HARZA Consulting Engineers and Scientists

December 5, 1994

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

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

Dear Mr. Johnson:

Enclosed please find our report for the above referenced project. We are submitting copies to Juliet Shin of Alameda County Health Care Services and to the Regional Water Quality Control Board on your behalf.

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

Sincerely,

Harza Consulting Engineers and Scientists

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

DL\lk:lk\encl.
Copies: Addressee (2)
Ms. Juliet Shin (ACHCSA - 1)
Alameda County LUFT Case Officer (RWQCB - 1)

K275-G reports\28052
12-05-94

425 Roland Way Oakland, California 94621
Tel: (510) 568-4001 Fax: (510) 568-2205

255 North Market, Suite 248 San Jose, California 95110
Tel: (408) 288-8312 Fax: (510) 568-2205

Ground Water Sampling Report

Mills Hall/Toyon Meadow
Oakland, California

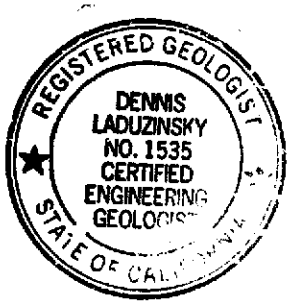
December 5, 1994

Prepared For:

Mills College
5000 MacArthur Boulevard
Oakland, CA 94613

Prepared By:

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



Derek D. Armentrout
Project Chemist

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

K275-G reports\28052
12-05-94

HARZA

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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 underground fuel storage tank (UST) on-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 ACHSCA requires semiannual monitoring at this site, as stipulated in their September 7, 1994 letter.

2.0 BACKGROUND

A small capacity fuel-oil UST was removed from the parking lot of the former Mills Kitchen building in June 1989. 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, conducted 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.

Monitoring well MHW-1 was installed in July 1989 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 been 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. Benzene, toluene, ethylbenzene, and xylenes (BTEX) have 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/GCFID, 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 October 26, 1994. 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 have been 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/GCFID, 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 to this report as Appendix B. A historical summary of ground water sample analytical results is also included in Table 2.

TPHd was detected in the water sample from well MHW-2 at a concentration of 0.4 ppm. TPHd was not detected in the water samples from wells MHW-1A or MHW-3. BTEX compounds were not detected in any of the wells. 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, and no downgradient migration of TPHd has been detected from this investigation. The analytical results are generally consistent with historical results (Table 2). The next monitoring event for the site is scheduled for April 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
Ground Water Sampling Report
Mills Hall/Toyon Meadow, Oakland, California
(Reported in feet)

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	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

NOTES

(1): 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.

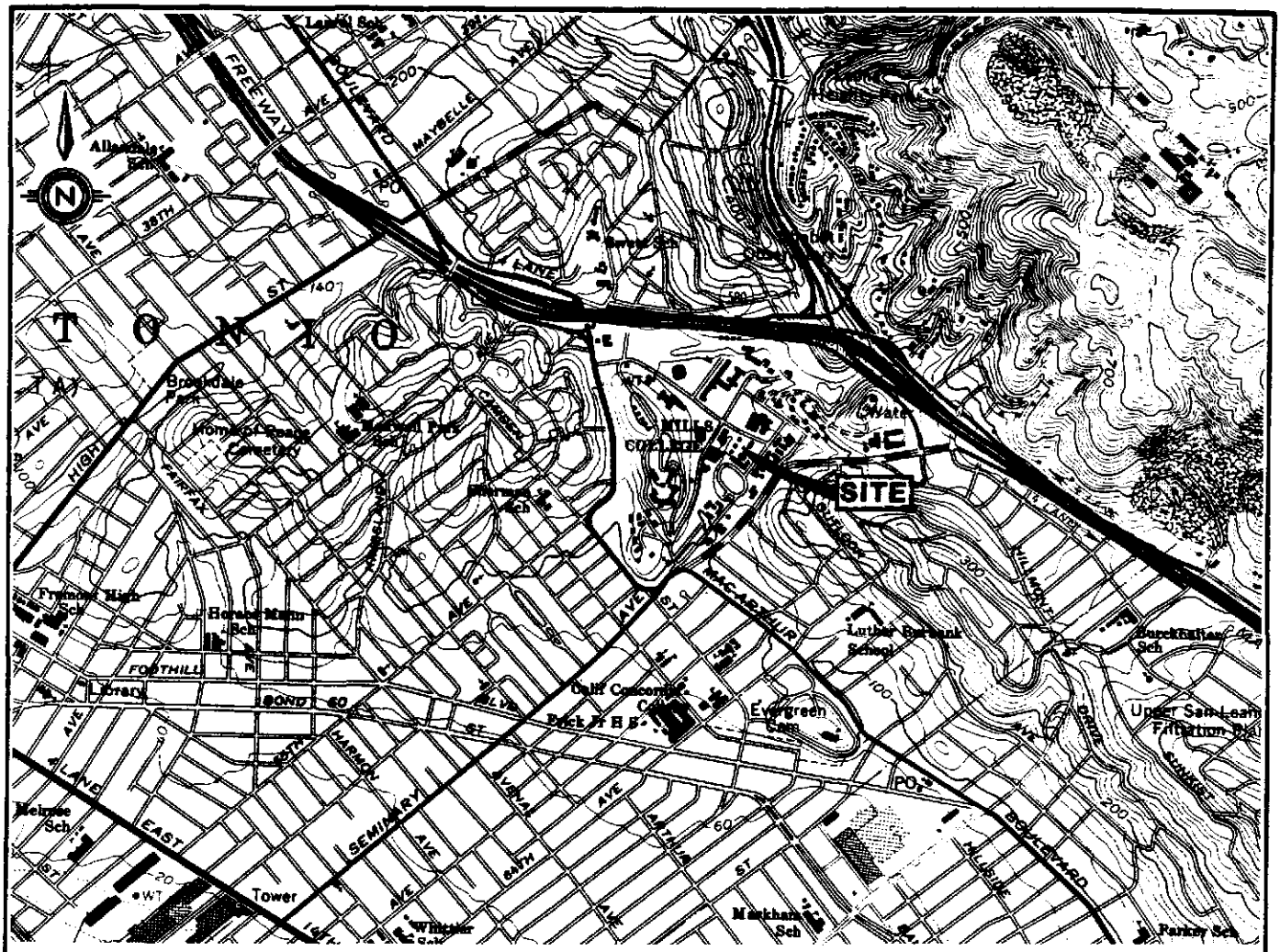
Table 2
SUMMARY OF GROUND WATER SAMPLE ANALYSES
Ground Water Sampling Report
Mills Hall/Toyon Meadow, Oakland, California
(Reported in parts per million, or milligram per liter)

Sample Date	TPH Diesel	TPH Oil	Benzene	Toluene	Ethylbenzene	Xylenes
MHW-1:						
June 1991	0.06	ND	ND	ND	ND	ND
March 1992	ND	--	ND	ND	ND	ND
October 1992	0.09	ND	ND	ND	ND	ND
May 1994*	ND	--	ND	ND	ND	ND
October 1994	ND	--	ND	ND	ND	ND
MHW-2						
June 1991	3.2	ND	ND	ND	ND	ND
March 1992	0.1	--	ND	ND	ND	ND
October 1992	0.61	ND	ND	ND	ND	ND
May 1994	0.2	--	ND	ND	ND	ND
October 1994	0.4	--	ND	ND	ND	ND
MHW-3						
June 1991	ND	ND	ND	ND	ND	ND
March 1992	ND	--	ND	ND	ND	ND
October 1992	ND	ND	ND	ND	ND	ND
May 1994	ND	--	ND	ND	ND	ND
October 1994	ND	--	ND	ND	ND	ND

NOTES

TPH:	Total petroleum hydrocarbons
--:	Not tested
ND:	Not detected at or above the laboratory method reporting limits
*:	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)

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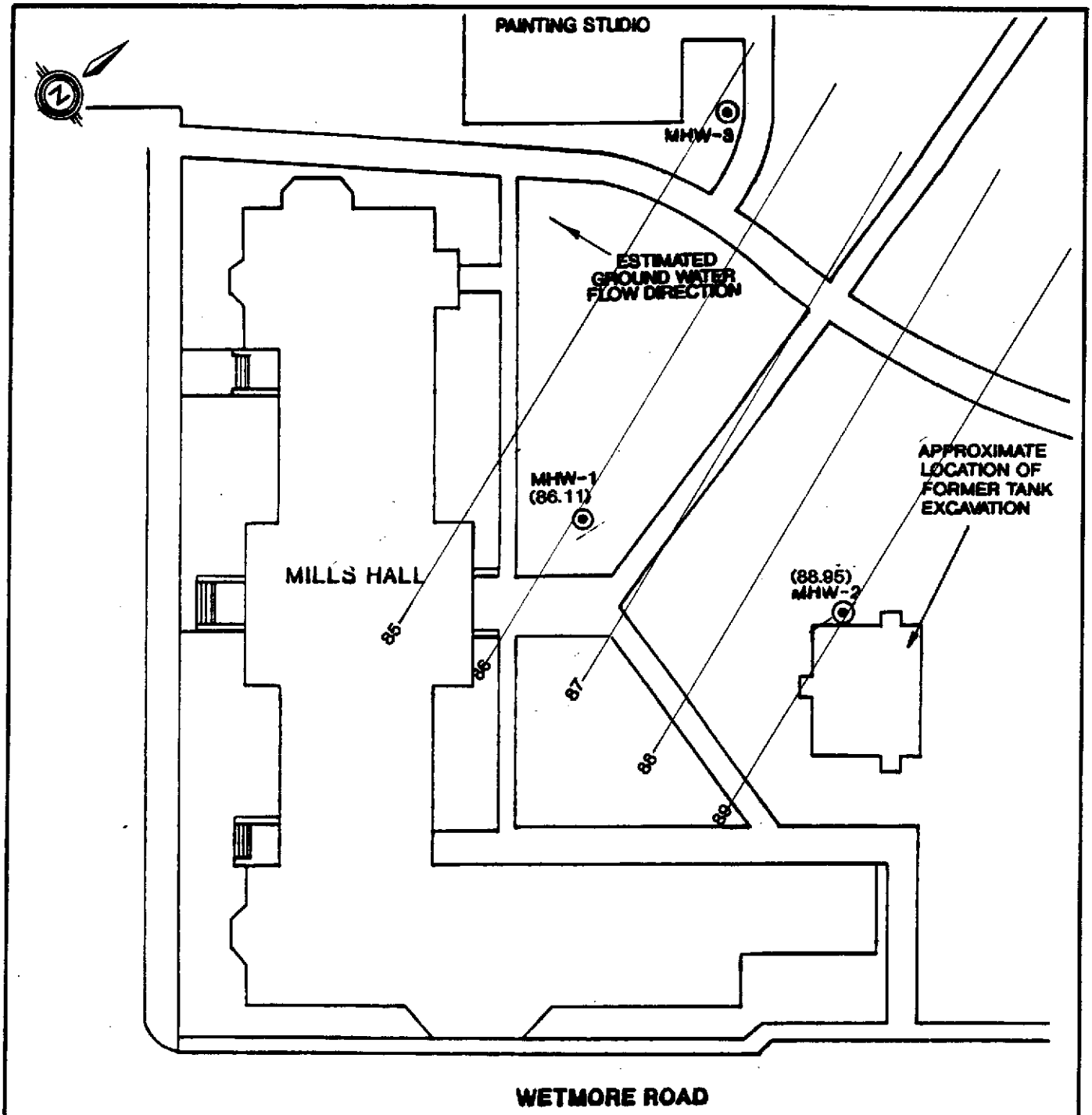
SITE VICINITY MAP

MILLS HALL/TOYON MEADOW
Oakland, California

PROJECT NO.	DATE	
K275-G	December 1994	Figure 1



LEGEND

MHW-1 ⊙ APPROXIMATE LOCATION OF MONITORING WELL WITH RELATIVE GROUND WATER ELEVATION

87—— GROUND WATER CONTOUR 10/26/94

APPROXIMATE SCALE IN FEET

0 40 80

BASE: Provided by Mills College, Dated 3/88

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Consulting Engineers and Scientists

LOCATION OF GROUND WATER MONITORING WELLS

MILLS HALL/TOYON MEADOW

Oakland, California

PROJECT NO.	DATE	
K275-G	December 1994	Figure 2

APPENDIX A

Well Sampling Logs

WATER SAMPLE LOG

Project Name: Mills College - Toyon Meadow
Project Number: K275-G
Well Number: MHW-1A
Well Location:

Date: 10/26/94
Sampler: Derek Armentrout
Weather:

Well Construction

Date Completed:
Total Depth of Well: 19.9'
Diameter: 2 inches
Well Elevation and Reference:

Sampling Equipment & Cleaning

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

Ground Water Levels:

Initial: 13.39'
Final: 13.59'
Reference Point: top of casing
Well Volume of Water: 1.1 gal

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
0927	start	0						
0932		1.5	6.96	63.4	1700		BROWN/VERY HAZY	none
0936		3	6.65	62.8	1740		"	"
0939		4.5	6.73	62.8	1750		"	"
		SAMPLED						

Total Discharge: 4.5 gal
Casing Volumes Removed: 4
Method of Disposal: 55-drum at Corporation Yard

Comments:

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Consulting Engineers and Scientists

WATER SAMPLE LOG

Project No.	Date	Figure

DDA:WATSAMP.XLS

HARZA

WATER SAMPLE LOG

Project Name: Mills College - TOYON MEADOW
Project Number: K275-G
Well Number: MW-2
Well Location:

Date: 10/26/94
Sampler: Derek Armentrout
Weather:

Well Construction

Date Completed:
Total Depth of Well: 19.3'
Diameter: 2 inches
Well Elevation and Reference:

Sampling Equipment & Cleaning

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

Ground Water Levels:

Initial: 11.05
Final: 11.47
Reference Point: top of casing
Well Volume of Water: 1.3 gal

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
1010	start	0						
1015		1.5	6.74	65.5	2210		GRAY / HIGH	PETROLEUM
1018		3	6.83	64.4	1880		"	"
1022		4.5	6.76	63.8	1640		GRAY / MODERATE	"
		SAMPLED						

Total Discharge: 4.5 gal
Casing Volumes Removed: 3
Method of Disposal: 55-drum at Corporation Yard

Comments:

HARZA
Consulting Engineers and Scientists

WATER SAMPLE LOG

Project No.	Date	Figure

WATER SAMPLE LOG

Project Name: Mills College - Tolon Meadow
Project Number: K275 - G
Well Number: MHW-3
Well Location:

Date: 10/26/94
Sampler: Derek Armentrout
Weather:

Well Construction

Date Completed:
Total Depth of Well: 18.5
Diameter: 2 inches
Well Elevation and Reference:

Sampling Equipment & Cleaning

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

Ground Water Levels:

Initial: 12.93'
Final: 13.20
Reference Point: top of casing
Well Volume of Water: 1 gal

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
0852	start	0						
0856		1.5	6.15	62.7	2240		BROWN / VERY HIGH	NONE
0900		3	6.50	63.7	2300		"	"
0905		4.5	6.70	63.7	2580		"	"
		SAMPLED						

Total Discharge: 4.5 gal
Casing Volumes Removed: 4
Method of Disposal: 55-drum at Corporation Yard

Comments:

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

APPENDIX B

Laboratory Analytical Reports and Chain-of-Custody Records

American Environmental Network

Certificate of Analysis

DOHS Certification: 1172 AIHA Accreditation: 11134

HARZA
425 ROLAND WAY
OAKLAND, CA 94621

ATTN: DEREK ARMENTROUT
CLIENT PROJ. ID: K275G

REPORT DATE: 11/08/94

DATE(S) SAMPLED: 10/26/94

DATE RECEIVED: 10/26/94

AEN WORK ORDER: 9410323

PROJECT SUMMARY:

On October 26, 1994, 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.

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: 9410323-01
AEN WORK ORDER: 9410323
CLIENT PROJ. ID: K275G

DATE SAMPLED: 10/26/94
DATE RECEIVED: 10/26/94
REPORT DATE: 11/08/94

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
EPA 8020 for BTEX	**EPA 8020**				
Benzene	71-43-2	ND	0.5	ug/L	11/02/94
Toluene	108-88-3	ND	0.5	ug/L	11/02/94
Ethylbenzene	100-41-4	ND	0.5	ug/L	11/02/94
Xylenes, total	1330-20-7	ND	2	ug/L	11/02/94
#Extraction for TPH	**EPA 3510**	-		Extrn Date	11/01/94
TPH as Diesel	**GC-FID**	ND	0.05	mg/L	11/03/94

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

HARZA

SAMPLE ID: MHW-2
AEN LAB NO: 9410323-02
AEN WORK ORDER: 9410323
CLIENT PROJ. ID: K275G

DATE SAMPLED: 10/26/94
DATE RECEIVED: 10/26/94
REPORT DATE: 11/08/94

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
EPA 8020 for BTEX	**EPA 8020**				
Benzene	71-43-2	ND	0.5	ug/L	11/02/94
Toluene	108-88-3	ND	0.5	ug/L	11/02/94
Ethylbenzene	100-41-4	ND	0.5	ug/L	11/02/94
Xylenes, total	1330-20-7	ND	2	ug/L	11/02/94
#Extraction for TPH	**EPA 3510**	-		Extrn Date	11/01/94
TPH as Diesel	**GC-FID**	0.4 *	0.05	mg/L	11/03/94

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

AEN (CALIFORNIA)
QUALITY CONTROL REPORT

AEN JOB NUMBER: 9410323

CLIENT PROJECT ID: K275G

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: 9410323
DATE EXTRACTED: 11/01/94
INSTRUMENT: C
MATRIX: WATER

Surrogate Standard Recovery Summary

Date Analyzed	Client Id.	Lab Id.	Percent Recovery n-Pentacosane
11/03/94	MHW-1A	01	91
11/03/94	MHW-2	02	92
11/03/94	MHW-3	03	68
QC Limits:			30-120

DATE EXTRACTED: 11/01/94
DATE ANALYZED: 11/02/94
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	1.72	102	3	65-103	12

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

QUALITY CONTROL DATA

METHOD: EPA 8020

AEN JOB NO: 9410323
INSTRUMENT: E
MATRIX: WATER

Surrogate Standard Recovery Summary

Date Analyzed	Client Id.	Lab Id.	Percent Recovery Fluorobenzene
11/02/94	MHW-1A	01	100
11/02/94	MHW-2	02	98
11/02/94	MHW-3	03	101
QC Limits:			86-110

DATE ANALYZED: 11/02/94
SAMPLE SPIKED: 9410322-04
INSTRUMENT: E

Matrix Spike Recovery Summary

Analyte	Spike Added (ug/L)	Average Percent Recovery	RPD	QC Limits Percent Recovery	QC Limits RPD
Benzene	17.8	88	3	82-125	15
Toluene	47.9	87	3	75-126	17

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

*** END OF REPORT ***

Reporting Information: R-1, S-B

1. Client: HARZA
Address: 425 ROLAND WAY
Contact: DEREK ARMENTROUT
Atl. Contact:

American Environmental Network
3440 Vincent Road, Pleasant Hill, CA 94523
Phone (510) 930-9090
FAX (510) 930-0256

AEN

Page 1 of 1

REQUEST FOR ANALYSIS / CHAIN OF CUSTODY

Lab Job Number: 9410323
Lab Destination:
Date Samples Shipped:
Lab Contact:
Date Results Required:
Date Report Required:
Client Phone No.:
Client FAX No.:

Address Report To:

2.

Send Invoice To:

3. DAVE JOHNSON
MILLS COLLEGE
5000 MACARTHUR BLVD
OAKLAND CA 94613

Send Report To: 1 or 2 (Circle one)

Client P.O. No.: Client Project I.D. No.: K275G

Sample Team Member (s) DEREK ARMENTROUT

Lab Number	Client Sample Indetification	Air Volume	Date/ Time Collected	Sample Type*	Pres.	No. of Cont.	Type of Cont.	ANALYSIS: TPH-DIESEL	ANALYSIS: 8020 - BTEX	Comments / Hazards
01A-E	MHW-1A		10/26/94	H_2O		3	VOA	X	X	
02A-E	MHW-2		↓	↓		2	1L	X	X	
03A-E	MHW-3		↓	↓		↓	↓	X	X	

Relinquished by: (Signature)	DATE 10/26/94	TIME 1630	Received by: (Signature) DATE 10/26/94 TIME 16:30
Relinquished by: (Signature)	DATE 10/26/94	TIME 17:20	Received by: (Signature) DATE TIME
Relinquished by: (Signature)	DATE	TIME	Received by: (Signature) DENISE HARRINGTON DATE 10/26/94 TIME 1720
Method of Shipment			Lab Comments

*Sample type (Specify): 1) 37mm 0.8 µm MCEF 2) 25mm 0.8 µm MCEF 3) 25mm 0.4 µm polycarb. filter
4) PVC filter, diam. ____ pore size ____ 5) Charcoal tube 6) Silica gel tube 7) Water 8) Soil 9) Bulk Sample
10) Other ____ 11) Other ____

COPIES: WHITE - JOB FILE YELLOW - PROJECT FILE PINK - CLIENT