September 1996 Semiannual Ground Water Sampling Report Mills Hall/Toyon Meadow Oakland, California

October 21, 1996

Prepared For:

Mills College 5000 MacArthur Boulevard Oakland, CA 94613

Prepared By:

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

Jur/ Derek D. Armentrout Project Chemist

K275GREP.040 10-21-96

ED GEO DENNIS LADUZINSKY NO. 1535 CERTIFIED ENGINEERIN GEOLOGIS

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





Consulting Engineers and Scientists



October 21, 1996

Ms. Madhulla Logan Alameda County Health Care Services Agency Department of Environmental Health 1131 Harbor Bay Parkway, 2nd Floor Alameda, CA 94502

Re: September 1996 Semiannual Ground Water Sampling Report Mills Hall/Toyon Meadow, Oakland, California Project No.: K275-G

Dear Ms. Logan:

We are pleased to submit our report for the above referenced project. Should you have any questions or require additional information, please do not hesitate to contact me.

Sincerely,

Harza Consulting Engineers and Scientists

Project Chemist

Dennis Laduzinsky, C.E.G.

Head, Geology and Hydrogeology

DA\DL:ll\encl. Copies: Addressee Mr. David Johnson (Mills College - 1) Case Officer (Regional Water Quality Control Board -1)

K275GREP.040 10-21-96

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

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September 1996 Semiannual Ground Water Sampling Report Mills Hall/Toyon Meadow, Oakland, California

1.0 INTRODUCTION

This report presents the results of the September 1996 semiannual 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 monitoring program under the jurisdiction of the Alameda County Health Care Services Agency (ACHCSA), and to obtain final closure of the site. This final round of sampling was requested by Ms. Madhulla Logan of the ACHCSA in a telephone conversation with Mr. Derek Armentrout of Harza.

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), up to 6,300 parts per million (ppm), were detected in soil samples collected from the excavation at the time of tank removal, and approximately 250 cubic yards of soil were excavated from the vicinity of the former tank and disposed of off-site. Closure samples collected 12 to 13 feet below ground surface (bgs) contained from 260 ppm to 5,000 ppm TPHd.

Harza, formerly Kaldveer Associates, performed a soil and ground water quality investigation at the site in 1989 to determine the areal extent of impact. TPHd was detected at concentrations up to 11,000 ppm in soil samples at depths of 12 to 15 feet bgs for a distance of at least 60 feet downgradient of the former tank location. Ground water at the site occurs at approximately 12 feet bgs, and the measured ground water flow direction has consistently been to the west.

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. Well MHW-2 was installed in the approximate location of the former UST, and well MHW-3 monitors downgradient water quality. During landscape renovation activities in



May 1994, monitoring well MHW-1 was destroyed under permit by a licensed drilling contractor. A new well, MHW-1A, was installed in the approximate location of the destroyed well. Ground water monitoring has been performed intermittently since June 1991 and is currently performed on a semiannual schedule. Historical analytical results from ground water sampling are presented in Table 1.

On May 29, 1996, Harza collected ground water grab samples from four locations (GB-1 through GB-4) to provide further evaluation of residual diesel in ground water in the source area and downgradient. Results of the investigation were discussed in *Additional Site Investigation Report* (Harza, June 28, 1996). Sample locations are shown on Figure 2, and analytical results are presented on Table 2. TPHd was detected at 75 ppm in sample GB-1, directly downgradient from the former tank location. TPHd was detected in the remaining samples at concentrations of 0.06 to 0.2 ppm.

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, purgeable aromatic compounds (BTEX), and semivolatile organic compounds (SVOCs)

Analysis for SVOCs was requested by Ms. Logan of ACHCSA.

4.0 FIELD INVESTIGATION

4.1 <u>Well Sampling</u>

The three monitoring wells were sampled on September 17, 1996. 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 3. 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, BTEX using EPA Method 8020, and SVOCs using EPA Method 8270.

5.2 Analytical Results

The results of the chemical analyses for TPHd and BTEX are presented in Table 1 and laboratory analytical reports are attached as Appendix B. A historical summary of ground water sample analytical results is also included in Table 1.

TPHd was detected in the ground water sample from well MHW-2 at a concentration of 0.16 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. SVOCs were not detected at or above MRLs in any sample.

6.0 CONCLUSIONS

TPHd has been detected in ground water samples collected from well MHW-1/1A during three of the seven sampling events performed over the past four years, and it has not been detected since April 1995. Concentrations have ranged from 0.06 to 0.09 ppm. TPHd concentrations detected in well MHW-2 have been below 0.61 ppm, except for the initial sampling following well installation in 1991. TPHd has never been detected in downgradient well MHW-3. BTEX have not been detected in any



of the three wells with the exception of a detection in April 1995, that is believed to have resulted from laboratory or field cross-contamination. SVOCs, including benzo(a)pyrene, were not detected in the ground water. The ground water gradient and flow direction have remained relatively constant.

The analytical results of the grab samples collected in May 1996 indicate there is residual TPHd in ground water in the vicinity of the former tank, but it appears the diesel is relatively immobile. The primary soil contamination was removed from the site in 1989, following removal of the tank. Residual TPHd in soil and ground water does not appear to be migrating, as significant concentrations of TPHd have not been detected in downgradient locations. TPHd is biodegradable in natural environments such as that found at the site, and studies of other sites have indicated that it typically is completely biodegraded within a few hundred feet of the source area. TPHd concentrations in the ground water beneath the subject site have decreased since monitoring began in June 1991. The tank which served as the source for TPHd contamination had been in use at the site from about the 1900s to 1950s and had not been used since that time. In our opinion, the contaminant plume would be expected to have migrated much further unless biodegradation was occurring at a comparable rate to the rate of migration. The fact that significant levels of TPHd have not been observed downgradient of the former source indicates that additional remediation and continued monitoring is unnecessary.

Shallow ground water beneath the site has no identified beneficial use, and contamination at the site does not appear to represent a threat to beneficial use of any water supply. The nearest surface water body, a creek, is located approximately 300 feet downgradient from the former tank location. Since petroleum hydrocarbons have not been detected in samples collected from well MW-3 located downgradient, the site does not appear to represent a potential impact to surface waters. We request that the site be granted case closure by your agency.

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

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TABLE 1 Ground Water Sample Analytical Results

September 1996 Semiannual Ground Water Sampling Report Toyon Meadow, Mills College, Oakland, CA

Well	Date	TPHd ppm	TPH Oil ppm	Benzene ppm	Toluene ppm	Ethylbenzen ppm	Xylenes ppm
MHW-1/1A	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
	April 1995	0.06		0.002	0.0006	ND	ND
	October 1995	ND		ND	ND	ND	ND
	September 1996*	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
	April 1995	0.52		ND	ND	ND	ND
	October 1995	0.4		ND	ND	ND	ND
	September 1996*	0.16		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
	April 1995	ND		0.0009	ND	ND	ND
	October 1995	ND		ND	ND	ND	ND
	September 1996*	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

* All wells were also analyzed for semivolatile organic compounds (SVOCs) in September 1996; no SVOCs were detected.

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

TABLE 2 Ground Water Grab Sample Analytical Results

September 1996 Semiannual Ground Water Sampling Report Toyon Meadow, Mills College, Oakland, CA

Sample ID	TPHd ppm	Benzene ppm	Toluene ppm	Ethylbenzene ppm	Xylenes ppm
GB-1	75.	0.0006	0.0058	0.0086	0.11
GB-2	0.09	ND	ND	ND	ND
GB-3	0,2	ND	ND	ND	ND
GB-4	0.06	ND	0.0007	ND	ND

NOTES

Samples collected May 29, 1996, and are discussed in Additional Site Investigation (June 28, 1996, Harza)

TPHd: Total petroleum hydrocarbons as diesel

ppm: Parts per million or milligrams per liter

ND: Not detected at or above the laboratory method reporting limits

TABLE 3Ground Water Elevation Data

September 1996 Semiannual Ground Water Sampling Report Toyon Meadow, Mills College, Oakland, CA (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
May 1996	MHW-1A	99,50	11.99	87.51
	MHW-2	100,00	9.67	90.33
	MHW-3	98.04	12.64	85.40
September 1996	MHW-1A	99,50	13.08	86.42
•	MHW-2	100,00	10.95	89.05
	MHW-3	98.04	13.04	85.00

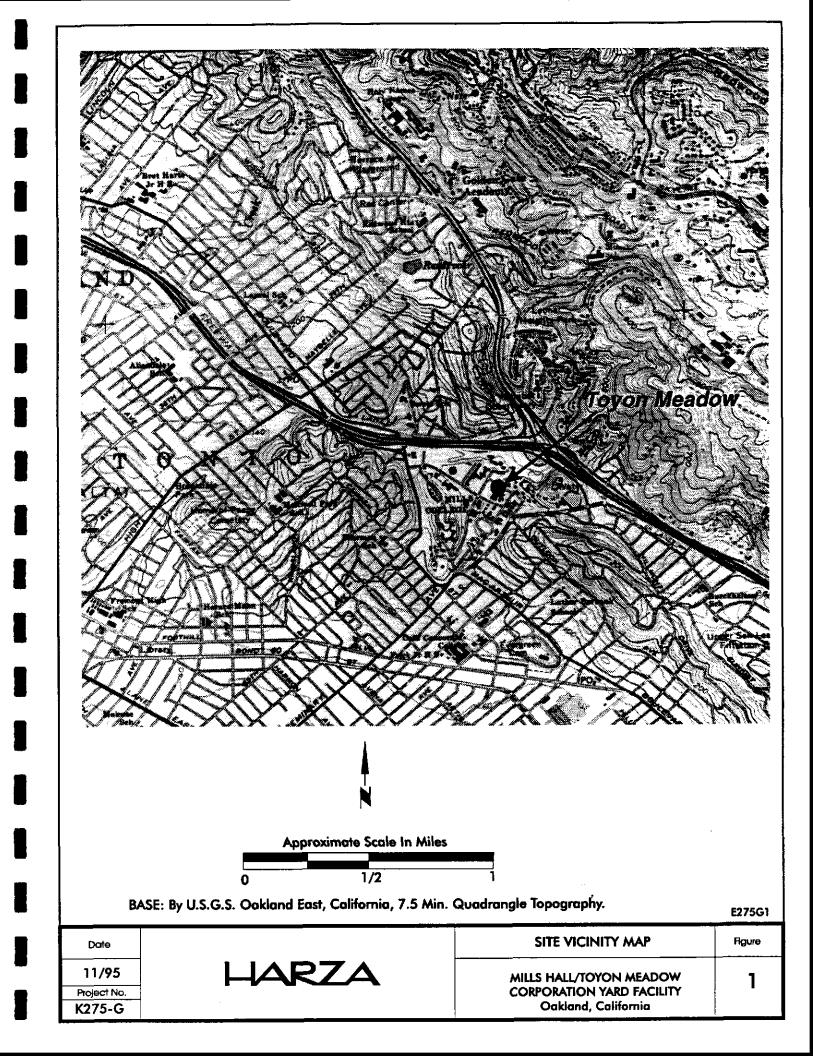
NOTES

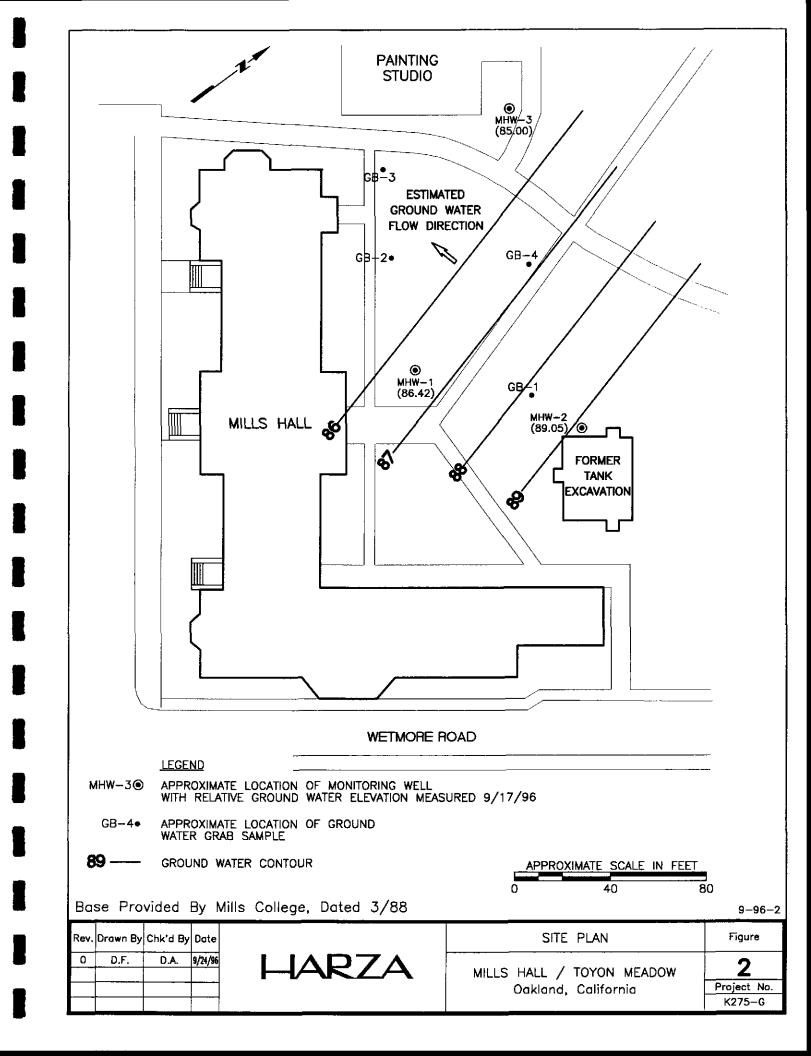
Well-top elevations are based on an arbitrary datum of 100.00 feet at MHW-2.

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

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FIGURES





APPENDIX A Water Sample Logs

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WATER SAMPLE LOG

Project Name:	Mills College - Toyon Meadow	Date:	9/17/96
Project Number:	K275-G (963)	Sampler:	Derek Armentrout
Well Number:	MHW-JA	Weather:	sunny, 70s
Well Location:			
Well Construction		Sampling Equipment &	<u>Cleaning</u>
Date Completed:		Sampler Type:	Teflon bailer
Total Depth of Wel	1: 20.1	Method of Cleaning:	TSP wash/DI rinse
Diameter:	2"	Pump/Bailer Type:	Teflon bailer
Well Elevation and	Reference:	Method of Cleaning:	TSP wash/DI rinse
		pH Meter:	Hydac
		Conductivity Meter:	Hydac
Ground Water Leve	els:	Comments:	
Initial: 13.08			
Final:			
Reference Point:	ТОС		
Well Volume of Wa	ater: <u>1.1 gal</u>		·
	SAMPLIN	G MEASUREMENTS	

	Discharge (gal.)		Discharge (gal.) Ter	Temp	Spec. Conductance (mmhos/cm)		Color/	
Time	Per Time Period	Cumulative	рН	(°F)	Field	@ 25°C	Turbidity	Odor
08:59	start	0						
09:06		1	7.48	64.8	2070		tan/moderate	none
09:13		2	7.82	63.9	2110		¥1	
09:19		3.5	7.91	63.9	2140		*1	"
09:22	sam	pled						
						<u> </u>		
otal Discl	narge: 3.5	gal		<u> </u>	Comments:	<u></u>		<u>·</u>
asing Vo	lumes Remove	ed:3		· · · · · · · · · · · · · · · · · · ·				

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

Method of Disposal: drummed on site

WATER SAMPLE LOG

Project Name:	Mills College - Toyon Meadow	Date:	9/17/96	
Project Number:	K275-G (963)	Sampler:	Derek Armentrout	
Well Number:	MHW-2	Weather:	sunny, 70s	
Well Location:	· · · · · · · · · · · · · · · · · · ·			
Well Construction		Sampling Equipment &	<u>: Cleaning</u>	
Date Completed:		Sampler Type:	Teflon bailer	
Total Depth of Well	: 19.7	Method of Cleaning:	TSP wash/DI rinse	
Diameter:	2"	Pump/Bailer Type:	Teflon bailer	
Well Elevation and	Reference:	Method of Cleaning:	TSP wash/DI rinse	
		pH Meter:	Hydac	
		Conductivity Meter:	Hydac	
Ground Water Leve	ls:	Comments:		
Initial: 10.95				
Final:				
Reference Point:	ТОС			
Well Volume of Wa	ater: 1.4 gal			
	SAMPLIN	IG MEASUREMENTS		
		Spec Conductance		

	Discharge (gal.)			Temp	Spec. Conductance (mmhos/cm)		Color/	
Time	Per Time Period	Cumulative	рН 	(°F)	Field	@ 25°C	Turbidity	Odor
09:40	start	0						
09:46		1.5	7.18	65.4	2620		tan/moderate	none
09:52		3	6.52	64.4	2080		tan/low	13
10:00		4.5	6.68	64.8	2160		19	"
10:02	sam	pled						ļ
	. <u> </u>		•				····	
		ļ				<u> </u>		+
							·	

Total Discharge:	4.5 gal		<u></u>	Comments:	
Casing Volumes Rep	moved:	3			_

Method of Disposal: drummed on site

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

WATER SAMPLE LOG

Project Name:	Mills College - Toyon Meadow	Date:	9/17/96
Project Number:	K275-G (963)	Sampler:	Derek Armentrout
Well Number:	MHW-3	Weather:	sunny, 70s
Well Location:			
Well Construction		Sampling Equipment &	<u>z Cleaning</u>
Date Completed:		Sampler Type:	Teflon bailer
Total Depth of Well	: 18.6	Method of Cleaning:	TSP wash/DI rinse
Diameter:	2"	Pump/Bailer Type:	Teflon bailer
Well Elevation and	Reference:	Method of Cleaning:	TSP wash/DI rinse
		pH Meter:	Hydac
		Conductivity Meter:	Hydac
Ground Water Leve	<u>ls:</u>	Comments:	
Initial: 13.04			
Final:			
Reference Point:	TOC		
Well Volume of Wa	ter: 0.9 gal		

					Spec. Co	nductance		
	Dischar	rge (gal.)		Тетр	(mmh	ios/cm)	Color/	
Time	Per Time Period	Cumulative	рН	(°F)	Field	@ 25°C	Turbidity	Odor
08:32	start	0						
08:36		1	7.15	64.3	2370		tan/high	none
08:39		2	7.05	64.2	2500		TI	"
08:43		3	7.02	64.1	2620		ti	ч
08:45	sarr	npled						
					· ····=-			

Total Discharge: 3.0	gai	
Casing Volumes Remove	d: 3	
Method of Disposal:	drummed on site	

	WATE	R SAMPLE LOG	
HARZA			······································
Consulting Engineers and Scientists	Project No.	Date	Figure

APPENDIX B Laboratory Analytical Reports

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American Environmental Network

DOHS Certification: 1172

AIHA Accreditation: 11134

PAGE 1

HARZA 425 ROLAND WAY OAKLAND, CA 94621

ATTN: MR. GARY GORMAN CLIENT PROJ. ID: K275-G(963) CLIENT PROJ. NAME: MILLS COLLEGE REPORT DATE: 09/30/96 DATE(S) SAMPLED: 09/17/96 DATE RECEIVED: 09/18/96 AEN WORK ORDER: 9609230

PROJECT SUMMARY:

On September 18, 1996, this laboratory received 3 water sample(s).

Client requested sample(s) be analyzed for chemical 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.

Larr Klein

Laboratory Director

HARZA

DATE SAMPLED: 09/17/96 **DATE RECEIVED:** 09/18/96 **REPORT DATE: 09/30/96**

SAMPLE ID: MHW-1A AEN LAB NO: 9609230-01 AEN WORK ORDER: 9609230 CLIENT PROJ. ID: K275-G(963)

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT UNITS	DATE ANALYZED
EPA 8020 for BTEX Benzene	EPA 8020 71-43-2	ND	0.5 ug/L	09/24/96
Toluene	108-88-3	ND	0.5 ug/L	09/24/96
Ethylbenzene	100-41-4	ND	0.5 ug/L	09/24/96
Xylenes, Total	1330-20-7	ND	2 uğ/L	09/24/96
#Extraction for TPH	EPA 3510	-	Extrn Date	09/24/96
TPH as Diesel	GC-FID	ND	0.05 mg/L	09/25/96
#Extraction for BNAs	EPA 3520	-	Extrn Date	09/23/96
Semi-Volatile Organics	EPA 8270			
Acenaphthene	83-32-9	ND	10 ug/L	09/26/96
Acenaphthylene	208-96-8	ND	10 ug/L	09/26/96 09/26/96
Anthracene Benzidine	120-12-7 92-87-5	ND ND	10 ug/L 50 ug/L	09/26/96
Benzoic Acid	65-85-0	ND	50 ug/L	09/26/96
Benzo(a)anthracene	56-55-3	ND	10 ug/L	09/26/96
Benzo(b)fluoranthene	205-99-2	ND	10 ug/L	09/26/96
Benzo(k)fluoranthene	207-08-9	ND	10 uğ/L	09/26/96
Benzo(g,h,i)perylene	191-24-2	ND	10 ug/L	09/26/96
Benzo(a)pyrene	50-32-8	ND	10 ug/L	09/26/96
Benzyl Alcohol	100-51-6	ND	20 ug/L	09/26/96
Bis(2-chloroethoxy)methane		ND	10 ug/L	09/26/96 09/26/96
Bis(2-chloroethyl) Ether Bis(2-chloroisopropyl) Eth	111-44-4 ner 108-60-1	ND ND	10 ug/L 10 ug/L	09/26/96
Bis(2-ethylhexyl) Phthalat		ND	10 ug/L	09/26/96
4-Bromophenyl Phenyl Ether	101-55-3	ND	10 ug/L	09/26/96
Butylbenzyl Phthalate	85-68-7	ND	10 ug/L	09/26/96
4-Chloroaniline	106-47-8	ND	20 ug/L	09/26/96
2-Chloronaphthalene	91-58-7	ND	10 ug/L	09/26/96
4-Chlorophenyl Phenyl Ethe	er 7005-72-3	ND	10 ug/L	09/26/96
Chrysene	218-01-9	ND	10 ug/L	09/26/96 09/26/96
Dibenzo(a,h)anthracene Dibenzofuran	53-70-3 132-64-9	ND ND	10 ug/L 10 ug/L	09/26/96
Di-n-butyl Phthalate	84-74-2	ND	10 ug/L	09/26/96
1.2-Dichlorobenzene	95-50-1	ND	10 ug/L	09/26/96
1.3-Dichlorobenzene	541-73-1	ND	10 ug/L	09/26/96
1,4-Dichlorobenzene	106-46-7	ND	10 ug/L	09/26/96
3,3'-Dichlorobenzidine	91-94-1	ND	20 ug/L	09/26/96
Diethyl Phthalate	84-66-2	ND	10 ug/L	09/26/96

HARZA

DATE SAMPLED: 09/17/96 DATE RECEIVED: 09/18/96 REPORT DATE: 09/30/96

SAMPLE ID: MHW-1A AEN LAB NO: 9609230-01 AEN WORK ORDER: 9609230 CLIENT PROJ. ID: K275-G(963)

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT UN	DATE NITS ANALYZED
Dimethyl Phthalate 2.4-Dinitrotoluene Di-n-octyl Phthalate Fluoranthene Fluorene Hexachlorobenzene Hexachlorocyclopentadiene Hexachlorocyclopentadiene Hexachloroethane Indeno(1,2,3-cd)pyrene Isophorone 2-Methylnaphthalene Naphthalene 2-Nitroaniline 3-Nitroaniline Nitrobenzene N-Nitrosodiphenylamine N-Nitrosodi-n-propylamine Phenanthrene Pyrene 1.2,4-Trichlorobenzene 4-Chloro-3-methylphenol 2.4-Dichlorophenol 2.4-Dinitrophenol 2.4.5-Trichlorophenol 2.4.5-Trichlorophenol	131 - 11 - 3 121 - 14 - 2 606 - 20 - 2 117 - 84 - 0 206 - 44 - 0 86 - 73 - 7 118 - 74 - 1 87 - 68 - 3 77 - 47 - 4 67 - 72 - 1 193 - 39 - 5 78 - 59 - 1 91 - 57 - 6 91 - 20 - 3 88 - 74 - 4 99 - 09 - 2 100 - 01 - 6 98 - 95 - 3 86 - 30 - 6 621 - 64 - 7 85 - 01 - 8 129 - 00 - 0 120 - 82 - 1 59 - 50 - 7 95 - 57 - 8 120 - 83 - 2 105 - 67 - 9 534 - 52 - 1 51 - 28 - 5 95 - 48 - 7 106 - 44 - 5 88 - 75 - 5 100 - 02 - 7 87 - 86 - 5 108 - 95 - 2 95 - 95 - 4 88 - 06 - 2		10 ug/L 10 ug/L	09/26/96 09/26/96

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

HARZA

DATE SAMPLED: 09/17/96 DATE RECEIVED: 09/18/96 REPORT DATE: 09/30/96

SAMPLE ID: MHW-2 AEN LAB NO: 9609230-02 AEN WORK ORDER: 9609230 CLIENT PROJ. ID: K275-G(963)

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
EPA 8020 for BTEX Benzene	EPA 8020 71-43-2	ND	0.5	ug/L	09/24/96
Toluene Ethylbenzene Xylenes, Total	108-88-3 100-41-4 1330-20-7	ND ND ND	0.5	ug/L ug/L ug/L	09/24/96 09/24/96 09/24/96
#Extraction for TPH	EPA 3510	-		Extrn Date	09/24/96
TPH as Diesel	GC-FID	0.16 *	0.05	mg/L	09/25/96
#Extraction for BNAs	EPA 3520	-		Extrn Date	09/23/96
Semi-Volatile Organics Acenaphthene Acenaphthylene Anthracene Benzidine Benzoic Acid Benzo(a)anthracene Benzo(b)fluoranthene Benzo(b)fluoranthene Benzo(g,h,i)perylene Benzo(a)pyrene Benzo(a)pyrene Benzyl Alcohol Bis(2-chloroethoxy)methane Bis(2-chloroethoxy)methane Bis(2-chloroisopropyl) Ether Bis(2-chloroisopropyl) Ether Bis(2-chloroisopropyl) Ether Bis(2-chloroisopropyl) Ether Bis(2-chloroisopropyl) Ether Butylbenzyl Phthalate 4-Bromophenyl Phenyl Ether Butylbenzyl Phthalate 4-Chlorophenyl Phenyl Ether Chloronaphthalene 4-Chlorophenyl Phenyl Ether Chrysene Dibenzo(a,h)anthracene Dibenzofuran Di-n-butyl Phthalate 1.2-Dichlorobenzene 1.3-Dichlorobenzene 3.3'-Dichlorobenzene 3.3'-Dichlorobenzidine Diethyl Phthalate	e 117-81-7 101-55-3 85-68-7 106-47-8 91-58-7	ND ND ND ND ND ND ND ND ND ND ND ND ND N	$ \begin{array}{c} 10\\ 10\\ 50\\ 50\\ 10\\ 10\\ 10\\ 10\\ 10\\ 10\\ 10\\ 10\\ 10\\ 1$	ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L	09/26/96 09/26/96

HARZA

DATE SAMPLED: 09/17/96 DATE RECEIVED: 09/18/96 REPORT DATE: 09/30/96

SAMPLE ID: MHW-2 AEN LAB NO: 9609230-02 AEN WORK ORDER: 9609230 CLIENT PROJ. ID: K275-G(963)

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ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT UNITS	DATE ANALYZED
Dimethyl Phthalate	131-11-3	ND	10 ug/L	09/26/96
2,4-Dinitrotoluene	121-14-2	ND	10 ug/L	09/26/96
2,6-Dinitrotoluene	606-20-2	ND	10 ug/L	09/26/96
Di-n-octyl Phthalate	117-84-0	ND	10 ug/L	09/26/96
Fluoranthene	206-44-0	ND	10 ug/L	09/26/96
Fluorene	86-73-7	ND	10 ug/L	09/26/96
Hexachlorobenzene	118-74-1	ND	10 ug/L	09/26/96
Hexachlorobutadiene	87-68-3	ND	10 ug/L	09/26/96
Hexachlorocyclopentadiene	77-47-4	ND	10 ug/L	09/26/96
Hexachloroethane	67-72-1	ND	10 ug/L	09/26/96
Indeno(1,2,3-cd)pyrene	193-39-5	ND	10 ug/L	09/26/96
Isophorone	78-59-1	ND	10 ug/L	09/26/96
2-Methylnaphthalene	91-57-6	ND	10 ug/L	09/26/96
Naphthalene	91-20-3	ND	10 ug/L	09/26/96
2-Nitroaniline	88-74-4	ND	50 ug/L	09/26/96
3-Nitroaniline	99-09-2	ND	50 ug/L	09/26/96
4-Nitroaniline	100-01-6	ND	50 ug/L	09/26/96
Nitrobenzene	98-95-3	ND	10 ug/L	09/26/96
N-Nitrosodiphenylamine	86-30-6	ND	10 ug/L	09/26/96
N-Nitrosodi-n-propylamine	621-64-7	ND	10 ug/L	09/26/96
Phenanthrene	85-01-8	ND	10 ug/L	09/26/96
Pyrene	129-00-0	ND	10 ug/L	09/26/96
1,2,4-Trichlorobenzene 4-Chloro-3-methylphenol 2-Chlorophenol 2,4-Dichlorophenol 2,4-Dimethylphenol	120-82-1 59-50-7 95-57-8 120-83-2 105-67-9	ND ND ND ND	10 ug/L 10 ug/L 10 ug/L 10 ug/L 10 ug/L	09/26/96 09/26/96 09/26/96 09/26/96 09/26/96
4,6-Dinitro-2-methylphenol 2,4-Dinitrophenol 2-Methylphenol 4-Methylphenol 2-Nitrophenol 4-Nitrophenol	534-52-1 51-28-5 95-48-7 106-44-5 88-75-5 100-02-7	ND ND ND ND ND	50 ug/L 50 ug/L 10 ug/L 10 ug/L 10 ug/L 50 ug/L 50 ug/L	09/26/96 09/26/96 09/26/96 09/26/96 09/26/96 09/26/96 09/26/96
Pentachlorophenol	87-86-5	ND	10 ug/L	09/26/96
Phenol	108-95-2	ND	10 ug/L	09/26/96
2,4,5-Trichlorophenol	95-95-4	ND	10 ug/L	09/26/96
2,4,6-Trichlorophenol	88-06-2	ND	10 ug/L	09/26/96

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

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DATE SAMPLED: 09/17/96 DATE RECEIVED: 09/18/96 REPORT DATE: 09/30/96

SAMPLE ID: MHW-3 AEN LAB NO: 9609230-03 AEN WORK ORDER: 9609230 CLIENT PROJ. ID: K275-G(963)

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ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT UNITS	DATE ANALYZED
EPA 8020 for BTEX Benzene Toluene Ethylbenzene Xylenes, Total	EPA 8020 71-43-2 108-88-3 100-41-4 1330-20-7	ND ND ND ND	0.5 ug/L 0.5 ug/L 0.5 ug/L 2 ug/L	09/24/96 09/24/96 09/24/96 09/24/96
#Extraction for TPH	EPA 3510	-	Extrn Date	09/24/96
TPH as Diesel	GC-FID	ND	0.05 mg/L	09/25/96
#Extraction for BNAs	EPA 3520	-	Extrn Date	09/23/96
Semi-Volatile Organics Acenaphthene Acenaphthylene Anthracene Benzoic Acid Benzo(a)anthracene Benzo(b)fluoranthene Benzo(b)fluoranthene Benzo(k)fluoranthene Benzo(a)pyrene Benzo(a)pyrene Benzo(a)pyrene Benzo(a)pyrene Benzo(a)pyrene Bis(2-chloroethoxy)methane Bis(2-chloroethoxy)methane Bis(2-chloroisopropyl) Ether Bis(2-chloroisopropyl) Ether Bis(2-ethylhexyl) Phthalate 4-Bromophenyl Phenyl Ether Butylbenzyl Phthalate 4-Chloroaniline 2-Chloronaphthalene 4-Chlorophenyl Phenyl Ether Chrysene Dibenzo(a,h)anthracene Dibenzofuran Di-n-butyl Phthalate 1,2-Dichlorobenzene 1,3-Dichlorobenzene 3,3'-Dichlorobenzidine Diethyl Phthalate	EPA 8270 83-32-9 208-96-8 120-12-7 92-87-5 65-85-0 56-55-3 205-99-2 207-08-9 191-24-2 50-32-8 100-51-6 111-91-1 111-44-4 108-60-1 117-81-7 101-55-3 85-68-7 106-47-8 91-58-7 7005-72-3 218-01-9 53-70-3 132-64-9 84-74-2 95-50-1 541-73-1 106-46-7 91-94-1 84-66-2	ND ND ND ND ND ND ND ND ND ND ND ND ND N	10 ug/L 10 ug/L 10 ug/L 50 ug/L 50 ug/L 10 ug/L	09/26/96 09/26/96

HARZA

DATE SAMPLED: 09/17/96 DATE RECEIVED: 09/18/96 REPORT DATE: 09/30/96

SAMPLE ID: MHW-3 AEN LAB NO: 9609230-03 AEN WORK ORDER: 9609230 CLIENT PROJ. ID: K275-G(963)

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ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT UNITS	DATE ANALYZED
Dimethyl Phthalate	131-11-3	ND	10 ug/L	09/26/96 09/26/96
2,4-Dinitrotoluene 2,6-Dinitrotoluene	121-14-2 606-20-2	ND ND	10 ug/L 10 ug/L	09/26/96
Di-n-octyl Phthalate	117-84-0	ND	10 ug/L	09/26/96
Fluoranthene	206-44-0	ND	10 ug/L	09/26/96
Fluorene	86-73-7	ND	10 ug/L	09/26/96
Hexachlorobenzene	118-74-1	ND	10 uğ/L	09/26/96
Hexachlorobutadiene	87-68-3	ND	10 ug/L	09/26/96
Hexachlorocyclopentadiene	77-47-4	ND	10 ug/L	09/26/96
Hexachloroethane	67-72-1	ND	10 ug/L	09/26/96
Indeno(1,2,3-cd)pyrene	193-39-5	ND	10 ug/L	09/26/96
Isophorone	78-59-1 91-57-6	ND ND	10 ug/L 10 ug/L	09/26/96 09/26/96
2-Methylnaphthalene Naphthalene	91-57-6	ND	10 ug/L 10 ug/L	09/26/96
2-Nitroaniline	88-74-4	ND	50 ug/L	09/26/96
3-Nitroaniline	99-09-2	ND	50 ug/L	09/26/96
4-Nitroaniline	100-01-6	ND	50 ug/L	09/26/96
Nitrobenzene	98-95-3	ND	10 uğ/L	09/26/96
N-Nitrosodiphenylamine	86-30-6	ND	10 ug/L	09/26/96
N-Nitrosodi-n-propylamine	621-64-7	ND	10 ug/L	09/26/96
Phenanthrene	85-01-8	ND	10 ug/L	09/26/96
Pyrene	129-00-0	ND	10 ug/L	09/26/96
1,2,4-Trichlorobenzene	120-82-1	ND ND	10 ug/L	09/26/96 09/26/96
4-Chloro-3-methylphenol 2-Chlorophenol	59-50-7 95-57-8	ND	10 ug/L 10 ug/L	09/26/96
2,4-Dichlorophenol	120-83-2	ND	10 ug/L	09/26/96
2,4-Dimethylphenol	105-67-9	ND	10 ug/L	09/26/96
4,6-Dinitro-2-methylphenol	534-52-1	ND	50 ug/L	09/26/96
2.4-Dinitrophenol	51-28-5	ND	50 ug/L	09/26/96
2-Methylphenol	95-48-7	ND	10 uğ/L	09/26/96
4-Methylphenol	106-44-5	ND	10 ug/L	09/26/96
2-Nitropheno]	88-75-5	ND	10 ug/L	09/26/96
4-Nitrophenol	100-02-7	ND	50 ug/L	09/26/96
Pentachlorophenol	87-86-5		50 ug/L	09/26/96 09/26/96
Phenol 2,4,5-Trichlorophenol	108-95-2 95-95-4	ND ND	10 ug/L 10 ug/L	09/26/96
2,4,6-Trichlorophenol	88-06-2	ND	10 ug/L	09/26/96
	00 00-2	NU	10 09/1	05720750

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

American Environmental Network

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AEN (CALIFORNIA) QUALITY CONTROL REPORT

AEN JOB NUMBER: 9609230

CLIENT PROJECT ID: K275-G(963)

Quality Control 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: 9609230 DATE(S) EXTRACTED: 09/23/96 INSTRUMENT: C MATRIX: WATER

Date Analyzed	Client Id.	Lab Id.	Percent Recovery
09/25/96 09/25/96 09/25/96	MHW-1A MHW-2 MHW-3	01 02 03	93 92 92
QC Limits:			65-125

Surrogate Standard Recovery Summary

DATE EXTRACTED: 09/23/96 DATE ANALYZED: 09/24/96 SAMPLE SPIKED: 9608341-20 INSTRUMENT: C

Matrix Spike Recovery Summary

				QC Limit	ts
Analyte	Spike Added (mg/L)	Average Percent Recovery	RPD	Percent Recovery	RPD
Diesel	4.00	90	1	60-110	15

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

American Environmental Network

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QUALITY CONTROL DATA

METHOD: EPA 8020, 5030 GCFID

AEN JOB NO: 9609230 INSTRUMENT: H MATRIX: WATER

> Surrogate Standard Recovery Summary Percent Recovery Date Fluorobenzene Client Id. Lab Id. Analyzed 102 MHW-1A 01 09/24/96 02 03 102 09/24/96 MHW-2 103 MHW-3 09/24/96 70-130 QC Limits:

DATE ANALYZED: 09/23/96 SAMPLE SPIKED: 9609229-05 INSTRUMENT: H

Matrix Spike Recovery Summary

	•			QC Limi	ts
Analyte	Spike Average Added Percent (ug/L) Recovery		RPD	Percent Recovery	RPD
Benzene Toluene	22.0 74.9	100 97	6 3	85-109 87-111	17 16

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

American Environmental Network

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QUALITY CONTROL DATA

METHOD: EPA 8270

AEN JOB NO: 9609230 DATE EXTRACTED: 09/23/96 INSTRUMENT: 11 MATRIX: WATER

Surrogate Standard Recovery Summary

Date Analyzed	Client Id.	Lab Id.	2-Fluoro- phenol	Phenol •d ₅	Nitro- benzene-d ₅	2-Fluoro- biphenyl	2,4,6-Tri- bromophenol	Terphenyl - d ₁₄
09/26/96	 MHW- 1A	01	77	71	68	96	72	86
09/26/96	MHW-2	02	49	59	51	83	70	84
09/26/96	MHW-3	03	87	78	75	98	69	86
QC Limits:			41-104	46-114	50-112	41-111	59-125	37-111

DATE EXTRACTED: 09/23/96 DATE ANALYZED: 09/26/96 SAMPLE SPIKED: LCS INSTRUMENT: 11

Laboratory Control Sample Recovery

	Spike		QC Limits
Analyte	Spike Added (ug/L)	Percent Recovery	Percent Recovery
Phenol 2-Chlorophenol 1,4-Dichlorobenzene N-Nitrosodi-n-propylamine 1,2,4-Trichlorobenzene 4-Chloro-3-methylphenol Acenaphthene 4-Nitrophenol 2,4-Dinitrotoluene Pentachlorophenol Pyrene	196 199 198 183 220 197 186 197 254 185 238	63 82 76 81 88 79 86 56 86 90 63	44-126 50-145 51-132 52-151 51-128 52-149 58-139 30-152 60-128 30-160 40-130

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

*** END OF REPORT ***

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