

92 JUN -3 11:09

LETTER OF TRANSMITTAL

TO:

Ms. Juliette Shin
Alameda County Health Care Services Agency
Hazardous Materials Division
80 Swan Way, Room 200
Oakland, CA 94621

DATE:

June 2, 1992

PROJECT

College of Alameda/555 Atlantic Avenue, Alameda

SCI JOB NUMBER:

469.005 and 469.006

WE ARE SENDING YOU:

1 copies each

- of our final report
- a draft of our report
- a Service Agreement
- a proposed scope of services
- specifications
- grading/foundation plans
- soil samples/groundwater samples
- an executed contract

- if you have any questions, please call
- for your review and comment
- please return an executed copy
- for geotechnical services
- with our comments
- with Chain of Custody documents
- for your use

REMARKS:

Enclosed is one copy of two reports:

Groundwater Investigation and
Underground Tank Closure and Groundwater Investigation/Work Plan

COPIES TO:

BY:

Marianne Watada

Marianne Watada

(initials)

Subsurface Consultants, Inc.

GROUNDWATER INVESTIGATION
COLLEGE OF ALAMEDA
555 ATLANTIC AVENUE
ALAMEDA, CALIFORNIA
SCI 469.006

Prepared for:

Mr. Robert Mibach
Director of Physical Plant
Peralta Community College District
333 East 8th Avenue
Oakland, California 94606

By:

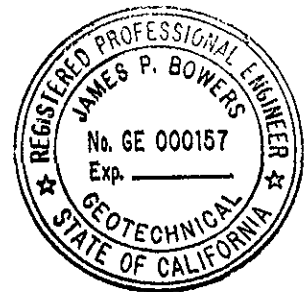
R. William Rudolph

R. William Rudolph
Geotechnical Engineer 741 (expires 12/31/92)



James P. Bowers by him

James P. Bowers
Geotechnical Engineer 157 (expires 3/31/95)



Subsurface Consultants, Inc.
171 12th Street, Suite 201
Oakland, California 94607
(510) 268-0461

April 3, 1992

I INTRODUCTION

This report presents the results of a groundwater investigation conducted by Subsurface Consultants, Inc. (SCI) at the College of Alameda, 555 Atlantic Avenue in Alameda, California. The investigation was required by the Alameda County Health Care Services Agency (ACHCSA) to evaluate whether groundwater quality has been impacted by hydrocarbon releases from previous underground storage tanks. The study area is shown on Plate 1.

On August 15 and 20, 1991, five underground storage tanks (identified as tanks A1, A2, A3, A4 and A5) were removed from the site. The tanks stored gasoline, fuel oil and waste oil. The analytical test results of soil and groundwater from beneath tanks A-1 through A-4 and their associated piping indicated that releases had occurred. Soil remediation, consisting of excavation and off-site disposal of contaminated soil, was successful in removing soils containing contaminant concentrations above analytical detection limits. Based upon a telephone conversation with Mr. Dennis Byrne, of the ACHCSA, an investigation of groundwater quality would be required near tanks A1 through A4. The results of tank closure and soil remediation, and a groundwater investigation work plan were presented in our report dated October 31, 1991.

As outlined in our proposal dated January 15, 1992, the scope of the groundwater investigation included:

1. Obtaining a permit to install three wells from the Alameda County Flood Control and Water Conservation District, Zone 7,

2. Performing a utility check to clear drilling locations,
3. Drilling 3 test borings approximately 15 to 20 feet deep,
4. Constructing a groundwater monitoring well in each of the test borings,
5. Developing, purging and sampling the wells in accordance with Regional Water Quality Control Board guidelines,
6. Performing analytical tests on selected soil and groundwater samples from each well,
7. Performing a level survey of the top of well casings, and
8. Preparing a written report recording the results of the investigation.

II FIELD INVESTIGATION

Groundwater monitoring wells were installed in three test borings drilled near the previous tanks. Well locations were selected in consultation with Mr. Byrne and are shown on the Study Area Plan, Plate 2. A discussion of procedures followed during drilling, soil sampling, monitoring well installation, well development and sampling is provided in Appendix A. Permits and field reports are presented in Appendix B.

A level survey was performed to determine the elevation of the top of the well casings. The elevations were referenced to the top of the curb adjacent to the fire hydrant shown on Plate 2. The elevation reference was assumed to be 100.00 feet.

III ANALYTICAL TESTING

Selected soil and groundwater samples were analyzed by Curtis & Tompkins, Ltd., a laboratory certified by the California Department of Health Services (DHS) for hazardous waste and water testing. The samples were analyzed for the following:

1. Total volatile hydrocarbons (TVH),
2. Benzene, toluene, xylene, and ethylbenzene (BTXE),
3. Total extractable hydrocarbons (TEH),
3. Oil and Grease, and
4. Purgeable halocarbons.

The results of the soil and groundwater analyses are presented in Tables 1 and 2, respectively. Analytical test reports and chain-of-custody documents are presented in Appendix C.

IV SITE CONDITIONS

A. Regional Setting

The College of Alameda is situated on the north side of Alameda, an island located south of the Oakland inner harbor. In the 1800's, about 1/3 of the northern portion of Alameda was marshland, traversed by meandering tidal channels. The College occupies an area on the edge of these former marshlands. Maps from

the late 1800's indicate that the shoreline existed at what is currently Atlantic Avenue, just south of the site. Reclamation of the marshlands by fill placement began in the late 1800's.

B. Surface Conditions

The College of Alameda encompasses the northwest corner of the intersection of Webster Street and Atlantic Avenue. The study area is at the west end of the campus, as shown on the Site Plan. The study area is relatively level and covered with a lawn, asphalt concrete pavement and several school buildings. Well and previous tank locations are shown on Plate 2.

C. Subsurface Conditions

Our investigation and the conditions exposed during tank removal activities confirm that the study area is underlain by fill overlying bay and marsh deposits (Bay Mud). The fill varies from 2 to 5 feet thick and consists of sands, clays and gravel. In Borings MW-1 and MW-2, the fill is underlain by a thin layer (about 2 feet thick) of clayey sand. The fill in Boring MW-3 and the clayey sands in MW-1 and MW-2 are underlain by soft bay/marsh deposits, locally known as Bay Mud. Characteristically, the Bay Mud possesses relatively low permeability.

D. Groundwater Conditions

Groundwater was encountered at depths of about 5 feet in Borings MW-1 and MW-2 during drilling. Groundwater was not encountered while drilling MW-3, yet was present four days later in the monitoring well. Groundwater levels have been periodically measured. However stabilized groundwater measurements have not

Tidal fluctuation?

been obtained to date in MW-3. As a result, we are unable to develop any conclusions regarding the direction of groundwater flow at the site at this time.

V CONCLUSIONS

A. Fuel Oil Tank Area

MW-1 is located near two previous fuel oil (diesel #2) tanks. Diesel was detected in both the soil and groundwater samples at concentrations of 3.8 mg/kg and 94 ug/l, respectively. Groundwater appears to have been impacted by hydrocarbon releases in this area.

B. Gasoline Tank Area

MW-2 is situated near a former gasoline tank. Neither gasoline, nor its constituents benzene, toluene, xylene and ethylbenzene (BTXE) were detected in the soil and groundwater samples at concentrations in excess of analytical detection limits.

C. Waste Oil Tank Area

1. Soil Conditions

MW-3 is located near the former waste oil tank. Oil and grease and extractable hydrocarbons, reported as diesel, were detected in the soil sample obtained from this boring.

2. Groundwater Conditions

Groundwater from MW-3 contained 680 ug/l of total extractable hydrocarbons in the kerosene range. However, due to the slow rate of recharge of this well, a low volume of water was removed prior to sampling. For this reason, we consider the sampling results to

be inconclusive since they may not be representative. Additional development and sampling should be conducted before conclusions regarding impacts to groundwater can be developed.

D. Recommendations

In accordance with ACHCSA and Regional Water Quality Control Board (RWQCB) guidelines, we recommend that the wells be monitored on a quarterly basis for TVH, BTXE, TEH, and oil and grease, as appropriate. The wells should be sampled and analytically tested as outlined in Appendix A. Due to widely fluctuating groundwater readings, we recommend that groundwater levels be monitored monthly for the next six months. In addition, we recommend that MW-3 be developed further prior to the next sampling event. 7,

VI REPORTING

This investigation was required by the ACHCSA. We recommend that this report be provided to them at the following address:

Mr. Dennis Byrne
Alameda County Health Care Services Agency
Hazardous Materials Program
80 Swan Way, Room 200
Oakland, California, 94621

List of Attached Plates:

Plate 1	Site Plan
Plate 2	Study Area Plan
Plates 3 and 4	Logs of Test Borings MW-1 through MW-3
Plate 5	Unified Soil Classification System

Tables:

Table 1	Contaminant Concentrations in Soil
Table 2	Contaminant Concentrations in Groundwater
Table 3	Groundwater Elevations

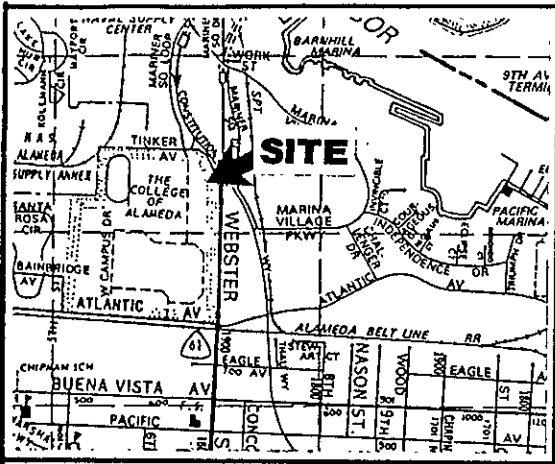
Appendix:

Appendix A	Investigation Protocol
Appendix B	Well Permits Well Development Forms Well Sampling Forms
Appendix C	Analytical Test Reports Chain-Of-Custody Documents

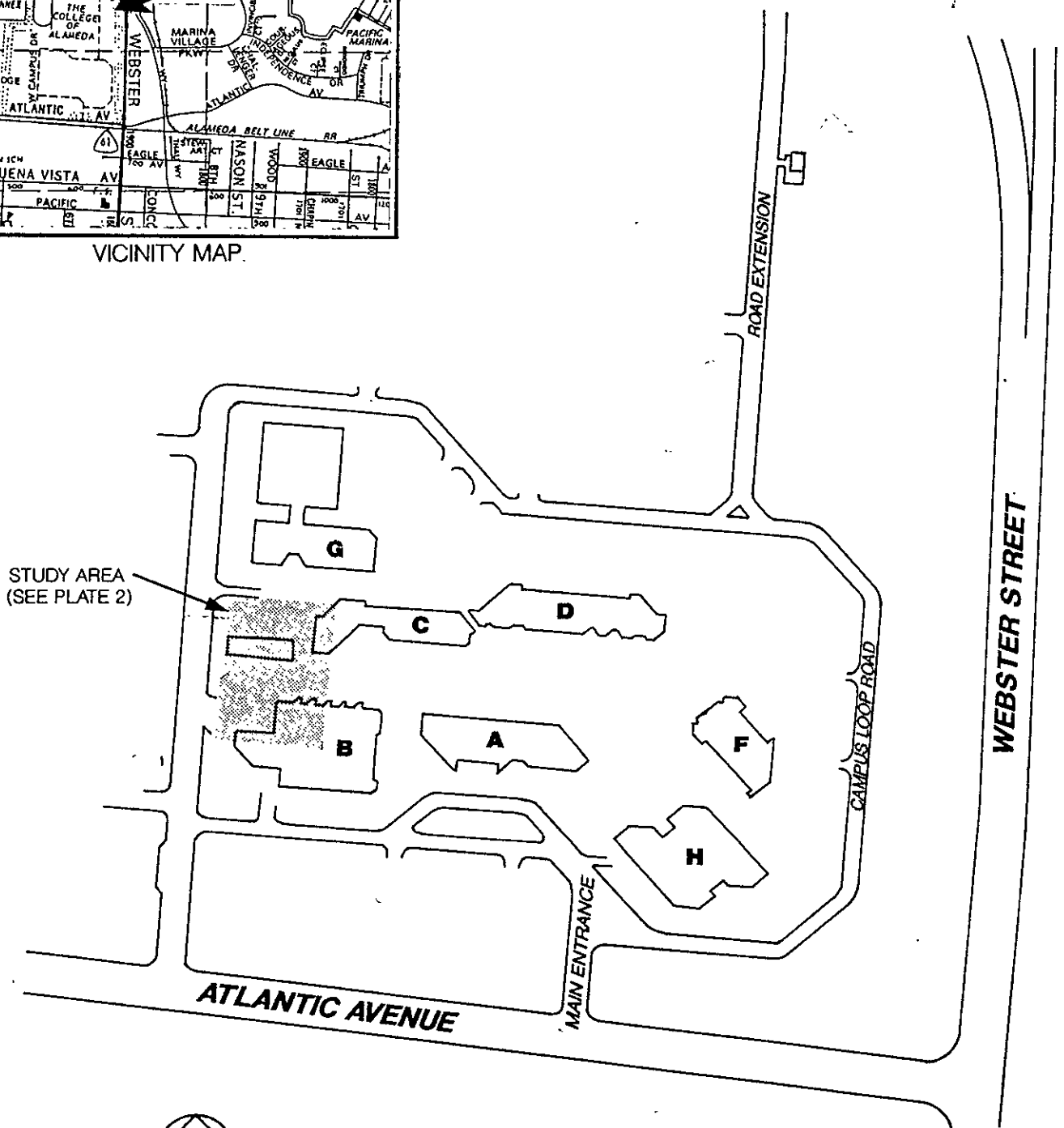
Distribution:

4 copies	Mr. Robert Mibach Director of Physical Plant Peralta Community College District 333 East 8th Avenue Oakland, California 94606
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MFW:RWR:JPB:ddh



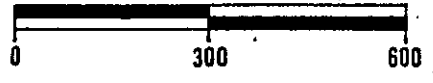
VICINITY MAP



STUDY AREA
(SEE PLATE 2)






APPROXIMATE SCALE (feet)

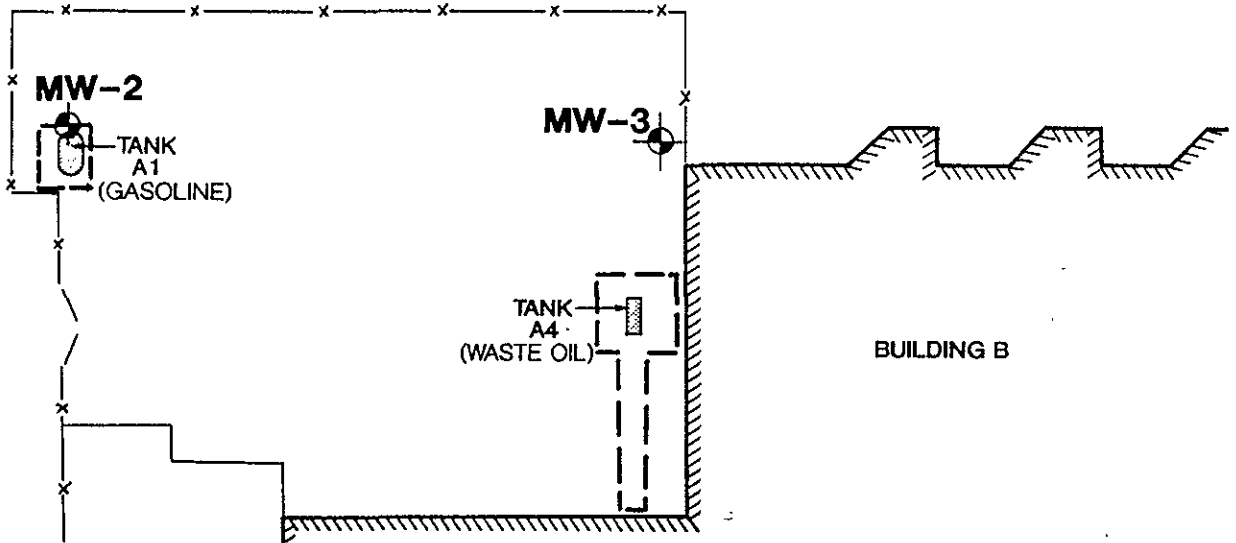
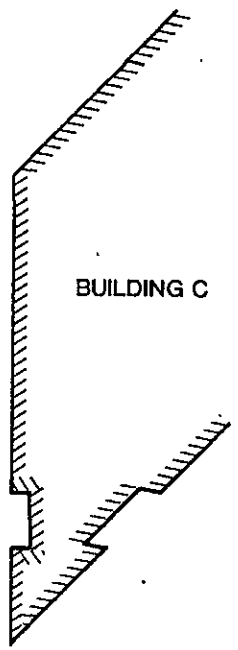
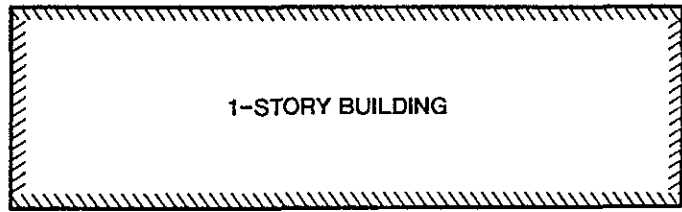
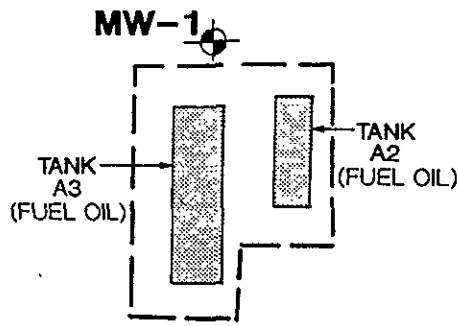


SITE PLAN

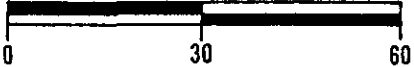
Subsurface Consultants

COLLEGE OF ALAMEDA - ALAMEDA, CA			PLATE
JOB NUMBER	DATE	APPROVED	1
469.006	3/12/92	uw	

 MONITORING WELL
 LIMITS OF PREVIOUS EXCAVATION
 FORMER TANK LOCATION
 REFERENCE ELEVATION: TOP OF CURB AT FIRE HYDRANT, ASSUMED TO BE 100 FEET



APPROXIMATE SCALE (feet)



STUDY AREA PLAN

Subsurface Consultants

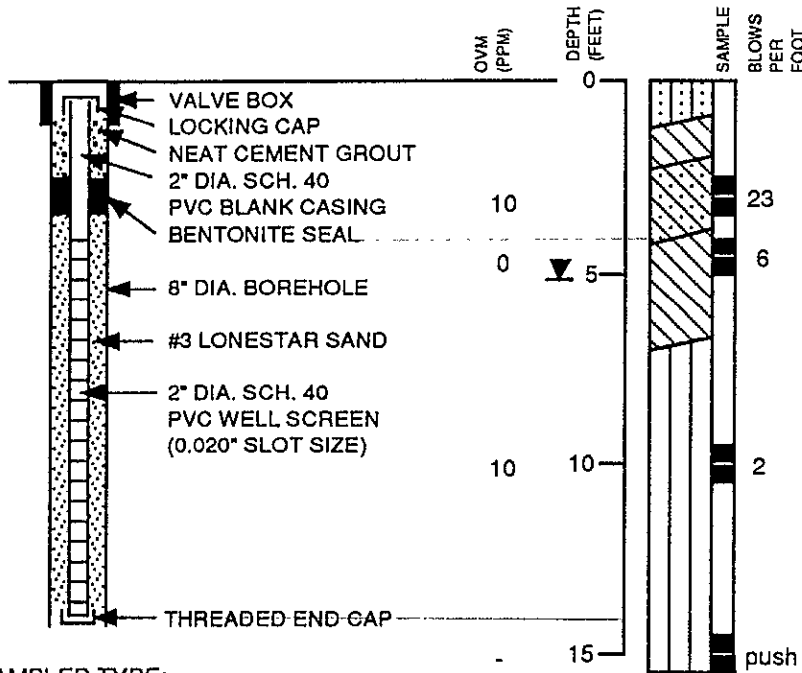
COLLEGE OF ALAMEDA - ALAMEDA, CA			PLATE
JOB NUMBER	DATE	APPROVED	2
469.006	3/12/92	MW	

LOG OF TEST BORING MW-1

EQUIPMENT 8" Hollow Stem Auger

DATE DRILLED 2/6/92

ELEVATION 100.72 feet*



BROWN SILTY SAND (SM)
medium dense, moist (fill)
GRAY-BROWN SANDY CLAY (CL)
medium stiff, moist, with occasional gravel (fill)
GROUNDWATER LEVEL DURING DRILLING
BROWN CLAYEY SAND (SC)
medium dense, moist, medium grained (fill)
GRAY-BROWN SILTY CLAY (CL)
medium stiff, moist, with peat
GRAY CLAYEY SILT (MH)
soft, moist (Bay Mud)
with peat below 12 feet

SAMPLER TYPE:
MODIFIED CALIFORNIA DRIVE
O.D.: 2.5 inches
I.D.: 2.0 inches

HAMMER WEIGHT: 140 pounds
HAMMER DROP: 30 inches

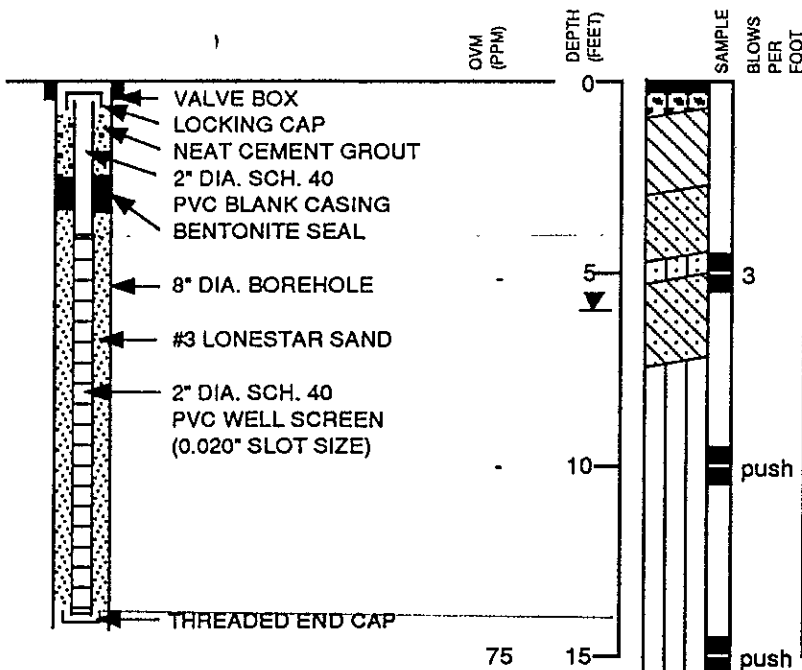
*Top of casing, using assumed elevation reference as shown on Site Plan, Plate 1.

LOG OF TEST BORING MW-2

EQUIPMENT 8" Hollow Stem Auger

DATE DRILLED 2/6/92

ELEVATION 99.54 feet



ASPHALTIC CONCRETE - 3" thick
BROWN SILTY GRAVEL (GM)
medium dense, moist (fill)
GRAY-BROWN SILTY CLAY (CL)
medium stiff, moist (fill)
GRAY-BROWN CLAYEY SAND (SC)
medium dense, moist (fill)
GROUNDWATER LEVEL DURING DRILLING
BROWN SILTY SAND (SM)
medium dense, moist (fill)
OLIVE GRAY CLAYEY SAND (SC)
medium dense, moist, with shell fragments
DARK GRAY CLAYEY SILT (MH)
soft, moist (Bay Mud)
with peat below 12 feet

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COLLEGE OF ALAMEDA - ALAMEDA, CA

PLATE

JOB NUMBER
469.006

DATE
2/14/92

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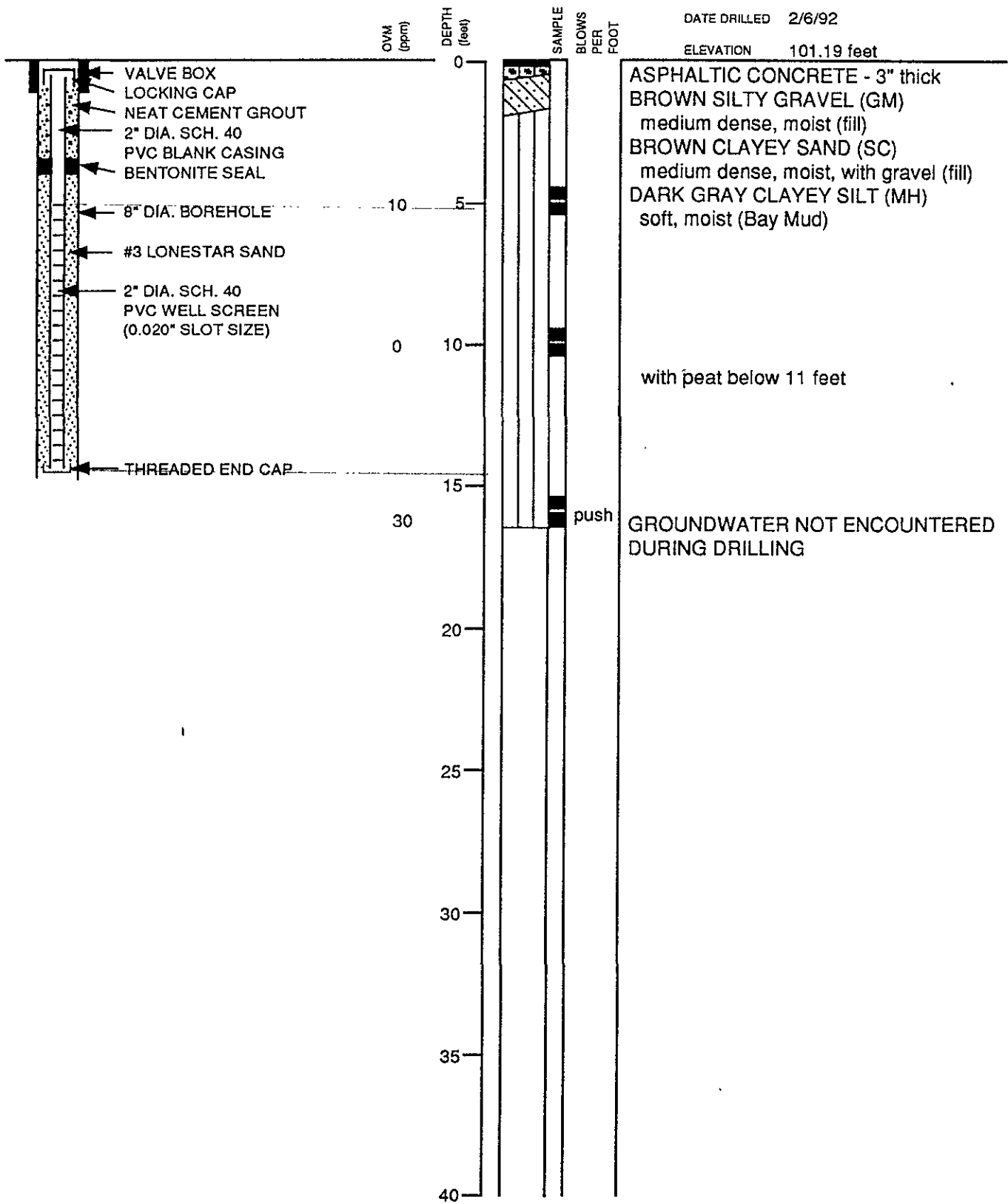
3

LOG OF TEST BORING MW-3

EQUIPMENT 8" Hollow Stem Auger

DATE DRILLED 2/6/92

ELEVATION 101.19 feet



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COLLEGE OF ALAMEDA - ALAMEDA, CA

JOB NUMBER
469.006

DATE
2/14/92

APPROVED
MW

PLATE

4

GENERAL SOIL CATEGORIES			SYMBOLS	TYPICAL SOIL TYPES
COARSE GRAINED SOILS More than half is larger than No. 200 sieve	GRAVEL More than half coarse fraction is larger than No. 4 sieve size	Clean Gravel with little or no fines	GW	Well Graded Gravel, Gravel-Sand Mixtures
		Gravel with more than 12% fines	GP	Poorly Graded Gravel, Gravel-Sand Mixtures
			GM	Silty Gravel, Poorly Graded Gravel-Sand-Silt Mixtures
		GC	Clayey Gravel, Poorly Graded Gravel-Sand-Clay Mixtures	
	SAND More than half coarse fraction is smaller than No. 4 sieve size	Clean sand with little or no fines	SW	Well Graded Sand, Gravelly Sand
			SP	Poorly Graded Sand, Gravelly Sand
		Sand with more than 12% fines	SM	Silty Sand, Poorly Graded Sand-Silt Mixtures
			SC	Clayey Sand, Poorly Graded Sand-Clay Mixtures
FINE GRAINED SOILS More than half is smaller than No. 200 sieve	SILT AND CLAY Liquid Limit Less than 50%	ML	Inorganic Silt and Very Fine Sand, Rock Flour, Silty or Clayey Fine Sand, or Clayey Silt with Slight Plasticity	
		CL	Inorganic Clay of Low to Medium Plasticity, Gravelly Clay, Sandy Clay, Silty Clay, Lean Clay	
		OL	Organic Clay and Organic Silty Clay of Low Plasticity	
	SILT AND CLAY Liquid Limit Greater than 50%	MH	Inorganic Silt, Micaceous or Diatomaceous Fine Sandy or Silty Soils, Elastic Silt	
		CH	Inorganic Clay of High Plasticity, Fat Clay	
		OH	Organic Clay of Medium to High Plasticity, Organic Silt	
HIGHLY ORGANIC SOILS			PT	Peat and Other Highly Organic Soils

UNIFIED SOIL CLASSIFICATION SYSTEM

Subsurface Consultants

COLLEGE OF ALAMEDA – ALAMEDA, CA

JOB NUMBER
469.006

DATE
2/14/92

APPROVED
MW

PLATE

5

Table 1.
Contaminant Concentrations In Soil

Sample	TVH ¹ (mg/kg) ⁴	TEH ²		TOG ³ (mg/kg)	Benzene (ug/kg) ⁵	Toluene (ug/kg)	Ethyl- Benzene (ug/kg)	Total Xylenes (ug/kg)	EPA 8010 Chemicals
		Kerosene Range (mg/kg)	Diesel Range (mg/kg)						
MW 1 @ 4.5'	-- ⁶	<1.0	3.8	--	<5.0 ⁷	<5.0	<5.0	<5.0	--
MW 2 @ 5'	<1.0	--	--	--	<5.0	<5.0	<5.0	<5.0	--
MW 3 @ 5'	<1.0	NR ⁸	13	190	<5.0	<5.0	<5.0	<5.0	ND ⁹

-
- 1 Total volatile hydrocarbons, as gasoline, EPA Method 5030/8015 modified
2 Total extractable hydrocarbons, EPA 3550/8015 modified
3 Total oil and grease, EPA 3550 and SMWW 17:5520 E&F
4 Milligrams per kilogram or parts per million (ppm)
5 Micrograms per kilogram or parts per billion (ppb)
6 Test not requested
7 Less than detection limit shown
8 Kerosene range not reported
9 None detected, less than detection limits with range from 5 to 20 ug/kg; 2 - chloroethylvinyl ether failed the calibration criteria, therefore there are no results for this compound

Table 2.
Contaminant Concentrations in Groundwater

Tank Area	Sampling Date	TVH ¹ (ug/l) ⁴	TEH ²		TOG ³ (mg/l) ⁵	Benzene (ug/l)	Toluene (ug/l)	Ethyl- Benzene (ug/l)	Total Xylenes (ug/l)	EPA 8010 Chemicals
			Kerosene Range (ug/l)	Diesel Range (ug/l)						
Fuel Oil MW-1	2/19/92	-- ⁶	<50	94	--	<0.5	<0.5	<0.5	<0.5	--
Gasoline MW-2	2/19/92	<50	--	--	--	<0.5	<0.5	<0.5	<0.5	--
Waste Oil MW-3	2/19/92	<5000 ⁷ 2	680	<50	<5	<50	<50	<50	84	ND ⁸

1 Total volatile hydrocarbons as gasoline, EPA 8015/5030 modified

2 Total extractable hydrocarbons, EPA 3550/8015 modified

3 Total oil and grease, EPA 3550 and SMWW 17:5520 E&F

4 Micrograms per liter or parts per billion (ppb)

5 Milligrams per liter or parts per million (ppm)

6 Test not requested

7 Sample diluted due to foaming during purge and trap extraction

8 Not detected at or above reporting limits. Reporting limits vary from 1.0 to 20 ug/l. See test reports for individual reporting limits.

Table 3.
Groundwater Elevations

<u>Well</u>	<u>TOC¹ Elevation</u>	<u>Date</u>	<u>Groundwater Depth² (feet)</u>	<u>Groundwater Elevation (feet)</u>
MW-1	100.72	2/24/92	8.04	92.68
		3/09/92	4.28	96.44
		3/24/92	4.33	96.39
MW-2	99.54	2/24/92	4.45	95.09
		3/09/92	3.70	95.84
		3/24/92	3.73	95.81
MW-3	101.19	2/24/92	13.12	88.07
		3/09/92	8.75	92.44
		3/24/92	6.87	94.32

-
- ¹ Top of casing. Referenced to top of curb at fire hydrant with an assumed elevation of 100.00 feet.
- ² Measured below TOC.

Appendix A
Investigation Protocol

APPENDIX A
INVESTIGATION PROTOCOL

A. Test Borings

Prior to drilling the test borings, SCI obtained a groundwater protection ordinance permit from the Alameda County Flood Control and Water Conservation District, Zone 7. The project permit number is 92022. A copy of the permit is included in Appendix B.

The test borings were drilled using a truck-mounted drill rig equipped with 8-inch-diameter hollow stem augers. Our field engineer observed drilling operations, prepared detailed logs of the test borings and obtained undisturbed samples of the materials encountered. Test boring logs are presented on Plates 3 and 4. Soils are classified in accordance with the Unified Soil Classification System described on Plate 5.

A California Drive Sampler having an outside diameter of 2.5 inches and an inside diameter of 2.0 inches was used to obtain soil samples. The number of blows required to drive the sampler the final 12 inches of each 18-inch penetration was recorded and is presented on the test boring logs. Drilling and sampling equipment was thoroughly steam-cleaned prior to each use to reduce the likelihood of cross-contamination between samples and/or borings.

Soil samples were retained in 2.0-inch-diameter brass liners. Teflon sheeting was placed over the ends of the soil liners; the liners were subsequently capped and sealed with duct tape. The shoe sample from each drive was retained in a plastic bag and screened for volatile organics using an Organic Vapor Meter (OVM).

OVM measurements are recorded on the test boring logs. The sealed liners were placed in ice-filled coolers and remained iced until delivery to the analytical laboratory. Chain-of-Custody records accompanied the samples to the laboratory.

The test borings were completed as groundwater monitoring wells, as detailed in the following section. Soil cuttings generated during drilling were stockpiled on-site and covered with plastic sheeting.

B. Groundwater Monitoring Wells

At the completion of drilling, monitoring wells were installed in the test borings. Well schematics are shown on the respective test boring logs. In general, the wells consist of 2 -inch-diameter, Schedule 40 PVC pipe having flush-threaded joints. The pipe was steam-cleaned prior to being placed in the borehole. The lower 10 feet of the wells consists of machine-slotted well screen having 0.02-inch slots. The remaining portion of the wells consist of blank pipe. The wells were provided with bottom caps and locking top caps. The well screen is encased in a filter composed of Lonestar No. 3 washed sand. The filter sand was placed by carefully pouring it through the annulus between the hollow stem of the auger and the well casing. Periodically, the augers were raised to allow the sand to fill the annulus between the casing and the borehole. The filter extends from just below the bottom of the well to at least one foot above the top of the screened section. A one-foot thick bentonite pellet seal was placed above the sand filter. The annulus above the bentonite seal was backfilled with

cement grout. The grout mixture consists of Portland cement mixed with clean water. It was placed in a manner similar to the sand filter. The monitoring well was completed below grade and is protected by a traffic-rated valve box.

The wells were developed at least 24 hours after the grout seal was placed to allow for proper set up. Initially, the depth to water was measured below the top of the well casing using an electronic sounder. The wells were then developed by removing water with a hand bailer. During the initial sampling event, the wells were allowed to sit for approximately 72 hours after development before sampling. They were then purged of about 2 to 4 well casing volumes of water and sampled with a disposable sampling device. Well development and purge water was placed in 55 gallon drums which are stored on-site. Well development and sampling forms are presented in Appendix B.

Groundwater samples were retained in chilled, pre-cleaned containers supplied by the laboratory. The type of containers used is dependent on the type of analysis to be performed. A summary of containers used is presented below.

Groundwater Sample Containers

<u>Analysis</u>	<u>Container</u>
Total Volatile Hydrocarbons (TVH) EPA 8015 modified/5030	Glass, 40 milliliter vials
Benzene, Toluene, Xylene and Ethylbenzene (BTXE) EPA 8020/5030	Glass, 40 milliliter vials
Purgeable Halocarbons EPA 8010	Glass, 40 milliliter vials
Total Extractable Hydrocarbons (SLED) EPA 8015 modified/3550	Glass, 1 liter bottle
Oil and Grease SMWW 17:5520	Glass, 1 liter bottle

Water samples were placed in ice-filled coolers and remained iced until delivery to the analytical laboratory. Chain-of-Custody records accompanied the samples to the laboratory.

Appendix B

**Well Permits
Well Development Forms
Well Sampling Forms**



ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

5997 PARKSIDE DRIVE PLEASANTON, CALIFORNIA 94566 (415) 484-2600

GROUNDWATER PROTECTION ORDINANCE PERMIT APPLICATION

FOR APPLICANT TO COMPLETE

FOR OFFICE USE

LOCATION OF PROJECT College of Alameda
355 Atlantic Avenue
Alameda, California

PERMIT NUMBER 92022
LOCATION NUMBER

CLIENT
Peralta Community College District
Address 333 East 8th Ave Phone 466-7340
City Oakland, CA Zip 94606

attn: Tony Graciale PERMIT CONDITIONS

Circled Permit Requirements Apply

APPLICANT
Name Sean Carson
Subsurface Consultants, Inc
Address 171 12th St #201 Phone 268-0461
City Oakland CA Zip 94607

GENERAL

- 1. A permit application should be submitted so as to arrive at the Zone 7 office five days prior to proposed starting date.
2. Submit to Zone 7 within 60 days after completion of permitted work the original Department of Water Resources Water Well Drillers Report or equivalent for well projects, or drilling logs and location sketch for geotechnical projects.
3. Permit is void if project not begun within 90 days of approval date.

DESCRIPTION OF PROJECT
Water Well Construction Geotechnical Investigation
Cathodic Protection General
Well Destruction Contamination X

WATER WELLS, INCLUDING PIEZOMETERS

- 1. Minimum surface seal thickness is two inches of cement grout placed by tremie.
2. Minimum seal depth is 50 feet for municipal and industrial wells or 20 feet for domestic and irrigation wells unless a lesser depth is specially approved. Minimum seal depth for monitoring wells is the maximum depth practicable or 20 feet.

PROPOSED WATER WELL USE
Domestic Industrial Irrigation
Municipal Monitoring Other X

GEOTECHNICAL. Backfill bore hole with compacted cuttings or heavy bentonite and upper two feet with compacted material. In areas of known or suspected contamination, tremied cement grout shall be used in place of compacted cuttings.

PROPOSED CONSTRUCTION
Drilling Method:
Mud Rotary Air Rotary Auger X
Cable Other

CATHODIC. Fill hole above anode zone with concrete placed by tremie.

DRILLER'S LICENSE NO. C57-596309

WELL DESTRUCTION. See attached.

WELL PROJECTS
Drill Hole Diameter 8 in. Maximum
Casing Diameter 2 in. Depth 20 ft.
Surface Seal Depth 4 ft. Number 3

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

ESTIMATED STARTING DATE 1/21/92
ESTIMATED COMPLETION DATE 1/23/92

Approved Wyman Hong Date 14 Jan 92

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

APPLICANT'S SIGNATURE Sean Carson Date 1/13/92

WELL DEVELOPMENT FORM

Project Name: College of Alameda Well Number: MW-1
 Project Number: 469006 Well Casing Diameter: 2 inches
 Developed By: FV, JB Date: 2/10/92
 TOC Elevation: 100.72 Weather: Cloudy, Raining
 Depth to Casing Bottom (below TOC) 12.0 feet
 Depth to Groundwater (below TOC) 7.01 feet
 Feet of Wter in Well 4.99 feet
 Casing Volume (feet of water x Casing DIA² x 0.0408) 18 gallons
 Depth Measurement Method Tape & Paste/ Elect. Sounder/ Other _____
 Development Method Disposable Bailer

FIELD MEASUREMENTS

<u>Gallons Removed</u>	<u>pH</u>	<u>Temp (°C)</u>	<u>Conductivity (micromhos/cm)</u>	<u>Comments</u>
<u>1</u>	<u>6.9</u>	<u>17.5</u>	<u>80 x 100</u>	<u>Clean; No Odor</u>
<u>2</u>	<u>9.13</u>	<u>17.6</u>	<u>150 x 100</u>	<u>"</u>
<u>3</u>	<u>9.80</u>	<u>16.8</u>	<u>170 x 100</u>	<u>"</u>
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

Total Gallons Removed 3 gallons
 Depth to Groundwater After Development (below TOC) _____ feet

WELL DEVELOPMENT FORM

Project Name: College of Alameda Well Number: MW-2
 Project Number: 469.006 Well Casing Diameter: 2 inches
 Developed By: FV, JB Date: 2/10/92
 TOC Elevation: _____ Weather: Cloudy, Raining
 Depth to Casing Bottom (below TOC) 14' 5 1/4" feet
 Depth to Groundwater (below TOC) 4.23 feet
 Feet of Wter in Well 10.2 feet
 Casing Volume (feet of water x Casing DIA² x 0.0408) 1.67 gallons
 Depth Measurement Method Tape & Paste/ Elect. Sounder Other _____
 Development Method hand pump

FIELD MEASUREMENTS

<u>Gallons Removed</u>	<u>pH</u>	<u>Temp (°C)</u>	<u>Conductivity (micromhos/cm)</u>	<u>Comments</u>
<u>10</u>	<u>7.01</u>	<u>17.6</u>	<u>90x100</u>	<u>Gray Sandy (murky)</u>
<u>20</u>	<u>9.50</u>	<u>17.7</u>	<u>150x100</u>	
<u>30</u>	<u>9.80</u>	<u>17.5</u>	<u>170x100</u>	<u>11</u>
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

Total Gallons Removed 30 gallons
 Depth to Groundwater After Development (below TOC) 4.58 feet

WELL DEVELOPMENT FORM

Project Name: College of Alameda Well Number: MW-3
 Project Number: 469.006 Well Casing Diameter: 2 inches
 Developed By: FV, JB Date: 2/10/92
 TOC Elevation: 101.19 Weather: Cloudy, Raining
 Depth to Casing Bottom (below TOC) 14' 10³/₄" feet
 Depth to Groundwater (below TOC) 13.60 feet
 Feet of Wter in Well 1.3 feet
 Casing Volume (feet of water x Casing DIA² x 0.0408) 21 gallons
 Depth Measurement Method Tape & Paste/ (Elect. Sounder) Other _____
 Development Method disposable bailer

FIELD MEASUREMENTS

Gallons Removed	pH	Temp (°C)	Conductivity (micromhos/cm)	Comments
<u>2</u>	<u>7.8</u>	<u>16.8</u>	<u>170 x 100</u>	<u>strong sewer odor</u>
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
Total Gallons Removed	<u>2</u>			gallons
Depth to Groundwater After Development (below TOC)				_____ feet

WELL SAMPLING FORM

Project Name: College of Alameda Well Number: MW-1

Project Number: 469.006 Well Casing Diameter: 2 inch

Sampled By: FV, JB Date: 2/19/92

TOC Elevation: _____ Weather: Raining

Depth to Casing Bottom (below TOC) 12.0 feet

Depth to Groundwater (below TOC) 7.10 feet

Feet of Water in Well 4.9 feet

Depth to Groundwater When 80 % Recovered 8 feet

Casing Volume (feet of water x Casing DIA² x 0.0408) 8 gallons

Depth Measurement Method Tape & Paste/ Elect. Sounder / Other

Free Product _____

Purge Method Disposable bailer

FIELD MEASUREMENTS

Gallons Removed	pH	Temp (°C)	Conductivity (micromhos/cm)	Comments
<u>5</u>	<u>9.5</u>	<u>17.5</u>	<u>140 x 100</u>	
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

Total Gallons Purged 5 gallons

Depth to Groundwater Before Sampling (below TOC) _____ feet

Sampling Method Disposable Bailer

Containers Used 2 40 ml 2 liter _____ pint

WELL SAMPLING FORM

Project Name: College of Ahmuda Well Number: MW-2
 Project Number: 469.006 Well Casing Diameter: 2 inch
 Sampled By: EV, JB Date: 2/19/92
 TOC Elevation: _____ Weather: Raining

Depth to Casing Bottom (below TOC) 14' 5 1/4" feet
 Depth to Groundwater (below TOC) 3.74 feet
 Feet of Water in Well 10.7 feet
 Depth to Groundwater When 80 % Recovered 6 feet
 Casing Volume (feet of water x Casing DIA² x 0.0408) 1.75 gallons
 Depth Measurement Method Tape & Paste/ (Elect. Sounder) Other _____
 Free Product _____
 Purge Method Disposable Bailer

FIELD MEASUREMENTS

Gallons Removed	pH	Temp (°C)	Conductivity (micromhos/cm)	Comments
<u>1</u>	<u>9.2</u>	<u>17.7</u>	<u>160 x 100</u>	
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

Total Gallons Purged 1 gallons
 Depth to Groundwater Before Sampling (below TOC) _____ feet
 Sampling Method Disposable Bailer
 Containers Used 2 _____ liter _____ pint
40 ml

WELL SAMPLING FORM

Project Name: College of Alameda Well Number: MW-3

Project Number: 469.006 Well Casing Diameter: 2 inch

Sampled By: FV, TB Date: 2/19/92

TOC Elevation: _____ Weather: Raining

Depth to Casing Bottom (below TOC) 14' 10^{3/4}" feet

Depth to Groundwater (below TOC) 11.89 feet

Feet of Water in Well 3 feet

Depth to Groundwater When 80 % Recovered 12.89 feet

Casing Volume (feet of water x Casing DIA² x 0.0408) .5 gallons

Depth Measurement Method Tape & Paste/ (Elect. Sounder) Other _____

Free Product _____

Purge Method Disposable Bailer

FIELD MEASUREMENTS

<u>Gallons Removed</u>	<u>pH</u>	<u>Temp (°C)</u>	<u>Conductivity (micromhos/cm)</u>	<u>Comments</u>
<u>1.5</u>	<u>9.6</u>	<u>17.5</u>	<u>160 x 100</u>	
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

Total Gallons Purged 1.5 gallons

Depth to Groundwater Before Sampling (below TOC) _____ feet

Sampling Method Disposable Bailer

Containers Used 4 40 ml 3 liter 3 pint

Appendix C

**Analytical Test Reports
Chain-of-Custody Documents**



Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878

2323 Fifth Street, Berkeley, CA 94710, Phone (415) 486-0900

DATE RECEIVED: 02/10/92
DATE REPORTED: 02/21/92


LABORATORY NUMBER: 106520

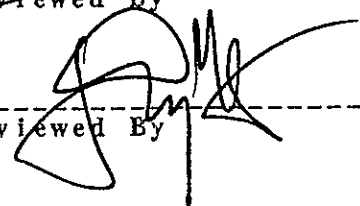
CLIENT: SUBSURFACE CONSULTANTS

PROJECT ID: 469.006

LOCATION: COLLEGE OF ALAMEDA

RESULTS: SEE ATTACHED



Reviewed By


Reviewed By

LABORATORY NUMBER: 106520
 CLIENT: SUBSURFACE CONSULTANTS
 PROJECT ID: 469.006
 LOCATION: COLLEGE OF ALAMEDA

DATE RECEIVED: 02/10/92
 DATE ANALYZED: 02/11/92
 DATE REPORTED: 02/21/92

Total Volatile Hydrocarbons with BTXE in Soils & Wastes
 TVH by California DOHS Method/LUFT Manual October 1989
 BTXE by EPA 5030/8020

LAB ID	SAMPLE ID	TVH AS GASOLINE (mg/Kg)	BENZENE (ug/Kg)	TOLUENE (ug/Kg)	ETHYL BENZENE (ug/Kg)	TOTAL XYLENES (ug/Kg)
106520-2	MW2@5'	ND(1.0)	ND(5.0)	ND(5.0)	ND(5.0)	ND(5.0)
106520-3	MW3@5'	ND(1.0)	ND(5.0)	ND(5.0)	ND(5.0)	ND(5.0)

ND = Not detected at or above reporting limit; Reporting limit
 indicated in parentheses.

QA/QC SUMMARY

RPD, %	9
RECOVERY, %	94

LABORATORY NUMBER: 106520
 CLIENT: SUBSURFACE CONSULTANTS
 PROJECT ID: 469.006
 LOCATION: COLLEGE OF ALAMEDA

DATE RECEIVED: 02/10/92
 DATE EXTRACTED: 02/14/92
 DATE ANALYZED: 02/16/92
 DATE REPORTED: 02/21/92

Extractable Petroleum Hydrocarbons in Soils & Wastes
 California DOHS Method
 LUFT Manual October 1989

LAB ID	SAMPLE ID	KEROSENE RANGE (mg / Kg)	DIESEL RANGE (mg / Kg)	REPORTING LIMIT* (mg / Kg)
106520-1	MW-1@4.5'	ND	3.8	1.0
106520-3	MW3@5'	**	13	1.0

ND = Not Detected at or above reporting limit.

*Reporting limit applies to all analytes.

**Kerosene range not reported.

QA/QC SUMMARY

=====

LCS RECOVERY, %

=====

79

Client: Subsurface Consultants

Laboratory Login Number: 106520

 Project Name: College of Alameda
 Project Number: 469.006

Report Date: 21 February 92

ANALYSIS: Hydrocarbon Oil & Grease (Gravimetric) METHOD: SMWW 17:5520EF

Lab ID	Sample ID	Matrix	Sampled	Received	Analyzed	Result	Units	RL	Analyst	QC Batch
106520-003	MW325	Soil	06-FEB-92	10-FEB-92	14-FEB-92	190	mg/Kg	50	TR	4246

ND = Not Detected at or above Reporting Limit (RL).

Q C B a t c h R e p o r t

 Client: Subsurface Consultants
 Project Name: College of Alameda
 Project Number: 469.006

 Laboratory Login Number: 106520
 Report Date: 21 February 92

ANALYSIS: Hydrocarbon Oil & Grease (Gravimetric)

QC Batch Number: 4246

Blank Results

Sample ID	Result	MDL	Units	Method	Date Analyzed
BLANK	ND	50	mg/Kg	SMWW 17:5520EF	14-FEB-92

Spike/Duplicate Results

Sample ID	Recovery	Method	Date Analyzed
BS	86%	SMWW 17:5520EF	14-FEB-92
BSD	82%	SMWW 17:5520EF	14-FEB-92

		Control Limits
Average Spike Recovery	84%	80% - 120%
Relative Percent Difference	4.5%	< 20%



LABORATORY NUMBER: 106520
CLIENT: SUBSURFACE CONSULTANTS
PROJECT ID: 469.006
LOCATION: COLLEGE OF ALAMEDA

DATE RECEIVED: 02/10/92
DATE ANALYZED: 02/11/92
DATE REPORTED: 02/21/92

Benzene, Toluene, Ethyl Benzene, Xylenes by EPA 8020
Extraction by EPA 5030 Purge and Trap

LAB ID	SAMPLE ID	BENZENE (ug/kg)	TOLUENE (ug/kg)	ETHYL BENZENE (ug/kg)	TOTAL XYLENES (ug/kg)	REPORTING LIMIT * (ug/kg)
106520-1	MW-1@4.5'	ND	ND	ND	ND	5.0

ND = Not detected at or above reporting limit.

* Reporting Limit applies to all analytes.

QA/QC SUMMARY

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=====
RPD, %                                <1
RECOVERY, %                            97
=====

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LABORATORY NUMBER: 106520-3
 CLIENT: SUBSURFACE CONSULTANTS
 PROJECT ID: 469.006
 LOCATION: COLLEGE OF ALAMEDA
 SAMPLE ID: MW3@5'

DATE RECEIVED: 02/10/92
 DATE ANALYZED: 02/12/92
 DATE REPORTED: 02/21/92

EPA 8010: Volatile Halocarbons in Soil & Wastes
 Extraction Method: EPA 5030 - Purge & Trap

Compound	RESULT ug/Kg	REPORTING LIMIT ug/Kg
Chloromethane	ND	10
Bromomethane	ND	10
Vinyl chloride	ND	10
Chloroethane	ND	10
Methylene chloride	ND	20
Trichlorofluoromethane	ND	5.0
1,1-Dichloroethene	ND	5.0
1,1-Dichloroethane	ND	5.0
cis-1,2-Dichloroethene	ND	5.0
trans-1,2-Dichloroethene	ND	5.0
Chloroform	ND	5.0
Freon 113	ND	5.0
1,2-Dichloroethane	ND	5.0
1,1,1-Trichloroethane	ND	5.0
Carbon tetrachloride	ND	5.0
Bromodichloromethane	ND	5.0
1,2-Dichloropropane	ND	5.0
cis-1,3-Dichloropropene	ND	5.0
Trichloroethylene	ND	5.0
1,1,2-Trichloroethane	ND	5.0
trans-1,3-Dichloropropene	ND	5.0
Dibromochloromethane	ND	5.0
2-Chloroethylvinyl ether	*	10
Bromoform	ND	5.0
Tetrachloroethylene	ND	5.0
1,1,2,2-Tetrachloroethane	ND	5.0
Chlorobenzene	ND	5.0
1,3-Dichlorobenzene	ND	5.0
1,2-Dichlorobenzene	ND	5.0
1,4-Dichlorobenzene	ND	5.0

ND = Not detected at or above reporting limit.

* = 2-Chloroethylvinyl ether failed calibration criteria. Cannot qualify or quantify this compound.

QA/QC SUMMARY

=====

Surrogate Recovery, %

=====

107

LABORATORY NUMBER: 106520-METHOD BLANK
 CLIENT: SUBSURFACE CONSULTANTS
 PROJECT ID: 469.006
 LOCATION: COLLEGE OF ALAMEDA

DATE ANALYZED: 02/12/92
 DATE REPORTED: 02/21/92

EPA 8010: Volatile Halocarbons in Soil & Wastes
 Extraction Method: EPA 5030 - Purge & Trap

Compound	RESULT ug/Kg	REPORTING LIMIT ug/Kg
Chloromethane	ND	10
Bromomethane	ND	10
Vinyl chloride	ND	10
Chloroethane	ND	10
Methylene chloride	ND	20
Trichlorofluoromethane	ND	5.0
1,1-Dichloroethene	ND	5.0
1,1-Dichloroethane	ND	5.0
cis-1,2-Dichloroethene	ND	5.0
trans-1,2-Dichloroethene	ND	5.0
Chloroform	ND	5.0
Freon 113	ND	5.0
1,2-Dichloroethane	ND	5.0
1,1,1-Trichloroethane	ND	5.0
Carbon tetrachloride	ND	5.0
Bromodichloromethane	ND	5.0
1,2-Dichloropropane	ND	5.0
cis-1,3-Dichloropropene	ND	5.0
Trichloroethylene	ND	5.0
1,1,2-Trichloroethane	ND	5.0
trans-1,3-Dichloropropene	ND	5.0
Dibromochloromethane	ND	5.0
2-Chloroethylvinyl ether	*	10
Bromoform	ND	5.0
Tetrachloroethylene	ND	5.0
1,1,2,2-Tetrachloroethane	ND	5.0
Chlorobenzene	ND	5.0
1,3-Dichlorobenzene	ND	5.0
1,2-Dichlorobenzene	ND	5.0
1,4-Dichlorobenzene	ND	5.0

ND = Not detected at or above reporting limit.

* = 2-Chloroethylvinyl ether failed calibration criteria. Cannot qualify or quantify this compound.

QA/QC SUMMARY

=====

Surrogate Recovery, %

=====

111



LABORATORY CONTROL SAMPLE SUMMARY SHEET FOR EPA 8010/8020

Operator:	CW	Spike file:	043G/H003
Analysis date:	2/12/92	Instrument :	GC05 (QUANT COLUMN)
Sample type:	SOIL	Sequence Name	FEB12

LCS SPIKE DATA (spiked at 20 ppb)

	READING	RECOVERY	STATUS	LIMITS
8010 COMPOUNDS				
1,1-Dichloroethene	15.20	76 %	OK	28 - 167
Trichloroethene	22.96	115 %	OK	35 - 146
Chlorobenzene	22.77	114 %	OK	38 - 150

SURROGATES				
Bromobenzene	114.00	114 %	OK	98 - 115

	READING	RECOVERY	STATUS	LIMITS
8020 COMPOUNDS				
Benzene	20.87	104 %	OK	39 - 150
Toluene	20.99	105 %	OK	46 - 148
Chlorobenzene	20.70	104 %	OK	55 - 135

SURROGATES				
Bromobenzene	100.00	100 %	OK	91 - 107

SPIKE RECOVERY LIMITS FROM SW-846 METHODS 8010/8020 TABLE 3;
 SURROGATE RECOVERY LIMITS FROM LCS WATER CONTROL CHARTS (NOV. 91).

MS/MSD SUMMARY SHEET FOR EPA 8010/8020



Curtis & Tompkins, Ltd.

Operator: CW
 Analysis date: 2/12/92
 Sample type: SOIL
 Sample Number: 106436-014 5G

Spike file: 043G/H004
 Spike dup file: 043G/H005
 Instrument: GC05

Ave Rec= 103 %

8010 MS/MSD DATA (spiked at 20 ppb)

	READING	RECOVERY	STATUS	LIMITS
SPIKE COMPOUNDS				
1,1-Dichloroethene	17.29	86 %	OK	46 - 172
Trichloroethene	18.49	92 %	OK	58 - 137
Chlorobenzene	20.97	105 %	OK	60 - 133
SPIKE DUP COMPOUNDS				
1,1-Dichloroethene	17.86	89 %	OK	46 - 172
Trichloroethene	20.77	104 %	OK	58 - 137
Chlorobenzene	28.38	142 %	NOT OK	60 - 133
SURROGATES				
Bromobenzene (MS)	103.00	103 %	OK	74 - 132
Bromobenzene (MSD)	117.00	117 %	OK	74 - 132

Ave Rec= 108 %

8020 MS/MSD DATA (spiked at 20 ppb)

	READING	RECOVERY	STATUS	LIMITS
SPIKE COMPOUNDS				
Benzene	20.71	104 %	OK	66 - 142
Toluene	20.99	105 %	OK	59 - 139
Chlorobenzene	20.39	102 %	OK	60 - 133
SPIKE DUP COMPOUNDS				
Benzene	22.40	112 %	OK	66 - 142
Toluene	22.83	114 %	OK	59 - 139
Chlorobenzene	22.24	111 %	OK	60 - 133
SURROGATES				
Bromobenzene (MS)	100.00	100 %	OK	74 - 132
Bromobenzene (MSD)	100.00	100 %	OK	74 - 132

RPD DATA

8010 RPD= 15.0 % 8020 RPD= 8.3 %

	SPIKE	SPIKE DUP	RPD	STATUS	LIMITS
8010 COMPOUNDS					
1,1-Dichloroethene	17.29	17.86	3 %	OK	< 22
Trichloroethene	18.49	20.77	12 %	OK	< 23
Chlorobenzene	20.97	28.38	30 %	NOT OK	< 21
8020 COMPOUNDS					
Benzene	20.71	22.40	8 %	OK	< 21
Toluene	20.99	22.83	8 %	OK	< 21
Chlorobenzene	20.39	22.24	9 %	OK	< 21

REVIEWED BY: _____

CHAIN OF CUSTODY FORM

PROJECT NAME: COLLEGE OF ALAMEDA
 JOB NUMBER: 469.006 LAB: CURTIS & TOMPKINS
 PROJECT CONTACT: BILL WIKANDER TURNAROUND: STANDARD
 SAMPLED BY: JOHN WOLFE REQUESTED BY: WKW

ANALYSIS REQUESTED									
TEH	BTX E	TNH/BTX E	046	PERCEPABLE HALOGENIDES					

LABORATORY I.D. NUMBER	SCI SAMPLE NUMBER	MATRIX				CONTAINERS				METHOD PRESERVED					SAMPLING DATE				NOTES	TEH	BTX E	TNH/BTX E	046	PERCEPABLE HALOGENIDES			
		WATER	SOIL	WASTE	AIR	VOA	LITER	PINT	TUBE	HCL	H2SO4	HNO3	ICE	NONE	MONTH	DAY	YEAR	TIME									
	MW-1045	/					/						/		02	06	92			/							
	MW205	/					/						/		02	06	92			/							
	MW305	/					/						/		02	06	92			/							

COMMENTS & NOTES:

CHAIN OF CUSTODY RECORD			
RELEASED BY: (Signature) <u>[Signature]</u>	DATE/TIME <u>02/10/92 4:30</u>	RECEIVED BY: (Signature) <u>[Signature]</u>	DATE/TIME <u>2/10/92</u>
RELEASED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	DATE/TIME
RELEASED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	DATE/TIME

Subsurface Consultants, Inc.
 171 12TH STREET, SUITE 201, OAKLAND, CALIFORNIA 94607
 (510) 268-0461 • FAX: 510-268-0137



Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878

2323 Fifth Street, Berkeley, CA 94710, Phone (415) 486-0900

DATE RECEIVED: 02/19/92

DATE REPORTED: 02/25/92


LABORATORY NUMBER: 106593

CLIENT: SUBSURFACE CONSULTANTS

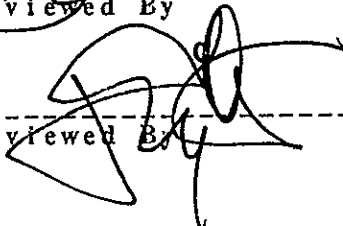
PROJECT ID: 469.006

LOCATION: COLLEGE OF ALAMEDA

RESULTS: SEE ATTACHED



Reviewed By



Reviewed By

Berkeley

Wilmington

Los Angeles

LABORATORY NUMBER: 106593
 CLIENT: SUBSURFACE CONSULTANTS
 PROJECT ID: 469.006
 LOCATION: COLLEGE OF ALAMEDA

DATE RECEIVED: 02/19/92
 DATE ANALYZED: 02/21/92
 DATE REPORTED: 02/25/92

Total Volatile Hydrocarbons with BTXE in Aqueous Solutions
 TVH by California DOHS Method/LUFT Manual October 1989
 BTXE by EPA 5030/8020

LAB ID	SAMPLE ID	TVH AS GASOLINE (ug/L)	BENZENE (ug/L)	TOLUENE (ug/L)	ETHYL BENZENE (ug/L)	TOTAL XYLENES (ug/L)
106593-2	MW-2	ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)
106593-3	MW-3*	ND(5000)	ND(50)	ND(50)	ND(50)	84

ND = Not detected at or above reporting limit; Reporting limit
 indicated in parentheses.

* Sample diluted due to foaming during purge.

QA/QC SUMMARY

RPD, %	9
RECOVERY, %	93

LABORATORY NUMBER: 106593
 CLIENT: SUBSURFACE CONSULTANTS
 PROJECT ID: 469.006
 LOCATION: COLLEGE OF ALAMEDA

DATE RECEIVED: 02/19/92
 DATE ANALYZED: 02/24/92
 DATE REPORTED: 02/25/92

Benzene, Toluene, Ethyl Benzene, Xylenes by EPA 8020
 Extraction by EPA 5030 Purge and Trap

LAB ID	CLIENT ID	BENZENE (ug/L)	TOLUENE (ug/L)	ETHYL BENZENE (ug/L)	TOTAL XYLENES (ug/L)	REPORTING LIMIT * (ug/L)
106593-1	MW-1	ND	ND	ND	ND	0.5

ND = Not detected at or above reporting limit.

* Reporting Limit applies to all analytes.

QA/QC SUMMARY

RPD, %	2
RECOVERY, %	87

LABORATORY NUMBER: 106593
 CLIENT: SUBSURFACE CONSULTANTS
 PROJECT ID: 469.006
 LOCATION: COLLEGE OF ALAMEDA

DATE RECEIVED: 02/19/92
 DATE EXTRACTED: 02/21/92
 DATE ANALYZED: 02/22/92
 DATE REPORTED: 02/25/92

Extractable Petroleum Hydrocarbons in Aqueous Solutions
 California DOHS Method
 LUFT Manual October 1989

LAB ID	CLIENT ID	KEROSENE RANGE (ug/L)	DIESEL RANGE (ug/L)	REPORTING LIMIT* (ug/L)
106593-1	MW-1	ND	94	50
106593-3	MW-3	680	ND	50

ND = Not detected at or above reporting limit.

*Reporting limit applies to all analytes.

QA/QC SUMMARY

RPD, %	<1
RECOVERY, %	90

LABORATORY NUMBER: 106593-3
 CLIENT: SUBSURFACE CONSULTANTS
 PROJECT ID: 469.006
 LOCATION: COLLEGE OF ALAMEDA
 SAMPLE ID: MW-3

DATE RECEIVED: 02/19/92
 DATE ANALYZED: 02/20/92
 DATE REPORTED: 02/25/92

EPA 8010
 Purgeable Halocarbons in Water

Compound	Result ug/L	Reporting Limit ug/L
Chloromethane	ND	2.0
Bromomethane	ND	2.0
Vinyl chloride	ND	2.0
Chloroethane	ND	2.0
Methylene chloride	ND	20
Trichlorofluoromethane	ND	1.0
1,1-Dichloroethene	ND	1.0
1,1-Dichloroethane	ND	1.0
cis-1,2-Dichloroethene	ND	1.0
trans-1,2-Dichloroethene	ND	1.0
Chloroform	ND	1.0
Freon 113	ND	1.0
1,2-Dichloroethane	ND	1.0
1,1,1-Trichloroethane	ND	1.0
Carbon tetrachloride	ND	1.0
Bromodichloromethane	ND	1.0
1,2-Dichloropropane	ND	1.0
cis-1,3-Dichloropropene	ND	1.0
Trichloroethylene	ND	1.0
1,1,2-Trichloroethane	ND	1.0
trans-1,3-Dichloropropene	ND	1.0
Dibromochloromethane	ND	1.0
2-Chloroethylvinyl ether	ND	2.0
Bromoform	ND	1.0
Tetrachloroethene	ND	1.0
1,1,2,2-Tetrachloroethane	ND	1.0
Chlorobenzene	ND	1.0
1,3-Dichlorobenzene	ND	1.0
1,2-Dichlorobenzene	ND	1.0
1,4-Dichlorobenzene	ND	1.0

ND = Not detected at or above reporting limit.

QA/QC SUMMARY

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Surrogate Recovery, %

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LABORATORY NUMBER: 106593
 CLIENT: SUBSURFACE CONSULTANTS
 PROJECT ID: 469.006
 LOCATION: COLLEGE OF ALAMEDA
 SAMPLE ID: METHOD BLANK

DATE ANALYZED: 02/20/92
 DATE REPORTED: 02/25/92

EPA 8010
 Purgeable Halocarbons in Water

Compound	Result ug/L	Reporting Limit ug/L
Chloromethane	ND	2.0
Bromomethane	ND	2.0
Vinyl chloride	ND	2.0
Chloroethane	ND	2.0
Methylene chloride	ND	20
Trichlorofluoromethane	ND	1.0
1,1-Dichloroethene	ND	1.0
1,1-Dichloroethane	ND	1.0
cis-1,2-Dichloroethene	ND	1.0
trans-1,2-Dichloroethene	ND	1.0
Chloroform	ND	1.0
Freon 113	ND	1.0
1,2-Dichloroethane	ND	1.0
1,1,1-Trichloroethane	ND	1.0
Carbon tetrachloride	ND	1.0
Bromodichloromethane	ND	1.0
1,2-Dichloropropane	ND	1.0
cis-1,3-Dichloropropene	ND	1.0
Trichloroethylene	ND	1.0
1,1,2-Trichloroethane	ND	1.0
trans-1,3-Dichloropropene	ND	1.0
Dibromochloromethane	ND	1.0
2-Chloroethylvinyl ether	ND	2.0
Bromoform	ND	1.0
Tetrachloroethene	ND	1.0
1,1,2,2-Tetrachloroethane	ND	1.0
Chlorobenzene	ND	1.0
1,3-Dichlorobenzene	ND	1.0
1,2-Dichlorobenzene	ND	1.0
1,4-Dichlorobenzene	ND	1.0

ND = Not detected at or above reporting limit.

QA/QC SUMMARY

=====

Surrogate Recovery, %

=====

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MS/MSD SUMMARY SHEET FOR EPA 8010/8020



Curtis & Tompkins, Ltd.

Operator: CW
 Analysis date: 2/20/92
 Sample type: WATER
 Sample Number: 106585-001 5ml

Spike file: 051E/F005
 Spike dup file: 051E/F006
 Instrument: GC05

8010 MS/MSD DATA (spiked at 20 ppb)

Ave Rec= 105 %

SPIKE COMPOUNDS	READING	RECOVERY	STATUS	LIMITS
1,1-Dichloroethene	21.23	106 %	OK	1 - 183
Trichloroethene	22.81	114 %	OK	55 - 155
Chlorobenzene	19.96	100 %	OK	66 - 133
SPIKE DUP COMPOUNDS				
1,1-Dichloroethene	18.49	92 %	OK	1 - 183
Trichloroethene	22.06	110 %	OK	55 - 155
Chlorobenzene	21.58	108 %	OK	66 - 133
SURROGATES				
1-bromo-4-fluorobenzene (MS)	90.00	90 %	OK	72 - 131
1-bromo-4-fluorobenzene (MSD)	90.00	90 %	OK	72 - 131

8020 MS/MSD DATA (spiked at 20 ppb)

Ave Rec= 117 %

SPIKE COMPOUNDS	READING	RECOVERY	STATUS	LIMITS
Benzene	22.96	115 %	OK	76 - 127
Toluene	23.43	117 %	OK	76 - 125
Chlorobenzene	23.61	118 %	OK	66 - 133
SPIKE DUP COMPOUNDS				
Benzene	22.77	114 %	OK	76 - 127
Toluene	23.17	116 %	OK	76 - 125
Chlorobenzene	23.91	120 %	OK	66 - 133
SURROGATES				
Bromobenzene (MS)	100.00	100 %	OK	72 - 131
Bromobenzene (MSD)	100.00	100 %	OK	72 - 131

RPD DATA

8010 RPD=

8.3 %

8020 RPD=

1.1 %

8010 COMPOUNDS	SPIKE	SPIKE DUP	RPD	STATUS	LIMITS
1,1-Dichloroethene	21.23	18.49	14 %	OK	< 14
Trichloroethene	22.81	22.06	3 %	OK	< 14
Chlorobenzene	19.96	21.58	8 %	OK	< 13
8020 COMPOUNDS					
Benzene	22.96	22.77	1 %	OK	< 11
Toluene	23.43	23.17	1 %	OK	< 13
Chlorobenzene	23.61	23.91	1 %	OK	< 13

REVIEWED BY: 

Client: Subsurface Consultants

Laboratory Login Number: 106593

 Project Name: College of Alameda
 Project Number: 469.006

Report Date: 26 February 92

ANALYSIS: Hydrocarbon Oil & Grease (Gravimetric) METHOD: SMWW 17:5520BF

Lab ID	Sample ID	Matrix	Sampled	Received	Analyzed	Result	Units	RL	Analyst	QC Batch
106593-003	MW-3	Water	19-FEB-92	19-FEB-92	20-FEB-92	ND	mg/L	5	TR	4299

ND = Not Detected at or above Reporting Limit (RL).



Q C B a t c h R e p o r t

Client: Subsurface Consultants
Project Name: College of Alameda
Project Number: 469.006

Laboratory Login Number: 106593
Report Date: 26 February 92

ANALYSIS: Hydrocarbon Oil & Grease (Gravimetric)

QC Batch Number: 4299

Blank Results

Sample ID	Result	MDL	Units	Method	Date Analyzed
BLANK	ND	5	mg/L	SMWW 17:5520BF	20-FEB-92

Spike/Duplicate Results

Sample ID	Recovery	Method	Date Analyzed
BS	91%	SMWW 17:5520BF	20-FEB-92
BSD	88%	SMWW 17:5520BF	20-FEB-92

		Control Limits
Average Spike Recovery	89%	80% - 120%
Relative Percent Difference	2.5%	< 20%

