

**First Semiannum 1995
Ground Water Sampling Report
Mills Hall/Toyon Meadow
Oakland, California**

June 19, 1995

Prepared For:

Mills College
5000 MacArthur Boulevard
Oakland, CA 94613

Prepared By:

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Lida Kagn for DA

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Project Chemist

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Head, Geology and Hydrogeology

ENVIRONMENTAL
PROTECTION
95 JUN 22 PM 1:20

June 19, 1995

Mr. David Johnson
Mills College
5000 MacArthur Boulevard
Oakland, CA 94613

Re: First Semiannum 1995 Ground Water Sampling Report
Mills Hall/Toyon Meadow, Oakland, California
Project No.: K275-G

Dear Mr. Johnson:

We are pleased to present our final report for the above referenced project. On your behalf, we will submit copies to Madhulla Logan of Alameda County Health Care Services and the Regional Water Quality Control Board.

Should you have any questions or require additional information, please do not hesitate to contact me.

Sincerely,

Harza Consulting Engineers and Scientists



Derek D. Armentrout
Project Chemist

DADL:gg\encl.

Copies: Addressee (1)

Ms. Madhulla Logan (Alameda County Health Care Services - 1)

Alameda County LUFT Case Officer (Regional Water Quality Control Board - 1)

K275-G reports\29131
06-19-95

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**First Semiannum 1995
Ground Water Sampling Report
Mills Hall/Toyon Meadow
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 (part per million or 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. Before the most recent monitoring event, benzene, toluene,

ethylbenzene, and xylenes (BTEX) had not been detected in any of the three wells. 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 using EPA Method 3550/GC-FID, and for purgeable aromatic compounds (BTEX) using EPA Method 8020.
- Preparing this report.

4.0 FIELD INVESTIGATION

4.1 Well Sampling

The three monitoring wells were sampled on April 27, 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 were surveyed to a common datum and water levels were measured in each well. 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 water samples from well MHW-2 at a concentration of 0.52 ppm and from well MHW-1A at 0.06 ppm. TPHd was not detected at or above the laboratory method limits (MRLs) in the water sample from well MHW-3. Benzene was detected at 0.002 ppm and toluene at 0.00006 ppb in the sample from MHW-1A, and benzene was detected at 0.0009 ppb in the sample from MHW-3. 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 shows no apparent trend. TPHd has been detected sporadically at low concentrations in well MHW-1/1A. Benzene and toluene were detected for the first time at concentrations slightly above the MRLs. Concentrations at this level can be caused by laboratory or field contamination. Future monitoring results will be used to evaluate if this detection is an indication of impact. The next monitoring event for the site is scheduled for October 1995.

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

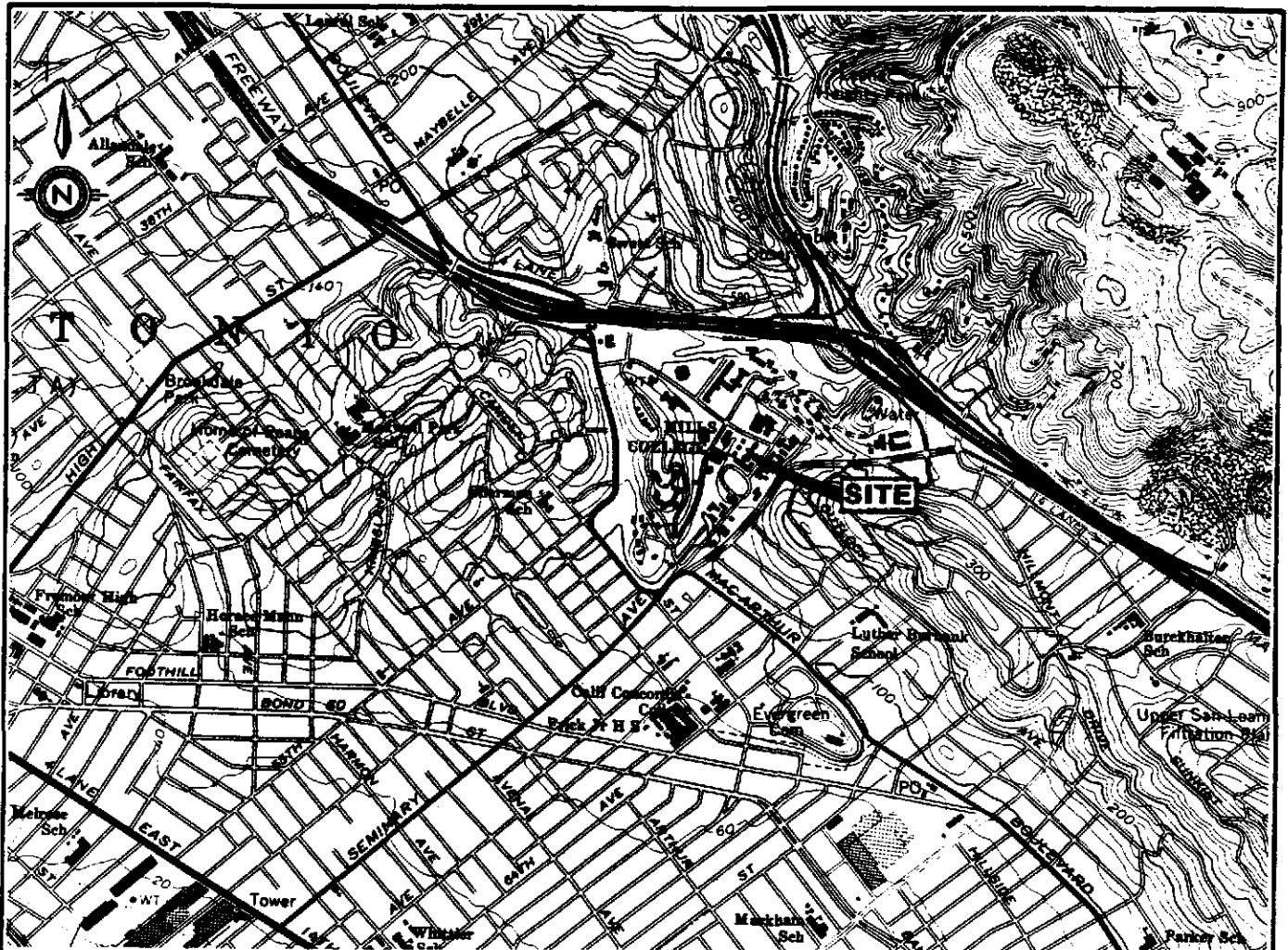
TABLE 1
Ground Water Elevation Data
 First Semiannum 1995 Ground Water Sampling Report
 Mills Hall/Toyon Meadow, Oakland, California
 (Reported in feet)

Date	Monitoring Well	Relative Well-Top Elevation ⁽¹⁾	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	09.95	89.58
	MHW-2	100.00	08.26	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 ⁽²⁾	99.50	11.64	87.86
	MHW-2	100.00	09.94	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

NOTES

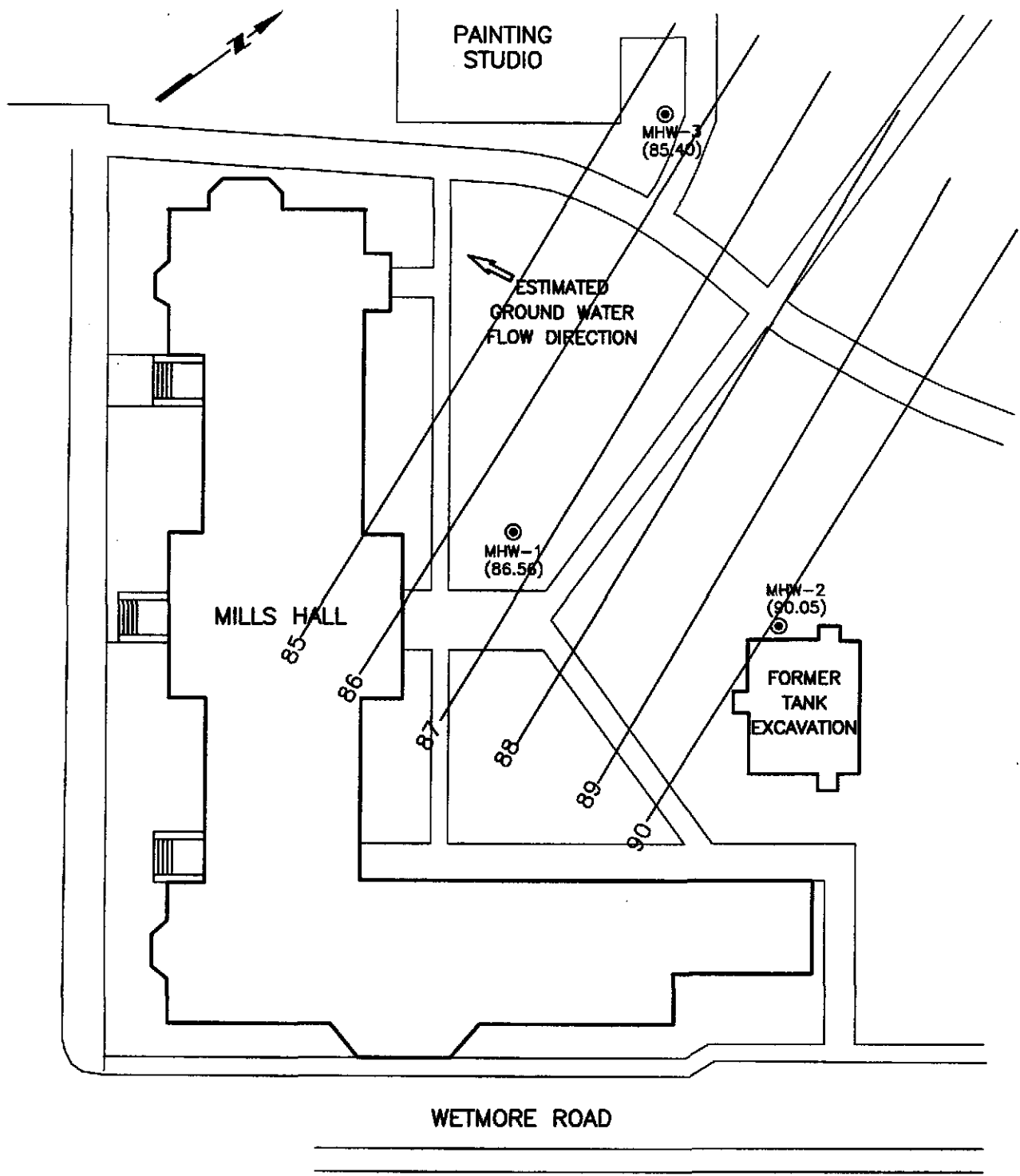
- (1): Well-top elevations are based on an arbitrary datum of 100.00 feet at MHW-2.
- (2): Well MHW-1 was replaced by MHW-1A on May 2, 1994 prior to the monitoring event.

FIGURES



Base: U.S.G.S. Oakland East 7.5 Minute Quadrangle (Topographic)

<h1>HARZA</h1> <p><i>Consulting Engineers and Scientists</i></p>	SITE VICINITY MAP		
	MILLS HALL/TOYON MEADOW Oakland, California		
	PROJECT NO.	DATE	Figure 1
	K275-G	June 1995	

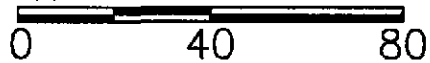


LEGEND

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

90— Ground Water Contour 4/27/95

Approximate Scale in Feet



Base Provided By Mills College, Dated 3/88

6-95-2

HARZA
Consulting Engineers and Scientists

LOCATION OF GROUND WATER
MONITORING WELLS

MILLS HALL / TOYON MEADOW
Oakland, California

PROJECT NO.

DATE

FIGURE NO.

K275-G

June 1995

2

APPENDIX A
Water Sample Logs

WATER SAMPLE LOG

Project Name: Mills College
 Project Number: K275- C
 Well Number: MHW-1
 Well Location: _____

Date: 9/27/95
 Sampler: J. PYRICH
 Weather: SHOWER

Well Construction

Date Completed: _____
 Total Depth of Well: 19.8'
 Diameter: 2"
 Well Elevation and Reference: _____

Sampling Equipment & Cleaning

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

Ground Water Levels:

Initial: 12.94'
 Final: 12.60
 Reference Point: TOC
 Well Volume of Water: 1.2 gal

SAMPLING MEASUREMENTS

Time	Discharge (gal.)		pH	Temp (F)	Spec. Conductance (umhos/cm)		Color/ Turbidity		Odor
	Per Time Period	Cumulative			Field	@ 25°C			
1000	start	0							
1007		1.5	7.24	60.9	2070		BROWN	HIGH	NONE
1012		3	7.20	61.1	2100		"	"	"
1016		4.8	7.19	61.2	2110		"	"	"
	SAMPLED								

Total Discharge: 4.8 gal
 Casing Volumes Removed: 4
 Method of Disposal: drummed on site

Comments: _____

HARZA <i>Consulting Engineers and Scientists</i>	WATER SAMPLE LOG		
	Project No.	Date	Figure

WATER SAMPLE LOG

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

Date: 4/25/95
 Sampler: J. PYRICH
 Weather: RAIN

Well Construction

Date Completed: _____
 Total Depth of Well: 19.40'
 Diameter: 2"
 Well Elevation and Reference: _____

Sampling Equipment & Cleaning

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

Ground Water Levels:

Initial: 9.95'
 Final: 10.30'
 Reference Point: TOC
 Well Volume of Water: 1.5 gal

SAMPLING MEASUREMENTS

Time	Discharge (gal.)		pH	Temp (°F)	Spec. Conductance (µmhos/cm)		Color/Turbidity	Odor
	Per Time Period	Cumulative			Field	@ 25°C		
1200	start	0					<u>BROWN / HIGH</u>	<u>NONE</u>
1210		1.5		61.2	2040		"	"
1215		3		62.1	2020		"	"
1225		4.5		62.0	2010		"	"
	<u>SAMPLED</u>							

Total Discharge: 4.5 gal
 Casing Volumes Removed: 3
 Method of Disposal: drummed on site

Comments: _____

HARZA <i>Consulting Engineers and Scientists</i>	WATER SAMPLE LOG		
	Project No.	Date	Figure

WATER SAMPLE LOG

Project Name: Mills College
 Project Number: K275- C
 Well Number: MHW-3
 Well Location: _____

Date: 4/27/95
 Sampler: J. PYRCH
 Weather: RAIN

Well Construction

Date Completed: _____
 Total Depth of Well: 18.6'
 Diameter: 2"
 Well Elevation and Reference: _____

Sampling Equipment & Cleaning

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

Ground Water Levels:

Initial: 12.64'
 Final: 12.99'
 Reference Point: TOC
 Well Volume of Water: 1.1 gal

SAMPLING MEASUREMENTS

Time	Discharge (gal.)		pH	Temp (F)	Spec. Conductance (µmhos/cm)		Color/ Turbidity	Odor
	Per Time Period	Cumulative			Field	@ 25°C		
	start	0	7.26		2000		BROWN/ HIGH	NONE
0907		1.5	7.26	59.8	2000		"	"
0918		3	7.24	59.9	2090		"	"
0924		4.5	7.20	59.6	1990		"	"
	SAMPLED							

Total Discharge: 4.5 gal
 Casing Volumes Removed: 4
 Method of Disposal: drummed on site
 Comments: _____

HARZA <i>Consulting Engineers and Scientists</i>	WATER SAMPLE LOG		
	Project No.	Date	Figure

APPENDIX B
Laboratory Analytical Reports

American Environmental Network

Certificate of Analysis

DOHS Certification: 1172

AIHA Accreditation: 11134

PAGE 1

HARZA
425 ROLAND WAY
OAKLAND, CA 94621

ATTN: MS. LIDA KAGAN
CLIENT PROJ. ID: K275-G
CLIENT PROJ. NAME: MILLS COLLEGE

REPORT DATE: 05/12/95

DATE(S) SAMPLED: 04/27/95

DATE RECEIVED: 04/28/95

AEN WORK ORDER: 9504341

PROJECT SUMMARY:

On April 28, 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-1A
 AEN LAB NO: 9504341-01
 AEN WORK ORDER: 9504341
 CLIENT PROJ. ID: K275-G

DATE SAMPLED: 04/27/95
 DATE RECEIVED: 04/28/95
 REPORT DATE: 05/12/95

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
EPA 8020 for BTEX	EPA 8020				
Benzene	71-43-2	2 *	0.5	ug/L	05/02/95
Toluene	108-88-3	0.6 *	0.5	ug/L	05/02/95
Ethylbenzene	100-41-4	ND	0.5	ug/L	05/02/95
Xylenes, total	1330-20-7	ND	2	ug/L	05/02/95
#Extraction for TPH	EPA 3510	-		Extrn Date	05/01/95
TPH as Diesel	GC-FID	0.06 *	0.05	mg/L	05/04/95

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

HARZA

SAMPLE ID: MHW-2
 AEN LAB NO: 9504341-02
 AEN WORK ORDER: 9504341
 CLIENT PROJ. ID: K275-G

DATE SAMPLED: 04/27/95
 DATE RECEIVED: 04/28/95
 REPORT DATE: 05/12/95

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
EPA 8020 for BTEX	EPA 8020				
Benzene	71-43-2	ND	0.5	ug/L	05/02/95
Toluene	108-88-3	ND	0.5	ug/L	05/02/95
Ethylbenzene	100-41-4	ND	0.5	ug/L	05/02/95
Xylenes, total	1330-20-7	ND	2	ug/L	05/02/95
#Extraction for TPH	EPA 3510	-		Extrn Date	05/01/95
TPH as Diesel	GC-FID	0.52 *	0.05	mg/L	05/04/95

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

HARZA

SAMPLE ID: MHW-3
 AEN LAB NO: 9504341-03
 AEN WORK ORDER: 9504341
 CLIENT PROJ. ID: K275-G

DATE SAMPLED: 04/27/95
 DATE RECEIVED: 04/28/95
 REPORT DATE: 05/12/95

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
EPA 8020 for BTEX	EPA 8020				
Benzene	71-43-2	0.9 *	0.5	ug/L	05/02/95
Toluene	108-88-3	ND	0.5	ug/L	05/02/95
Ethylbenzene	100-41-4	ND	0.5	ug/L	05/02/95
Xylenes, total	1330-20-7	ND	2	ug/L	05/02/95
#Extraction for TPH	EPA 3510	-		Extrn Date	05/01/95
TPH as Diesel	GC-FID	ND	0.05	mg/L	05/04/95

ND = Not detected at or above the reporting limit

* = Value at or above reporting limit

AEN (CALIFORNIA)
QUALITY CONTROL REPORT

AEN JOB NUMBER: 9504341

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: 9504341
 DATE EXTRACTED: 05/01/95
 INSTRUMENT: C
 MATRIX: WATER

Surrogate Standard Recovery Summary

Date Analyzed	Client Id.	Lab Id.	Percent Recovery n-Pentacosane
05/04/95	MHW-1A	01	79
05/04/95	MHW-2	02	81
05/04/95	MHW-3	03	80
QC Limits:			73-129

DATE EXTRACTED: 05/01/95
 DATE ANALYZED: 05/03/95
 SAMPLE SPIKED: DI WATER
 INSTRUMENT: C

Method Spike Recovery Summary

Analyte	Spike Added (mg/L)	Average Percent Recovery	RPD	QC Limits	
				Percent Recovery	RPD
Diesel	1.82	92	4	65-103	12

Daily method blanks for all associated analytical runs showed no contamination over the reporting limit.

QUALITY CONTROL DATA

METHOD: EPA 8020, 5030 GCFID

AEN JOB NO: 9504341
 INSTRUMENT: F,H
 MATRIX: WATER

Surrogate Standard Recovery Summary

Date Analyzed	Client Id.	Lab Id.	Percent Recovery	
			Fluorobenzene	
05/02/95	MHW-1A	01	95	
05/02/95	MHW-2	02	99	
05/02/95	MHW-3	03	93	
QC Limits:			92-109	

DATE ANALYZED: 04/29/95
 SAMPLE SPIKED: 9504298-05
 INSTRUMENT: F

Matrix Spike Recovery Summary

Analyte	Spike Added (ug/L)	Average Percent Recovery	RPD	QC Limits	
				Percent Recovery	RPD
Benzene	19.1	97	5	85-109	17
Toluene	52.9	98	5	87-111	16
Hydrocarbons as Gasoline	500	94	9	66-117	19

Daily method blanks for all associated analytical runs showed no contamination over the reporting limit.

QUALITY CONTROL DATA

METHOD: EPA 8020, 5030 GCFID

AEN JOB NO: 9504341
DATE ANALYZED: 05/02/95
SAMPLE SPIKED: 9504326-05
INSTRUMENT: H

Matrix Spike Recovery Summary

Analyte	Spike Added (ug/L)	Average Percent Recovery	RPD	QC Limits	
				Percent Recovery	RPD
Benzene	36.3	102	4	85-109	17
Toluene	103.0	103	3	87-111	16
Hydrocarbons as Gasoline	1000	102	<1	66-117	19

Daily method blanks for all associated analytical runs showed no contamination over the reporting limit.

*** END OF REPORT ***

