October 1995 Semiannual
Ground Water Sampling Report
Mills Hall/Toyon Meadow
Oakland, California

December 8, 1995

Prepared For:

Mills College
5000 MacArthur Boulevard
Oakland, CA 94613

Prepared By:

Harza Consulting Engineers and Scientists
425 Roland Way
Oakland, CA 94621

REGISTERED GEOLOGIST
DENNIS LADUZINSKY
NO. 1535
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

Derek D. Armentrout
Project Chemist

Dennis Laduzinsky, C.E.G.
Head, Geology and Hydrogeology

K275GREP.010
12-08-95

HARZA

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Oakland, California

1.0 INTRODUCTION

This report presents the results of ground water sampling performed at the Mills Hall/Toyon Meadow site in Oakland, California. The project location is shown on the Site Vicinity Map (Figure 1).

The purpose of the investigation has been to evaluate the extent of petroleum hydrocarbons in ground water related to a previously removed fuel underground storage tank (UST) at the site. This investigation was performed to comply with the continuing monitoring program under the jurisdiction of the Alameda County Health Care Services Agency (ACHCSA). The ACHCSA requires semiannual monitoring at this site, as stipulated in their September 7, 1994 letter.

2.0 BACKGROUND

In June 1989, a small capacity fuel-oil UST was removed from the parking lot of the former Mills Kitchen building. This area is now developed as an open lawn and landscape area referred to as Toyon Meadow. Elevated levels of total petroleum hydrocarbons as diesel (TPHd) were detected in soil samples collected from the excavation at the time of removal, and approximately 250 cubic yards of soil were excavated from the vicinity of the former tank and disposed off-site.

Harza, formerly Kaldveer Associates, performed a soil and ground water quality investigation at the site in 1989. A drilling and soil sampling program was initiated to determine the areal extent of impact. TPHd was detected in soil samples at a depth of 12 to 15 feet below ground surface (bgs) for a distance of at least 60 feet downgradient of the former tank location.

In July 1989, monitoring well MHW-1 was installed approximately 50 feet downgradient from the former tank location, as shown in Figure 2. Two additional wells (MHW-2 and MHW-3) were installed in June 1991. Ground water monitoring has been performed intermittently since June 1991.

TPHd concentrations in ground water have ranged from below detection limits to 0.09 milligrams per liter (parts per million [ppm]) in former well MHW-1 and 0.1 to 3.2 ppm in well MHW-2. TPHd

has not been detected in well MHW-3. Benzene, toluene, ethylbenzene, and xylenes (BTEX) have not been detected in any of the three wells with the exception of a detection in April 1995 that is believed to be an artifact. The measured ground water flow direction has consistently been toward the southwest.

During landscape renovation activities, monitoring well MHW-1 was destroyed under permit by a licensed drilling contractor in May 1994. A new well, MHW-1A, was installed in the approximate location of the destroyed well. In the *Monitoring Well Installation and Ground Water Sampling Report* (August 17, 1994), Harza recommended that the frequency of ground water monitoring at the Mills Hall/Toyon Meadow site be reduced to a semiannual schedule. This change was approved by the ACHCSA in their September 7, 1994 letter.

3.0 SCOPE OF SERVICES

The investigation consisted of the following tasks:

- Measuring ground water levels in all wells for use in developing a ground water elevation contour map
- Collecting ground water samples from the three wells at the site
- Analyzing ground water samples for TPHd and purgeable aromatic compounds (BTEX)

4.0 FIELD INVESTIGATION

4.1 Well Sampling

The three monitoring wells were sampled on October 19, 1995. Following an initial ground water level measurement, a minimum of three well-casing volumes of water were purged from each well using a Teflon bailer. Purging consisted of the gradual removal of water from the well until physical parameters such as pH, temperature, and electrical conductivity stabilized. Following purging, samples were decanted from the bailer into appropriate sample containers, labeled, and placed in refrigerated storage for transport to the laboratory under chain-of-custody control. The bailer was washed with trisodium phosphate (TSP) and rinsed with deionized water between wells to reduce the potential for cross contamination. Purge water was contained on-site in a 55-gallon drum. Monitoring well sampling logs are attached to this report as Appendix A.

4.2 Ground Water Gradient

Well-top elevations, depth to water, and calculated water-surface elevations are presented in Table 1. These data are used to generate the ground water elevation contours presented on Figure 2. Ground water elevation data collected during this investigation indicate a general southwesterly flow at an approximate gradient of 0.04 foot per foot.

5.0 ANALYTICAL RESULTS

5.1 Laboratory Procedures

Ground water samples were analyzed by American Environmental Network (AEN) of Pleasant Hill, California. AEN is certified by the California Environmental Protection Agency for the analyses performed. Samples from each well were analyzed for TPHd using EPA Method 3550/GC-FID, and for BTEX using EPA Method 8020.

5.2 Analytical Results

The results of the chemical analyses are presented in Table 2 and laboratory analytical reports are attached as Appendix B. A historical summary of ground water sample analytical results is also included in Table 2.

TPHd was detected in the ground water sample from well MHW-2 at a concentration of 0.4 ppm. TPHd was not detected at or above the laboratory method limits (MRLs) in the samples from wells MHW-1 and MHW-3. BTEX were not detected above the laboratory MRLs in any of the samples collected. No visible product or sheen was observed during sampling.

6.0 CONCLUSIONS

The ground water gradient and flow direction remain relatively constant. The concentration of TPHd in well MHW-2 has been relatively constant at low concentrations. TPHd has been detected sporadically at low concentrations in well MHW-1/1A. Benzene and toluene were detected in samples collected from wells MHW-1A and MHW-3 during the previous sampling event but were not detected during the present sampling event. Because these compounds had not been detected in prior samplings, it is likely that the levels detected were caused by laboratory or field contamination, and are not representative of actual ground water quality. The next monitoring event for the site is scheduled for April 1996.

7.0 LIMITATIONS

The purpose of a geologic/hydrogeologic study is to reasonably characterize existing site conditions based on the geology/hydrogeology of the area. In performing such a study, a balance must be struck between a reasonable investigation into the site conditions and an exhaustive analysis of each conceivable condition. The following paragraphs discuss the assumptions and parameters under which such a study is conducted.

No investigation is thorough enough to detect every geologic/hydrogeologic condition of interest at a given site. If conditions have not been identified during the study, such a finding should not therefore be construed as a guarantee of the absence of such conditions at the site, but rather as the result of the services performed within the scope, limitations, and cost of the work performed.

We are unable to report on or accurately predict events that may change the site conditions after the described services are performed, whether occurring naturally or caused by external forces. We cannot assume responsibility for conditions we were not authorized to evaluate, or conditions not generally recognized as predictable when services were performed.

Geologic/hydrogeologic conditions may exist at the site that cannot be identified solely by visual observation. Where subsurface exploratory work was performed, our professional opinions are based in part on interpretation of data from discrete sampling locations that may not represent actual conditions at unsampled locations.

TABLES

TABLE 1
Summary of Ground Water Sample Analyses
October 1995 Semiannual Ground Water Sampling Report
Mills Hall/Toyon Meadow, Oakland, California

Well	Date	TPHd ppm	TPH Oil ppm	Benzene ppm	Toluene ppm	Ethylbenzene ppm	Xylenes ppm
MHW-1/1A	06/91	**0.06**	ND	ND	ND	ND	ND
	03/92	ND	--	ND	ND	ND	ND
	10/92	**0.09**	ND	ND	ND	ND	ND
	05/94	ND	--	ND	ND	ND	ND
	10/94	ND	--	ND	ND	ND	ND
	04/95	**0.06**	--	**0.002**	**0.0006**	ND	ND
	10/95	ND	--	ND	ND	ND	ND
MHW-2	06/91	**3.2**	ND	ND	ND	ND	ND
	03/92	**0.1**	--	ND	ND	ND	ND
	10/92	**0.61**	ND	ND	ND	ND	ND
	05/94	**0.2**	--	ND	ND	ND	ND
	10/94	**0.4**	--	ND	ND	ND	ND
	04/95	**0.52**	--	ND	ND	ND	ND
	10/95	**0.4**	--	ND	ND	ND	ND
MHW-3	06/91	ND	ND	ND	ND	ND	ND
	03/92	ND	--	ND	ND	ND	ND
	10/92	ND	ND	ND	ND	ND	ND
	05/94	ND	--	ND	ND	ND	ND
	10/94	ND	--	ND	ND	ND	ND
	04/95	ND	--	**0.0009**	ND	ND	ND
	10/95	ND	--	ND	ND	ND	ND

NOTES

TPHd: Total petroleum hydrocarbons as diesel
TPH Oil: Total petroleum hydrocarbons as oil
ppm: Parts per million or milligrams per liter
ND: Not detected at or above the laboratory method reporting limits
--: Not tested
Well MHW-1 was replaced by MHW-1A on May 2, 1994 prior to the monitoring event

TABLE 2
Ground Water Elevation Data
October 1995 Semiannual Ground Water Sampling Report
Mills Hall/Toyon Meadow, Oakland, California
(Reported in feet)

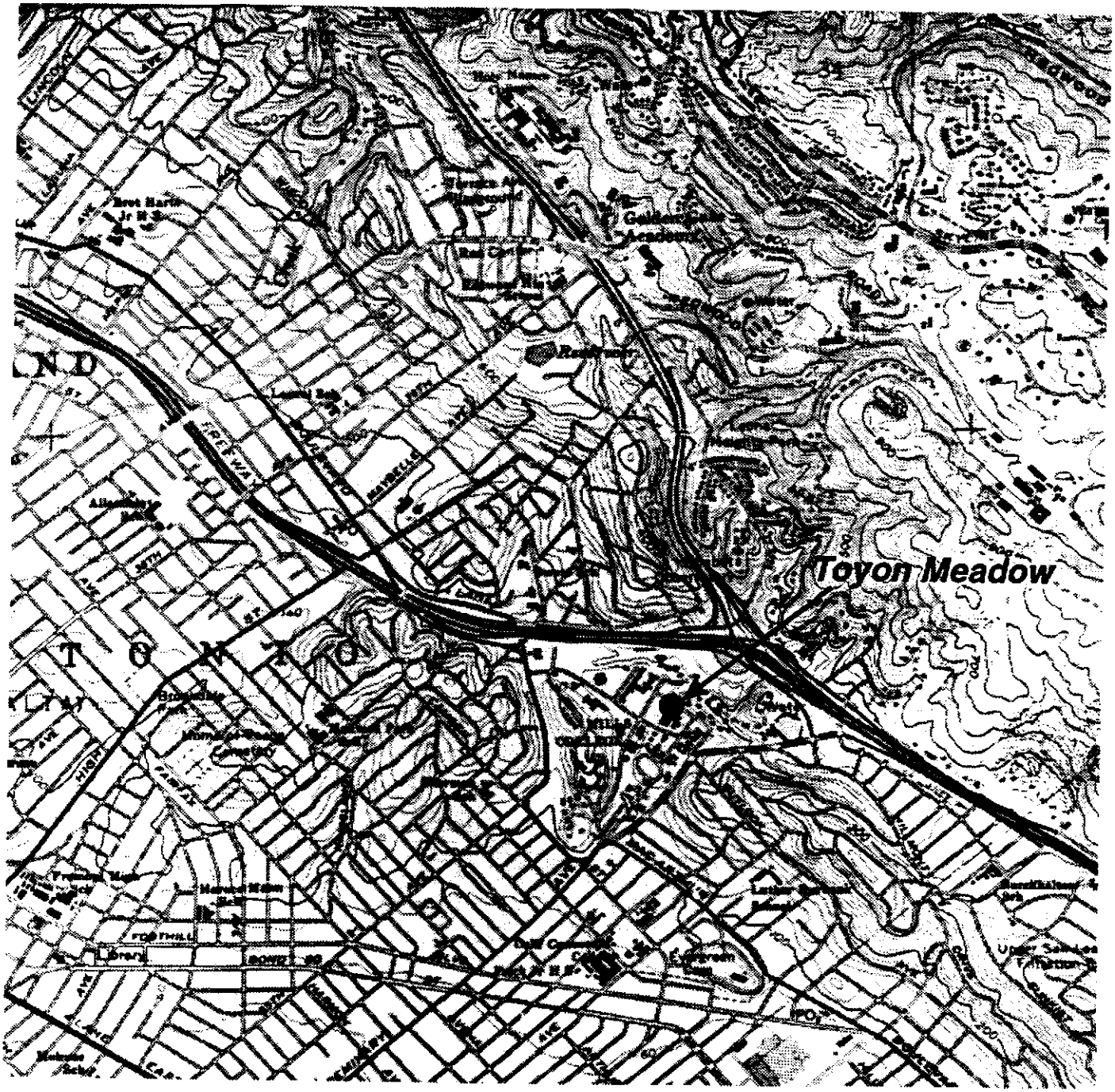
Date	Monitoring Well	Relative Well-Top Elevation	Depth to Water	Ground Water Elevation
June 1991	MHW-1	99.53	11.92	87.61
	MHW-2	100.00	10.32	89.68
	MHW-3	98.01	12.45	85.56
March 1992	MHW-1	99.53	9.95	89.58
	MHW-2	100.00	8.26	91.74
	MHW-3	98.01	11.12	86.89
October 1992	MHW-1	99.53	12.98	86.55
	MHW-2	100.00	11.19	88.81
	MHW-3	98.01	12.79	85.22
May 1994	MHW-1A	99.50	11.64	87.86
	MHW-2	100.00	9.94	90.06
	MHW-3	98.04	12.60	85.44
October 1994	MHW-1A	99.50	13.39	86.11
	MHW-2	100.00	11.05	88.95
	MHW-3	98.04	12.93	85.11
April 1995	MHW-1A	99.50	12.94	86.56
	MHW-2	100.00	9.95	90.05
	MHW-3	98.04	12.64	85.40
October 1995	MHW-1A	99.50	12.83	86.67
	MHW-2	100.00	10.66	89.34
	MHW-3	98.04	12.89	85.15

NOTES

Well-top elevations are based on an arbitrary datum of 100.00 feet at MHW-2.

Well MHW-1 was replaced by MHW-1A on May 2, 1994 prior to the monitoring event.

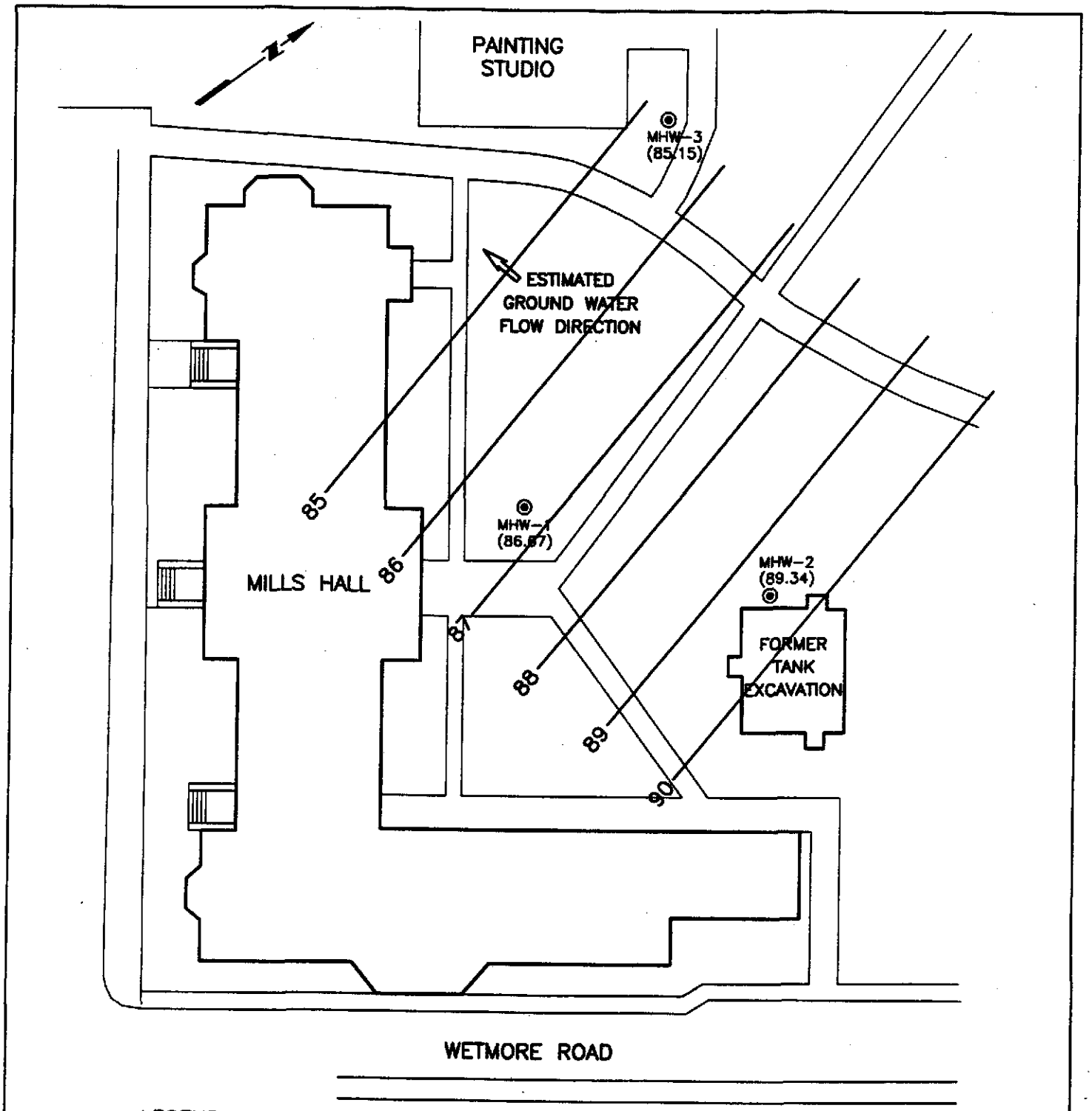
FIGURES



BASE: By U.S.G.S. Oakland East, California, 7.5 Min. Quadrangle Topography.

E275G1

Date		SITE VICINITY MAP	Figure
11/95	HARZA	MILLS HALL/TOYON MEADOW CORPORATION YARD FACILITY Oakland, California	1
Project No. K275-G			



LEGEND

MHW-3◉ Approximate Location Of Monitoring Well With Relative Ground Water Elevation

90—— Ground Water Contour 10/19/95

Approximate Scale in Feet

0 40 80

Base Provided By Mills College, Dated 3/88

11-95-2

Rev.	Drawn By	Chk'd By	Date
0	D.F.	M.A.	11/17/95

HARZA

SITE PLAN

MILLS HALL / TOYON MEADOW
Oakland, California

Figure 2

Project No. K275-G

APPENDIX A

Water Sample Logs

WATER SAMPLE LOG

Project Name: Mills College
Project Number: K275-G
Well Number: MW-1
Well Location:

Date: 10/19/95
Sampler: M. Anders
Weather: Sunny, 70s

Well Construction

Date Completed:
Total Depth of Well: 19.95'
Diameter: 2"
Well Elevation and Reference:

Sampling Equipment & Cleaning

Sampler Type: Teflon bailer
Method of Cleaning: TSP/rinse
Pump/Bailer Type: Teflon bailer
Method of Cleaning: TSP/rinse
pH Meter: Hydac
Conductivity Meter: Hydac
Comments:

Ground Water Levels:

Initial: 12.83'
Final: 12.94'
Reference Point: TOC
Well Volume of Water: 1.16

SAMPLING MEASUREMENTS

Time	Discharge (gal.)		pH	Temp (°F)	Spec. Conductance (µmhos/cm)		Color/ Turbidity	Odor
	Per Time Period	Cumulative			Field	@ 25°C		
	start	0						
1053		1.5	6.89	65.5	1750		BROWN / HIGH	NONE
1058		3	6.84	65.5	1733		"	"
1102		4.5	6.89	65.2	1758		"	"
	Sampled							

Total Discharge: 5 gal
Casing Volumes Removed: 4.3
Method of Disposal: Drum on-site

Comments:

HARZA *Consulting Engineers and Scientists*	WATER SAMPLE LOG		
	Project No.	Date	Figure

DDA:WATSAMP.XLS

WATER SAMPLE LOG

Project Name: Mills College
Project Number: K275-G
Well Number: MHW-2
Well Location:

Date: 10/19/95
Sampler: M. Anders
Weather: 70s Sunny

Well Construction

Date Completed:
Total Depth of Well: 19.50
Diameter: 2"
Well Elevation and Reference:

Sampling Equipment & Cleaning

Sampler Type: Teflon bailer
Method of Cleaning: TSP/rinse
Pump/Bailer Type: Teflon bailer
Method of Cleaning: TSP/rinse
pH Meter: Hydac
Conductivity Meter: Hydac
Comments:

Ground Water Levels:

Initial: 10.66
Final: 10.87
Reference Point: TOC
Well Volume of Water: 1.48

SAMPLING MEASUREMENTS

Time	Discharge (gal.)		pH	Temp (°F)	Spec. Conductance (µmhos/cm)		Color/ Turbidity	Odor
	Per Time Period	Cumulative			Field	@ 25°C		
1011	start	0						
1017	1.5		6.71	66	1933		GRAY-BROWN/MUDDY	NONE
1020	3		6.84	65.5	1717		"	"
1024	4.5		6.88	65.2	1699		"	"
	SAMPLED							

Total Discharge: 5 gal
Casing Volumes Removed: 3.38
Method of Disposal: DRUM on-site

Comments:

HARZA *Consulting Engineers and Scientists*	WATER SAMPLE LOG		
	Project No.	Date	Figure

DDA:WATSAMP.XLS

WATER SAMPLE LOG

Project Name: Mills College
Project Number: K275-G
Well Number: MW-3
Well Location:

Date: 10/19/95
Sampler: M. Anders
Weather: 70s sunny

Well Construction

Date Completed:
Total Depth of Well: 12.50
Diameter: 2"
Well Elevation and Reference:

Sampling Equipment & Cleaning

Sampler Type: Teflon bailer
Method of Cleaning: TSP/rinse
Pump/Bailer Type: Teflon bailer
Method of Cleaning: TSP/rinse
pH Meter: Hydac
Conductivity Meter: Hydac
Comments:

Ground Water Levels:

Initial: 12.89
Final: 13.08
Reference Point: TOC
Well Volume of Water: 0.9

SAMPLING MEASUREMENTS

Time	Discharge (gal.) Per Time Period	Discharge (gal.) Cumulative	pH	Temp (°F)	Spec. Conductance (µmhos/cm) Field	Spec. Conductance (µmhos/cm) @ 25°C	Color/ Turbidity	Odor
922	start	0						
925		1.5	7.80	68°	1968		Brown/High	none
929		2.5	6.83	66.5°	1892		"	"
935		3.5	6.80	66°	~~1910~~	1792	"	"
939		4.5	6.81	66	1983		"	"
	SAMPLED							

Total Discharge: 4.5 gal
Casing Volumes Removed: 6.0
Method of Disposal: DRUM ON-SITE

Comments:

HARZA Consulting Engineers and Scientists	WATER SAMPLE LOG		
	Project No.	Date	Figure

DDA:WATSAMP.XLS

APPENDIX B

Laboratory Analytical Reports

American Environmental Network

Certificate of Analysis

DOHS Certification: 1172 AIHA Accreditation: 11134

HARZA
425 ROLAND WAY
OAKLAND, CA 94621

ATTN: MR. GARY GORMAN
CLIENT PROJ. ID: K275-G
CLIENT PROJ. NAME: MILLS COLLEGE

REPORT DATE: 10/26/95
DATE(S) SAMPLED: 10/19/95
DATE RECEIVED: 10/19/95
AEN WORK ORDER: 9510258

PROJECT SUMMARY:

On October 19, 1995, this laboratory received 3 water sample(s).

Client requested sample(s) be analyzed for organic parameters. Results of analysis are summarized on the following page(s). Please see quality control report for a summary of QC data pertaining to this project.

Samples will be stored for 30 days after completion of analysis, then disposed of in accordance with State and Federal regulations. Samples may be archived by prior arrangement.

If you have any questions, please contact Client Services at (510) 930-9090.

Larry Klein
Laboratory Director

HARZA

SAMPLE ID: MHW-1
AEN LAB NO: 9510258-01
AEN WORK ORDER: 9510258
CLIENT PROJ. ID: K275-G

DATE SAMPLED: 10/19/95
DATE RECEIVED: 10/19/95
REPORT DATE: 10/26/95

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
EPA 8020 for BTEX	EPA 8020				
Benzene	71-43-2	ND	0.5	ug/L	10/23/95
Toluene	108-88-3	ND	0.5	ug/L	10/23/95
Ethylbenzene	100-41-4	ND	0.5	ug/L	10/23/95
Xylenes, Total	1330-20-7	ND	2	ug/L	10/23/95
#Extraction for TPH	EPA 3510	-		Extrn Date	10/23/95
TPH as Diesel	GC-FID	ND	0.05	mg/L	10/24/95

ND = Not detected at or above the reporting limit
* = Value above reporting limit

HARZA

SAMPLE ID: MHW-2
AEN LAB NO: 9510258-02
AEN WORK ORDER: 9510258
CLIENT PROJ. ID: K275-G

DATE SAMPLED: 10/19/95
DATE RECEIVED: 10/19/95
REPORT DATE: 10/26/95

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
EPA 8020 for BTEX	EPA 8020				
Benzene	71-43-2	ND	0.5	ug/L	10/21/95
Toluene	108-88-3	ND	0.5	ug/L	10/21/95
Ethylbenzene	100-41-4	ND	0.5	ug/L	10/21/95
Xylenes, Total	1330-20-7	ND	2	ug/L	10/21/95
#Extraction for TPH	EPA 3510	-		Extrn Date	10/23/95
TPH as Diesel	GC-FID	0.4 *	0.05	mg/L	10/24/95

ND = Not detected at or above the reporting limit
* = Value above reporting limit

HARZA

SAMPLE ID: MHW-3
AEN LAB NO: 9510258-03
AEN WORK ORDER: 9510258
CLIENT PROJ. ID: K275-G

DATE SAMPLED: 10/19/95
DATE RECEIVED: 10/19/95
REPORT DATE: 10/26/95

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
EPA 8020 for BTEX	EPA 8020				
Benzene	71-43-2	ND	0.5	ug/L	10/21/95
Toluene	108-88-3	ND	0.5	ug/L	10/21/95
Ethylbenzene	100-41-4	ND	0.5	ug/L	10/21/95
Xylenes, Total	1330-20-7	ND	2	ug/L	10/21/95
#Extraction for TPH	EPA 3510	-		Extrn Date	10/23/95
TPH as Diesel	GC-FID	ND	0.05	mg/L	10/24/95

ND = Not detected at or above the reporting limit
* = Value above reporting limit

AEN (CALIFORNIA)
QUALITY CONTROL REPORT

AEN JOB NUMBER: 9510258

CLIENT PROJECT ID: K275-G

Quality Control and Project Summary

All laboratory quality control parameters were found to be within established limits.

Definitions

Laboratory Control Sample (LCS)/Method Spike(s): Control samples of known composition. LCS and Method Spike data are used to validate batch analytical results.

Matrix Spike(s): Aliquot of a sample (aqueous or solid) with added quantities of specific compounds and subjected to the entire analytical procedure. Matrix spike and matrix spike duplicate QC data are advisory.

Method Blank: An analytical control consisting of all reagents, internal standards, and surrogate standards carried through the entire analytical process. Used to monitor laboratory background and reagent contamination.

Not Detected (ND): Not detected at or above the reporting limit.

Relative Percent Difference (RPD): An indication of method precision based on duplicate analysis.

Reporting Limit (RL): The lowest concentration routinely determined during laboratory operations. The RL is generally 1 to 10 times the Method Detection Limit (MDL). Reporting limits are matrix, method, and analyte dependent and take into account any dilutions performed as part of the analysis.

Surrogates: Organic compounds which are similar to analytes of interest in chemical behavior, but are not found in environmental samples. Surrogates are added to all blanks, calibration and check standards, samples, and spiked samples. Surrogate recovery is monitored as an indication of acceptable sample preparation and instrumental performance.

D: Surrogates diluted out.

#: Indicates result outside of established laboratory QC limits.

QUALITY CONTROL DATA

METHOD: EPA 3510 GCFID

AEN JOB NO: 9510258
DATE EXTRACTED: 10/23/95
INSTRUMENT: C
MATRIX: WATER

Surrogate Standard Recovery Summary

Date Analyzed	Client Id.	Lab Id.	Percent Recovery n-Pentacosane
10/24/95	MHW-1	01	94
10/24/95	MHW-2	02	91
10/24/95	MHW-3	03	98
QC Limits:			59-118

DATE EXTRACTED: 10/20/95
DATE ANALYZED: 10/23/95
SAMPLE SPIKED: DI WATER
INSTRUMENT: C

Method Spike Recovery Summary

Analyte	Spike Added (mg/L)	Average Percent Recovery	RPD	QC Limits Percent Recovery	QC Limits RPD
Diesel	2.07	83	3	58-107	4

Daily method blanks for all associated analytical runs showed no contamination at or above the reporting limit.

QUALITY CONTROL DATA

METHOD: EPA 8020, 5030 GCFID

AEN JOB NO: 9510258
INSTRUMENT: H
MATRIX: WATER

Surrogate Standard Recovery Summary

Date Analyzed	Client Id.	Lab Id.	Percent Recovery Fluorobenzene
10/23/95	MHW-1	01	100
10/21/95	MHW-2	02	101
10/21/95	MHW-3	03	101
QC Limits:			92-109

DATE ANALYZED: 10/23/95
SAMPLE SPIKED: 9510258-03
INSTRUMENT: H

Matrix Spike Recovery Summary

Analyte	Spike Added (ug/L)	Average Percent Recovery	RPD	QC Limits Percent Recovery	QC Limits RPD
Benzene	35.4	109	4	85-109	17
Toluene	108	109	3	87-111	16
HCs as Gasoline	1000	110	<1	66-117	19

Daily method blanks for all associated analytical runs showed no contamination at or above the reporting limit.

*** END OF REPORT ***

R-3, S-1
R-3, S-2
9510 10/9/95

Page 1 of 1

Contact: DEREK ARMENTROUT

AEN

HARZA Consulting Engineers and Scientists
425 Roland Way
Oakland, CA 94621
(510) 568-4001
(510) 568-2205 Fax

Project Number: K275-G

Lab Project Number: 9510258

Project Name: MILLS COLLEGE

Sampler's Name (printed): M. ANDERS

Harza Sample ID	Lab Sample ID	Date	Time	Sample Type	Number/Type of Container
MHW-1	01A-E	10/2/95	1105	WTR	(2) Amb (3) VOAs
MHW-2	02A-E		1030		
MHW-3	03A-E		945		↓
MW-1	04A-C		1610		(3) VOA
MW-2	05A-C		1503		
MW-3	06A-C		1536		
MW-4	07A-C		1320		
MW-5	08A-B	↓	1420	↓	(2) VOA
TB	09A-B	–	–	–	↓

Analyses: TPH as Gasoline; TPH as Diesel / Motor Oil / Full Scan / Method 418.1 - TRPH; Method 8240 - Volatile Organic Compounds; Method 8010 - Halogenated VOCs; Method 8020 - BTEX; Method 8270 - Semivolatile Organic Compounds; Metals - Method 8080 - Organochlorine Pesticides / PCBs

Remarks

Relinquished by: (Signature) — Date 10/2/95 Time 1703

Relinquished by: (Signature) — Date 10/4/95 Time 15:10

Relinquished by: (Signature)

Received by: (Signature)

Received by: (Signature)

Date 10/4/95 Time 17:03

Date 10/9/95 Time 1810

Requested Turnaround Time: ☒ Standard ☐ 3-Day ☐ 2-Day ☐ 24-Hour ☐ other ☐ FAX Results

NOTES