to the presence or absence of oil or hazardous materials and substances in the environment as defined in the applicable state and federal environmental laws and regulations and to gather information regarding current and past environmental conditions at the Site.

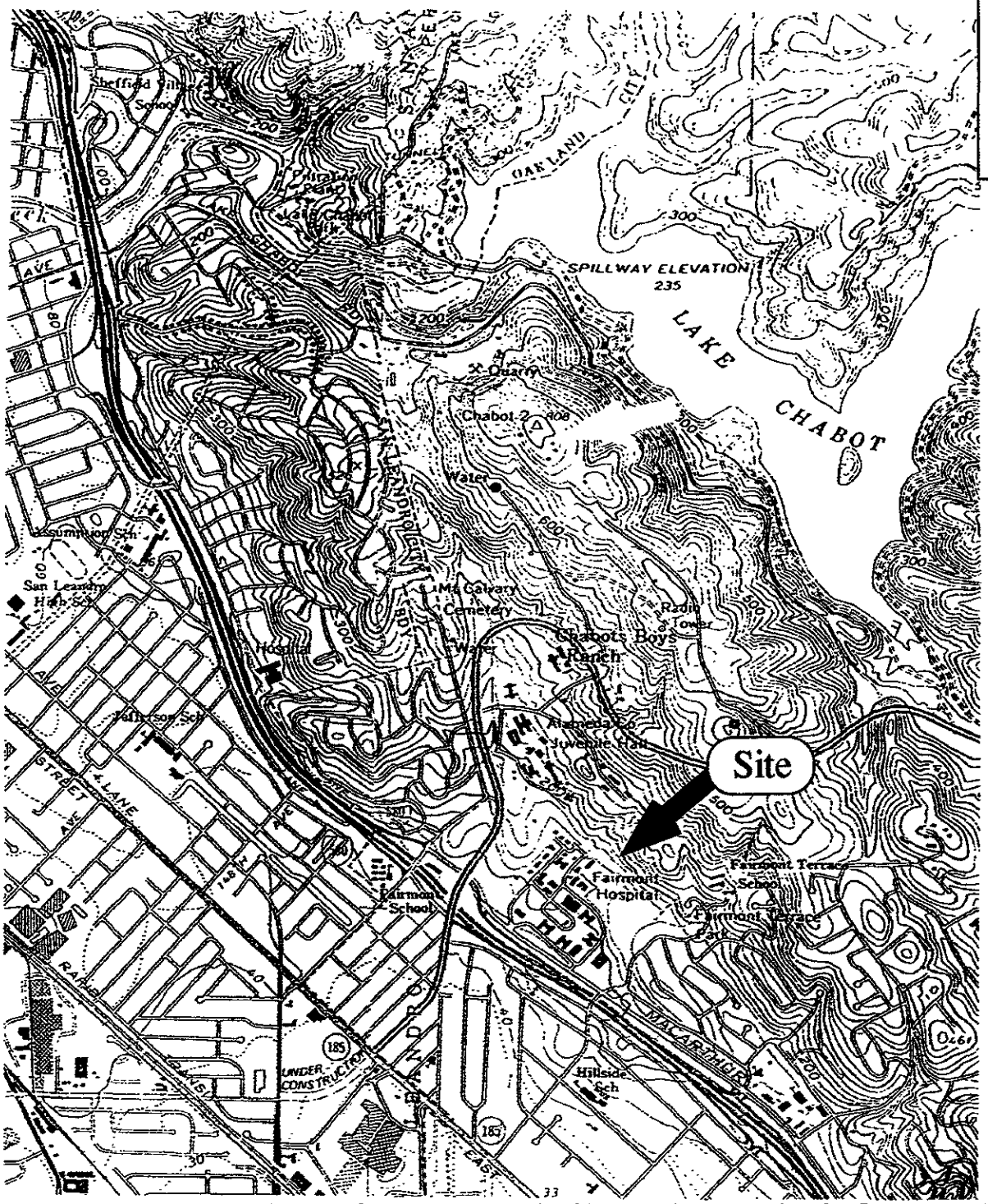
- Versar derived the data in this report primarily from visual limited inspections and examination of records in the public domain as indicated by the Scope of Services for the Site. Due to site access restrictions, a complete interior building inspection was not included in Versar's Scope of Work. The passage of time, manifestation of latent conditions, or occurrence of future events may require further exploration at the Site, analysis of the data, and reevaluation of the findings, observations, conclusions, and recommendations expressed in the report.

- In preparing this report, Versar has relied upon and presumed accurate certain information (or the absence thereof) about the Site and adjacent properties provided by governmental officials and agencies. Except as otherwise stated in the report, Versar has not attempted to verify the accuracy or completeness of such information.

- The data reported and the findings, observations, conclusions, and recommendations expressed in the report are limited by the Scope of Services. The Scope of Services was defined by the requests of the Client, the time and budgetary constraints imposed by the Client, and the availability of access to the Site.

- Because of the limitations stated above, the findings, observations, conclusions and recommendations expressed by Versar in this report are limited to the information obtained and should not be considered an opinion concerning the compliance of any past or current owner or operator of the Site with any federal, state, or local law or regulation. No warranty or guarantee, whether express or implied, is made with respect to the data reported or findings, observations, conclusions, and recommendations expressed in this report. Further, such data, findings, observations, conclusions, and recommendations are based solely upon Site conditions in existence at the time of investigation.

- This report has been prepared on behalf of and for the exclusive use of the Client, and is subject to and issued in connection with the Agreement and the provisions thereof.



Note: base map from USGS Hayward and San Leandro, CA quadrangles, 7.5 minute series

Not to Scale	Site Location	Figure 1
Project No. 2241-016	Fairmont Hospital San Leandro, California	Versar, Inc.

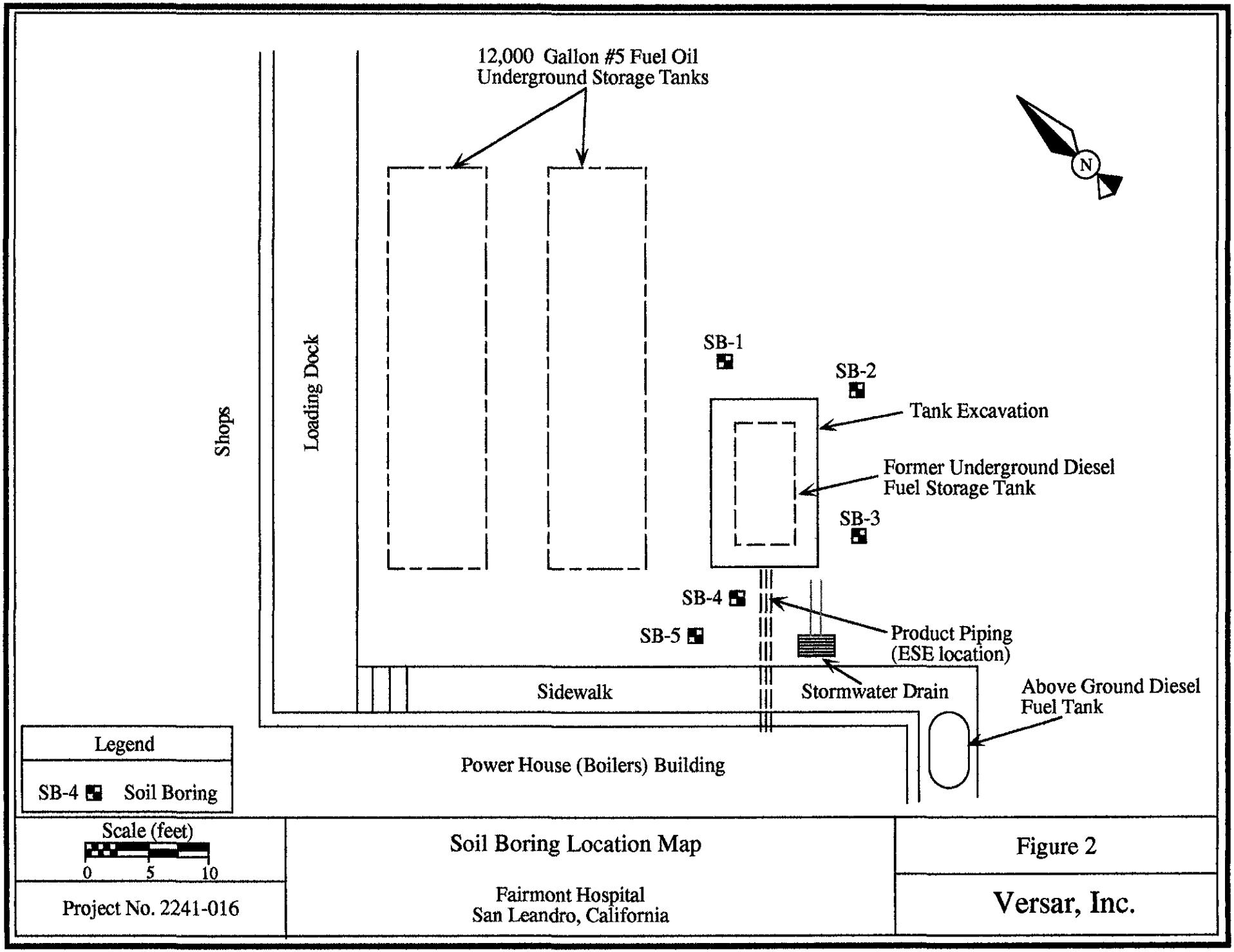

12,000 Gallon #5 Fuel Oil
Underground Storage Tanks
N
Shops
Loading Dock
SB-1
SB-2
Tank Excavation
Former Underground Diesel
Fuel Storage Tank
SB-3
SB-4
SB-5
Product Piping
(ESE location)
Sidewalk
Stormwater Drain
Above Ground Diesel
Fuel Tank
Power House (Boilers) Building
Legend
SB-4 Soil Boring
Scale (feet)
0 5 10
Soil Boring Location Map
Fairmont Hospital
San Leandro, California
Figure 2
Project No. 2241-016
Versar, Inc.

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TABLE 1
LABORATORY ANALYTICAL RESULTS FOR ORGANICS

Fairmont Hospital
San Leandro, California

Sample ID	Sample Date	Sample Depth (feet)	TPH-D[1]	Benzene[2]	Toluene[2]	Ethylbenzene[2]	Xylenes[2]
SB-1-8	04/21/94	8.0 - 9.0	< 10[3]	< 0.005	< 0.005	< 0.005	< 0.005
SB-1-11	04/21/94	11.0 - 11.5	< 10	< 0.005	< 0.005	< 0.005	< 0.005
SB-2-11.5	04/21/94	11.0 - 11.5	< 10	< 0.005	< 0.005	< 0.005	0.015
SB-2-13	04/21/94	13.0	< 10	< 0.005	< 0.005	< 0.005	0.012
SB-3-10	04/22/94	9.0 - 10.5	< 10	< 0.005	< 0.005	< 0.005	0.021
SB-3-11	04/22/94	11.0 - 11.5	< 10	< 0.005	< 0.005	< 0.005	0.023
SB-5-12	04/22/94	11.0 - 12.5	< 10	< 0.005	< 0.005	< 0.005	0.010
SB-5-14	04/22/94	13.0 - 14.5	< 10	< 0.005	< 0.005	< 0.005	< 0.005
SB-5-16	04/22/94	15.0 - 16.5	< 10	< 0.005	< 0.005	< 0.005	0.028

All results expressed in milligrams per kilogram

[1] Total Petroleum Hydrocarbons as Diesel by EPA Method 3350/8015M
[2] BTEX by EPA Method 8020
[3] Less than detection limit

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APPENDIX A

Drilling Logs

Versar Inc.	DRILLING LOG	PROJECT NO. 2241-016

Supervising Geologist: M. Sellens	Site Name: Fairmont Hospital
Log By: John Russell	Boring No: SB-1
Date: 4/21/94	Boring Diameter: 8 - inches
Drilling Contractor: Turner Exploration	Boring Depth: 11.5 feet
Contractor Lic. No. C-57 #602720	Boring Location: See Figure
Rig Type: Mobile Drill B-34	
Driller: Guy Cabral	

Depth (ft)	Advanced/ Recovered	Blow Counts	First Water/ Water Table	Well Construction	USCS Group	Lithology	USCS SOIL DESCRIPTION / SOIL CONDITION AND GEOLOGIC INTERPRETATION SOIL TYPE, ROUNDING, SORTING, PERCENT: GRAVEL, SANDS, FINES COLOR, MOISTURE, DENSITY, SECONDARY POROSITY, ODORS, STAINING GEOLOGY: FILL, ALLUVIUM, BEDROCK		Headspace (ppm)
1							0.0' - 0.5' Concrete. 0.5' - 2.5' Silty sand, moist, dense, no hydrocarbon odor or staining.	1.0' -	0
2									
3							2.5' - 4.5' Same as above.		
4									
5		23 50/3"					4.5' - 5.5' Grey silty sand, moist, very dense, no hydrocarbon odor or staining, weathered bedrock.	4.5' -	0
6		37 50					5.5' - 6.0' Same as above.	5.5' -	0
7		67/4"					6.0' - 8.0' Fractured meatmorphic bedrock, greenstone, no hydrocarbon odor or staining.		
8									
9		33 75/3"					8.0' - 11.5' Same as above. Boring terminated at 11.5'. SPT sampler.	8.5' -	NA
10									
11		50 67/3"					SPT sampler	10.5' -	0

Versar Inc.	**DRILLING LOG**	PROJECT NO. 2241-016
Supervising Geologist: M. Sellens	Site Name: Fairmont Hospital	
Log By: John Russell	Boring No: SB-2	
Date: 4/21/94	Boring Diameter: 8 - inches	
Drilling Contractor: Turner Exploration	Boring Depth: 13.5 feet	
Contractor Lic. No. C-57 #602720	Boring Location: See Figure	
Rig Type: Mobile Drill B-53		
Driller: Guy Cabral		

Depth (ft)	Advanced/ Recovered	Blow Counts	First Water/ Water Table	Well Construction	USCS Group	Lithology	USCS SOIL DESCRIPTION SOIL CONDITION AND GEOLOGIC INTERPRETATION SOIL TYPE, ROUNDING, SORTING, PERCENT: GRAVEL, SANDS, FINES COLOR, MOISTURE, DENSITY, SECONDARY POROSITY, ODORS, STAINING GEOLOGY: FILL, ALLUVIUM, BEDROCK	Headspace (ppm)
1							0.0' - 0.5' Concrete. 0.5' - 4.0' Silty sand, fine grained sand, well graded, brown, moist, very dense, no hydrocarbon odor or staining, trace clay, some silt.	
2								
3								
4		7 26					4.0' -	0
5		21					4.0' - 6.0' Same as above. 5.0' -	0
6		17 26						
7		37					6.0' - 7.5' Silty sand, fine grained sand, trace clay, some silt, metamorphic rock fragments up to 3 centimeters diameter, brown, moist, very dense, no hydrocarbon odor. 6.5' -	0
8		33 40/1"					7.5' - 9.0' Metamorphic rock - greenstone, fractured, very dense, no hydrocarbon odor or staining. 7.5' -	0
9								
10		30 40					9.0' - 11.0' Same as above. SPT Sampler. 9.5' -	NA
11		35					11.0' - 13.0' Same as above. SPT Sampler. 11.0' -	NA

Versar Inc.	**DRILLING LOG**	PROJECT NO. 2241-016

Supervising Geologist: M. Sellens	Site Name: Fairmont Hospital
Log By: John Russell	Boring No: SB-2
Date: 4/21/94	Boring Diameter: 8 - inches
Drilling Contractor: Turner Exploration	Boring Depth: 13.5 feet
Contractor Lic. No. C-57 #602720	Boring Location: See Figure
Rig Type: Mobile Drill B-53	
Driller: Guy Cabral	

Depth (ft)	Advanced/ Recovered	Blow Counts	First Water/ Water Table	Well Construction	USCS Group	Lithology	USCS SOIL DESCRIPTION SOIL CONDITION AND GEOLOGIC INTERPRETATION SOIL TYPE, ROUNDING, SORTING, PERCENT: GRAVEL, SANDS, FINES COLOR, MOISTURE, DENSITY, SECONDARY POROSITY, ODORS, STAINING GEOLOGY: FILL, ALLUVIUM, BEDROCK	Headspace (ppm)
12		40 50/3"					13.0' - 13.5' Same as above, very hard drilling. SPT Sampler.	
13								
14		63/6"					SPT Sampler. Boring terminated at 13.5'. 13.5' -	NA

Versar Inc.	**DRILLING LOG**	PROJECT NO. 2241-016

Supervising Geologist: M. Sellens	Site Name: Fairmont Hospital
Log By: John Russell	Boring No: SB-3
Date: 4/22/94	Boring Diameter: 8 - inches
Drilling Contractor: Turner Exploration	Boring Depth: 11.5 feet
Contractor Lic. No. C-57 #602720	Boring Location: See Figure
Rig Type: Mobile Drill B-53	
Driller: Guy Cabral	

Depth (ft)	Advanced/ Recovered	Blow Counts	First Water/ Water Table	Well Construction	USCS Group	Lithology	USCS SOIL DESCRIPTION / SOIL CONDITION AND GEOLOGIC INTERPRETATION SOIL TYPE, ROUNDING, SORTING, PERCENT: GRAVEL, SANDS, FINES COLOR, MOISTURE, DENSITY, SECONDARY POROSITY, ODORS, STAINING GEOLOGY: FILL, ALLUVIUM, BEDROCK		Headspace (ppm)
1							0.0' - 0.5' Concrete. 0.5' - 4.0' Silty sand, well graded, little clay, no hydrocarbon odor or staining.		
2									
3									
4		8 17							
5		28					4.0' - 6.0' Weathered metamorphic bedrock, weathered to brown silty sand, some clay, no hydrocarbon odor or staining.	4.0' -	0
6		47 50/3"					5.5' - 7.5' Weathered metamorphic bedrock - greenstone, fractured, no hydrocarbon odor or staining. Composite sample from 5 - 6 feet. SPT Sampler.	5.0' -	0
7									
8		33 38					7.5' - 9.5' Weathered metamorphic bedrock - greenstone with quartz, fractured, no hydrocarbon odor or staining. Composite sample	7.5' -	NA
9		50					from 7 - 8.5 feet. SPT Sampler.		
10		25 35					9.5' - 11.0' Weathered/fresh bedrock. Greenstone, fractured, but more competent than above rock. Not as weathered	9.5' -	NA
11		37 35					as above. No hydrocarbon odor or staining. Boring terminated at 11.5'. SPT Sampler. 11.0' - 13.0' Same as above. SPT Sampler.	10.5' - 11.5' -	NA NA
		37							

Versar Inc.	**DRILLING LOG**	PROJECT NO. 2241-016

Supervising Geologist: M. Sellens	Site Name: Fairmont Hospital
Log By: John Russell	Boring No: SB-4
Date: 4/22/94	Boring Diameter: 8 - inches
Drilling Contractor: Turner Exploration	Boring Depth: 2 feet
Contractor Lic. No. C-57 #602720	Boring Location: See Figure
Rig Type: Mobile Drill B-53	
Driller: Guy Cabral	

Depth (ft)	Advanced/ Recovered	Blow Counts	First Water/ Water Table	Well Construction	USCS Group	Lithology	USCS SOIL DESCRIPTION SOIL CONDITION AND GEOLOGIC INTERPRETATION SOIL TYPE, ROUNDING, SORTING, PERCENT: GRAVEL, SANDS, FINES COLOR, MOISTURE, DENSITY, SECONDARY POROSITY, ODORS, STAINING GEOLOGY: FILL, ALLUVIUM, BEDROCK	Headspace (ppm)
1							SB-4 was abandoned when piping was encountered at 2.0 feet.	
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								

Versar Inc.	DRILLING LOG	PROJECT NO. 2241-016

Supervising Geologist: M. Sellens	Site Name: Fairmont Hospital
Log By: John Russell	Boring No: SB-5
Date: 4/22/94	Boring Diameter: 8 - inches
Drilling Contractor: Turner Exploration	Boring Depth: 16.5 feet
Contractor Lic. No. C-57 #602720	Boring Location: See Figure
Rig Type: Mobile Drill B-53	
Driller: Guy Cabral	

Depth (ft)	Advanced/ Recovered	Blow Counts	First Water/ Water Table	Well Construction	USCS Group	Lithology	USCS SOIL DESCRIPTION SOIL CONDITION AND GEOLOGIC INTERPRETATION SOIL TYPE, ROUNDING, SORTING, PERCENT: GRAVEL, SANDS, FINES COLOR, MOISTURE, DENSITY, SECONDARY POROSITY, ODORS, STAINING GEOLOGY: FILL, ALLUVIUM, BEDROCK	Headspace (ppm)
1							0.0' - 0.5' Concrete. 0.5' - 4.0' Silty sand, well graded, little clay, no hydrocarbon odor or staining.	
2								
3								
4								
5							4.0' - 5.5' Metamorphic bedrock weathered to silty sand, brown, angular, well graded, some clay, no hydrocarbon odor or staining. 4.5' -	0
6		35 42					5.5' - 7.5' Fractured metamorphic bedrock, little clay material, (weathered bedrock), no hydrocarbon odor or staining. 5.5' -	0
7		50/5"						
8		20 35					7.5' - 9.5' Fractured metamorphic bedrock, greenstone, trace clay material, no hydrocarbon odor or staining. Composite sample 7 - 8.5 feet. SPT Sampler. 7.5' -	0
9		37						
10		16 25					9.5' - 11.5' Same as above. Composite sample from 9 - 10.5 feet. No hydrocarbon odor or staining. SPT Sampler. 9.5' -	NA
11		26						

Versar Inc.	DRILLING LOG	PROJECT NO. 2241-016

Supervising Geologist: M. Sellens	Site Name: Fairmont Hospital
Log By: John Russell	Boring No: SB-5
Date: 4/22/94	Boring Diameter: 8 - inches
Drilling Contractor: Turner Exploration	Boring Depth: 16.5 feet
Contractor Lic. No. C-57 #602720	Boring Location: See Figure
Rig Type: Mobile Drill B-53	
Driller: Guy Cabral	

Depth (ft)	Advanced/ Recovered	Blow Counts	First Water/ Water Table	Well Construction	USCS Group	Lithology	USCS SOIL DESCRIPTION / SOIL CONDITION AND GEOLOGIC INTERPRETATION SOIL TYPE, ROUNDING, SORTING, PERCENT: GRAVEL, SANDS, FINES COLOR, MOISTURE, DENSITY, SECONDARY POROSITY, ODORS, STAINING GEOLOGY: FILL, ALLUVIUM, BEDROCK	Headspace (ppm)
12	XX	15					11.5' - 13.5' Same as above. Composite sample from 11 - 12.5 feet. No staining or hydrocarbon odor. Very hard drilling. SPT Sampler.	NA
13	XX	15						
14							13.5' - 15.5' Weathered, fractured metamorphic rock, greenstone. No staining or hydrocarbon odor. Very hard drilling. Composite sample from 13 - 14.5 feet.	13.5' - NA
15								
16	XX	15 39					15.5' - 16.5' Same as above. Weathered bedrock. No staining or hydrocarbon odor. Very hard drilling. Composite sample from 15 - 16.5 feet.	15.5' - NA
17	XX	47						

Versar INC.

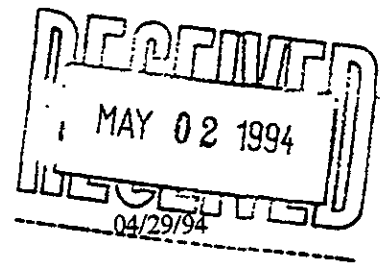
APPENDIX B

Analytical Reports and Chain-of-Custody Forms

McCAMPBELL ANALYTICAL INC.

110 2nd Avenue South, #D7, Pacheco, CA 94553
Tele: 510-798-1620 Fax: 510-798-1622

COPY



Dear Peter:

Enclosed are:

1). the results of 9 samples from your # **2241-016; Fairmont Hospital** project,

2). a QC report for the above samples

3). a copy of the chain of custody, and

4). a bill for analytical services.

If you have any questions please contact me. McCampbell Analytical Laboratories strives for excellence in quality, service and cost. Thank you for your business and I look forward to working with you again.

Yours truly,

Edward Hamilton

McCAMPBELL ANALYTICAL INC. | 110 2nd Avenue South, #D7, Pacheco, CA 94553
Tele: 510-798-1620 Fax: 510-798-1622

Versar 5330 Primrose Dr. # 228 Fair Oaks, Ca. 95628	Client Project ID: # 2241-016; Fairmont Hospital	Date Sampled: 04/21-04/22/94
		Date Received: 04/22/94
	Client Contact: Peter Kinney / John Russell	Date Extracted: 04/22/94
	Client P.O: # 141-0-7925-00	Date Analyzed: 04/23-04/24/94

Gasoline Range (C6-C12) Volatile Hydrocarbons as Gasoline*, with BTEX*

EPA methods 5030, modified 8015, and 8020 or 602; California RWQCB (SF Bay Region) method GCFID(5030)

Lab ID	Client ID	Matrix	TPH(g)+	Benzene	Toluene	Ethylben-zene	Xylenes	% Rec. Surrogate
35259	SB-1-8	S	—	ND	ND	ND	ND	95
35260	SB-1-11	S	—	ND	ND	ND	ND	95
35265	SB-2-11.5	S	—	ND	ND	ND	0.015	96
35266	SB-2-13	S	—	ND	ND	ND	0.012	97
35270	SB-3-10	S	—	ND	ND	ND	0.021	92
35271	SB-3-11	S	—	ND	ND	ND	0.023	92
35276	SB-5-12	S	—	ND	ND	ND	0.010	91
35277	SB-5-14	S	—	ND	ND	ND	ND	97
35278	SB-5-16	S	—	ND	ND	ND	0.028	86
Detection Limit unless other-wise stated; ND means Not Detected		W	50 ug/L	0.5	0.5	0.5	0.5	
		S	1.0 mg/kg	0.005	0.005	0.005	0.005	

*water samples are reported in ug/L, soil samples in mg/kg, and all TCLP extracts in mg/L

cluttered chromatogram; sample peak co-elutes with surrogate peak

+ The following descriptions of the TPH chromatogram are cursory in nature and McCampbell Analytical is not responsible for their interpretation: a) unmodified or weakly modified gasoline is significant; b) heavier gasoline range compounds are significant(aged gasoline?); c) lighter gasoline range compounds (the most mobile fraction) are significant; d) gasoline range compounds are significant; no recognizable pattern; e) TPH pattern that does not appear to be derived from gasoline (?); f) one to a few isolated peaks present; g) strongly aged gasoline or diesel range compounds are significant; h) lighter than water immiscible phase is present.

DHS Certification No. 1644

Edward Hamilton, Lab Director

McCAMPBELL ANALYTICAL INC.
110 2nd Avenue South, #D7, Pacheco, CA 94553
Tele: 510-798-1620 Fax: 510-798-1622

Versar 5330 Primrose Dr. # 228 Fair Oaks, Ca. 95628	Client Project ID: # 2241-016; Fairmont Hospital	Date Sampled: 04/21-04/22/94
		Date Received: 04/22/94
	Client Contact: Peter Kinney / John Russell	Date Extracted: 04/22/94
	Client P.O: # 141-0-7925-00	Date Analyzed: 04/23-04/24/94

Diesel Range (C10-C23) Extractable Hydrocarbons as Diesel *

EPA methods modified 8015, and 3550 or 3510; California RWQCB (SF Bay Region) method GCFID(3550) or GCFID(3510)

Lab ID	Client ID	Matrix	TPH(d)+	% Recovery Surrogate
35259	SB-1-8	S	ND	88
35260	SB-1-11	S	ND	92
35265	SB-2-11.5	S	ND	90
35266	SB-2-13	S	ND	91
35270	SB-3-10	S	ND	87
35271	SB-3-11	S	ND	87
35276	SB-5-12	S	ND	89
35277	SB-5-14	S	ND	87
35278	SB-5-16	S	ND	86
Detection Limit unless otherwise stated; ND means Not Detected		W	50 ug/L	
		S	10 mg/kg	

*water samples are reported in ug/L, soil samples in mg/kg, and all TCLP extracts in mg/L

cluttered chromatogram; surrogate and sample peaks co-elute or surrogate peak is on elevated baseline

+ The following descriptions of the TPH chromatogram are cursory in nature and McCampbell Analytical is not responsible for their interpretation: a) unmodified or weakly modified diesel is significant; b) diesel range compounds are significant; no recognizable pattern; c) modified diesel?; light(C_L) or heavy(C_H) diesel compounds are significant); d) gasoline range compounds are significant; e) medium boiling point pattern that does not match diesel(?); f) one to a few isolated peaks present; g) oil range compounds are significant; h) lighter than water immiscible phase is present.

DHS Certification No. 1644

Edward Hamilton, Lab Director

McCAMPBELL ANALYTICAL INC. | 110 2nd Avenue South, #D7, Pacheco, CA 94553
Tele: 510-798-1620 Fax: 510-798-1622

QC REPORT FOR HYDROCARBON ANALYSES

Date: 04/23-04/24/94 Matrix: Soil

Analyte	Concentration (mg/kg)			Amount Spiked	% Recovery		RPD
	Sample	MS	MSD		MS	MSD	
TPH (gas)	0.000	1.754	1.887	2.03	86	93	7.3
Benzene	0.000	0.176	0.188	0.2	88	94	6.6
Toluene	0.000	0.180	0.192	0.2	90	96	6.5
Ethylbenzene	0.000	0.180	0.184	0.2	90	92	2.2
Xylenes	0.000	0.548	0.562	0.6	91	94	2.5
TPH (diesel)	19	336	317	300	106	99	5.8
TRPH (oil & grease)	N/A	N/A	N/A	N/A	N/A	N/A	N/A

% Rec. = (MS - Sample) / amount spiked x 100

RPD = (MS - MSD) / (MS + MSD) x 2 x 100

3330 Fairmont Dr. #225 Fairfax, CA 94621

2320 AAC 8

Versar

CHAIN OF CUSTODY RECORD

PROJECT NO.	PROJECT NAME
2241-016	Fairmont Hospital - County of Alameda

SAMPLERS: (Signature) John Russell (Printed) John Russell

FIELD SAMPLE NUMBER	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	TPH-D (8015M)	BTEX (8020)	Hold	REMARKS
B-1-3	4/21/94	1340		X	SB-1	1			X	35256
SB-1-5	"	1352		X	SB-1	1			X	35257
SB-1-6	"	1409		X	SB-1	1			X	35258
SB-1-8	"	1422		X	SB-1	1	X	X		35259
SB-1-11	"	1446		X	SB-1	1	X	X		35260
SB-2-4	"	1526		X	SB-2	1			X	35261
SB-2-6	"	1530		X	SB-2	1			X	35262
SB-2-7.5	"	1539		X	SB-2	1			X	35263
SB-2-10.5	"	1552		X	SB-2	1			X	35264
SB-2-11.5	"	1602		X	SB-2	1	X	X		35265
SB-2-13	"	1614		X	SB-2	1	X	X		35266

PARAMETERS

INDUSTRIAL HYGIENE SAMPLE: Y / (N)

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
John Russell	4/22/94 427	Heidi Ricca			
(Printed) John Russell		(Printed) Heidi Ricca	(Printed)		(Printed)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature) VOA'S O&G METALS OTHER	Date / Time	Remarks Send Results to: 1. Pete Kinney, Co of Alameda 2. John Russell - Versar (916) 962-1612 FAX (916) 962-2678	Normal TAT
(Printed)		ICE/T GOOD CONDITION HEAD SPACE ABSENT PRESERVATIVE APPROPRIATE CONTAINERS			

Versar

CHAIN OF CUSTODY RECORD

2320 AAC

PROJECT NO.	PROJECT NAME
2241-016	Fairmont Hospital - County of Alameda

SAMPLERS: (Signature) John Russell (Printed) John Russell

FIELD SAMPLE NUMBER	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	TPH-D (8015M)	BTEX (8020)	HOLD	INDUSTRIAL HYGIENE SAMPLE Y/N	REMARKS
SB-3-4	4/22/94	0815		X	SB-3	1			X		35267
SB-3-5.5	"	0823		X	SB-3	1			X		35268
SB-3-8.5	"	0830		X	SB-3	1			X		35269
SB-3-10	"	0839		X	SB-3	1	X	X			35270
SB-3-11	"	0851		X	SB-3	1	X	X			35271
SB-5-4.5	"	0918		X	SB-5	1			X		35272
SB-5-6.5	"	0928		X	SB-5	1			X		35273
SB-5-8.5	"	0935		X	SB-5	1			X		35274
SB-5-10.5	"	0940		X	SB-5	1			X		35275
SB-5-12.0	"	0949		X	SB-5	1	X	X			35276
SB-5-14	"	0954		X	SB-5	1	X	X			35277
SB-5-16		1015		X	SB-5	1	X	X			35278

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
John Russell	4/22/94 427pm	Heidi Ricca			
(Printed) John Russell		(Printed) Heidi Ricca	(Printed)		(Printed)

Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks
(Printed)		VOAS O&G METALS OTHER		Send results to 1. Pete Kinney - Co. of Alameda 2. John Russell, Versar (916) 962-1612 FAX (916) 962-2678

ICE? ✓ GOOD CONDITION ✓ HEAD SPACE ABSENT ✓ PRESERVATIVE APPROPRIATE ✓ CONTAINERS ✓