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3rd Water Sampling Report

MarkAir Facility, Fairbanks, Alaska

Introduction

This phase of groundwater evaluation is being performed as a corrective action for the Fairbanks, MarkAir Facility. This report summarizes sampling procedures and the results of the third water sampling event. These activities were carried out in accordance with Environmental Management, Inc.'s (EMI) Quality Assurance Program Plan (QAPP).

During the week of June 21, 1993, nine monitoring wells were installed around the Fairbanks, MarkAir Facility. On June 30, 1993, EMI collected the first water samples from the nine monitoring wells around the MarkAir facilities. The results of this phase of work were submitted in a report titled MarkAir Fairbanks Monitoring Well Report.

On September 30, 1993, EMI collected the second water samples from the nine monitoring wells around the MarkAir facilities. The results from this sampling event were submitted in a report titled 2nd Water Sampling Report MarkAir Facility, Fairbanks, Alaska.

This phase of groundwater evaluation is being performed on a quarterly basis, so that, contamination can be monitored for the seasonal cycle of water table fluctuations.

Summary of Findings

The following is a summary of findings. Please consult the main body of the report and attachments for supporting information.

- Benzene was detected in some of the monitoring wells above the maximum contaminant levels outlined by the State of Alaska's Drinking Water Standards (18 AAC 80).
- pH values for some of the water samples fell outside the range established by

the the State of Alaska's Drinking Water Standards (18 AAC 80).

Water Sampling Procedures

On December 29, 1993, monitoring wells were purged by removing 3 well casing volumes of water.

On December 30, 1993 monitoring well samples were collected by Stan Dolloff of EMI following techniques were used as described in EMI's QAPP. All samples were then sent to Superior Precision Analytical, Inc. in Martinez, California for laboratory analysis. Monitoring well water samples were tested for Diesel Range Petroleum Hydrocarbons (EPA Method 3540/8100 Modified), Gasoline Range Petroleum Hydrocarbons (EPA Method 5030/8015 Modified), Total BTEX (EPA Method 5030/602), Total Range Petroleum Hydrocarbons (EPA Method 3550/418.1), PCB's (EPA Method 3550/8080), Volatile Chlorinated Solvents (EPA Method 5030/601), and Leachable Metals (Arsenic EPA Method 3020/7060), (Cadmium EPA Method 3010/6010), (Chromium EPA Method 3010/6010), (Lead EPA Method 3020/7421). Summary results may be found in Appendix C Tables #2 - #14. The chain of custody and complete analytical results can be found in Appendix D.

Water Quality

Petroleum contaminant concentrations that are above the maximum contaminant levels (MCL) (18 AAC 80, Drinking Water Standards, March 18, 1993) are depicted on sheet 2 of 3 and sheet 3 of 3 of Appendix A. No monitoring well contained detectable amounts of petroleum products above their MCL which were not detected in the previous sampling event on September 30, 1993.

MW #1, #2, #4 at the Weaver Brothers Building and MW# 1, and #2 at the Mark Air Hanger showed a decline in detectable amounts of petroleum contaminants from the previous sampling event on September 30, 1993.

The metals arsenic, cadmium, chromium, and lead were tested for and the results are presented in Appendix C, Tables #12 to #15.

Temperature, pH, dissolved oxygen, and conductivity were checked by the use of a Hana Temperature/pH meter and a Hana Dissolved Oxygen/Conductivity meter. Temperature values from the three sampling events ranged between 38 degrees F to 42 degrees F. pH values from the three sampling events ranged between 6.22 pH to 7.1 pH. Dissolved oxygen values ranged between 36% to 45.6% for the second and third sampling events. Conductivity values from the three sampling events ranged between 340 uS to 410 uS. Temperature, pH, dissolved oxygen, and conductivity results are presented in Appendix C Tables 16 and 17.

Discussion of Findings

Due to the changing pattern of detection and non-detection of petroleum hydrocarbons, the plume of contamination seems to be migrant. Up gradient monitoring wells (MW#4 @ the Weaver Brothers Bldg. and MW#5 @ the MarkAir Hangar) are showing detectable amounts of petroleum hydrocarbons. MW #4 @ the Weaver Brothers Building shows detectable amounts of Benzene above its MCL of 5.0 parts per billion (ppb). Therefore, contamination from nearby sources could be encroaching on to MarkAir properties. The furthest down gradient monitoring wells (MW#1 @ the Weaver Brothers Bldg. and MW#1 @ the MarkAir Hangar) show no detectable amounts of any contaminant above its MCL.

Microorganisms are naturally present in the soil and water, existing over a broad range of conditions. Typically, microorganisms utilize pollutants as a food source, converting them into carbon dioxide, water, inorganic salts, and small amounts of organic material. Optimization of growth of these microbes is in large part determined by oxygen availability, temperature, and pH. Temperature changes have a twofold effect on the proliferation of the organisms, deviations from optimum temperatures directly affects growth rates and dissolved oxygen content is in part affected by water temperature values. For bacteria, pH values in the range 6.5 to 7.5 yeild optimum growth rates. Only four out of nine monitoring well samples showed pH levels within the MCL range of 6.5 to 8.5. The remaining samples seem to be more acidic with pH values between 6.22 and 6.49, a deviation from the optimum range of only 0.2% to 4%.

Data Presentation and Validation

Laboratory results are compiled and summarized in Appendix C, Tables #2 to #14. Data validation calculations were performed in accordance with EMI's QAPP, and summarized in Appendix C Tables #17 to #19. The complete laboratory data deliverables are presented in Appendix D. All QA/QC objectives were met.

Recommendations

EMI recommends the continued quarterly sampling of the monitoring wells until June 30, 1994, so that, contamination can be monitored for one seasonal cycle of water table fluctuations. Results from this monitoring will aid in the establishment of the plume migration pattern. Also the change in hydrocarbon levels from one sampling event to the next can be used to assess the effectiveness of natural biodegradation. Site specific information from all the land users at the Fairbanks International Airport obtained during this sampling event, previous sampling events, and future sampling events, should be compiled and reviewed to better define the extent and levels of hydrocarbons around the airport area prior to developing a remediation plan. A decision in conjunction with the ADEC regarding further action can be made once a better history of quantitative contamination is established based on data from the monitoring wells.

Closure

The discussion presented in this report is based on our understanding of ADEC guidelines, our investigations, our Quality Assurance Program Plan, and other pertinent information referred to herein.

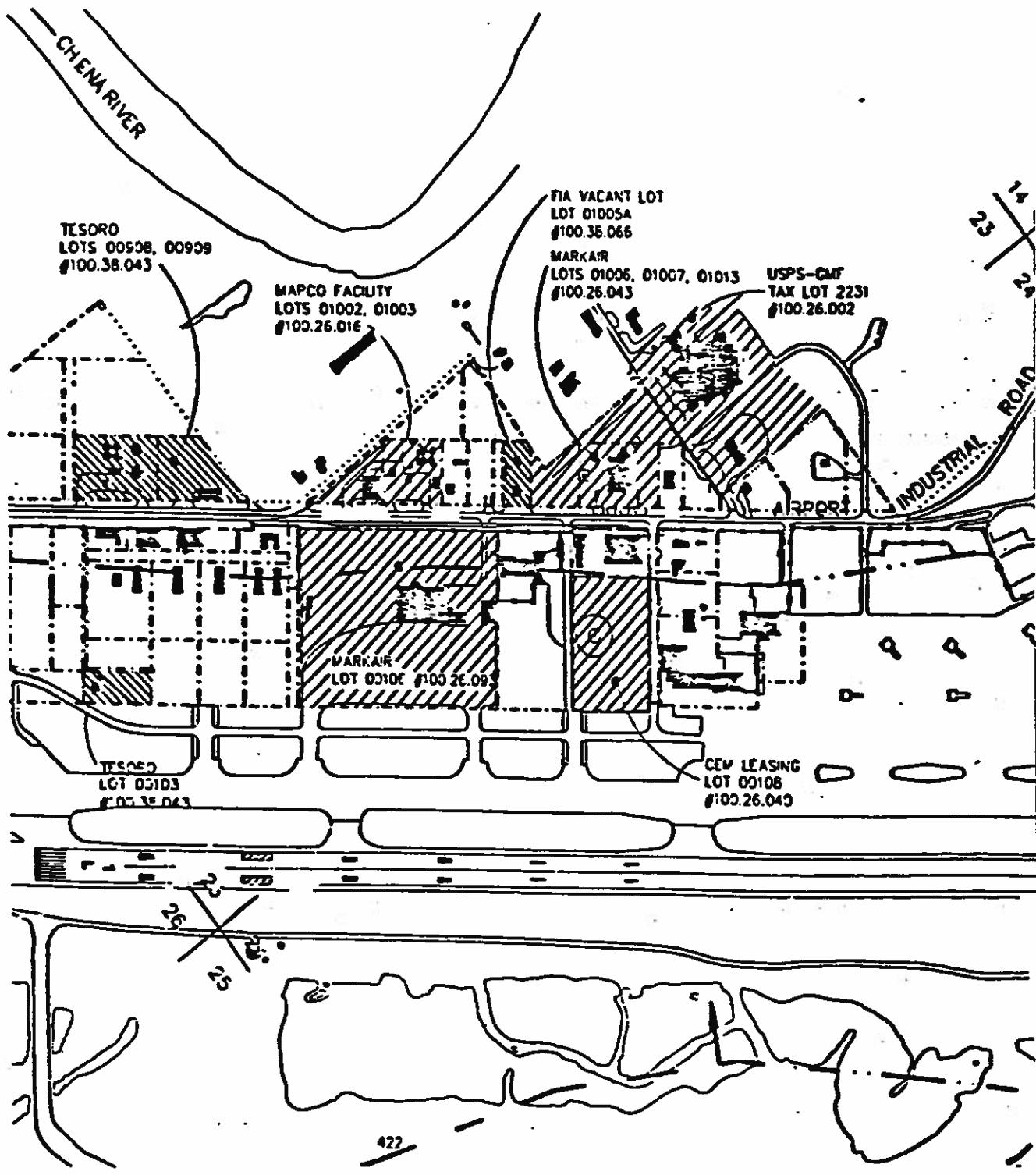
Findings representative of the site at any particular time are the result of services rendered within the scope authorized by the client. Changes due to natural processes and human activity will affect the conditions described herein.

EMI prepared these tasks in a manner consistent with the level of skill ordinarily

exercised by members of the profession currently practicing under similar conditions. No warranty, express or implied, beyond exercise of reasonable care and professional diligence, is made.

ATTACHMENT A

FIGURES



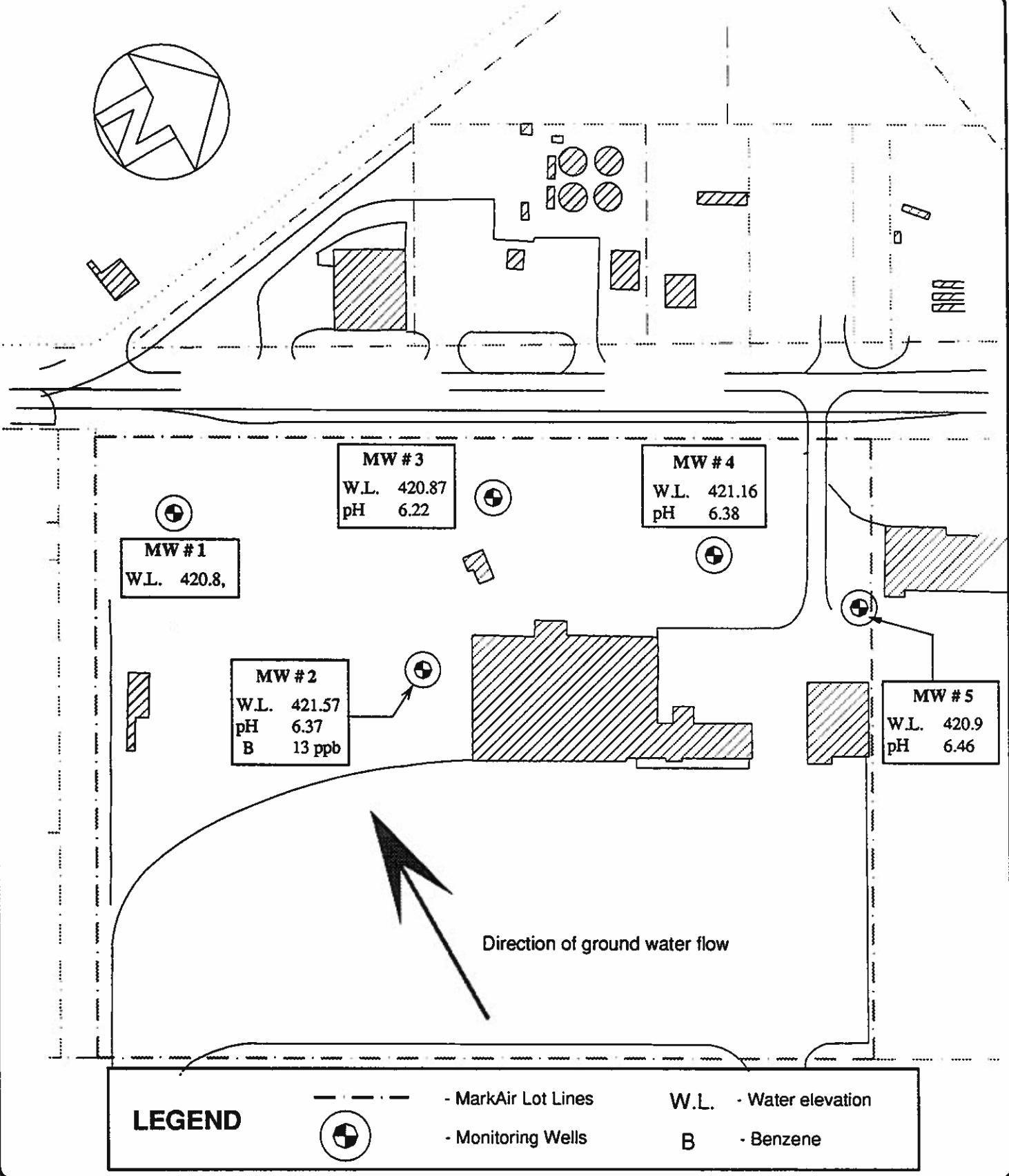
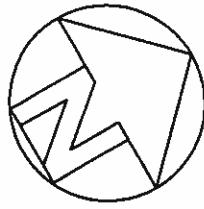
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DRAWN <u>SHS</u>
CHECKED <u>JES</u>
NO. <u> </u> DATE <u> </u> BY <u> </u>

REVISIONS



MARKAIR FAIRBANKS FACILITY
Vicinity Map
Range 2 West, Township 1 South
Fairbanks Meridian, Alaska

DATE 2/24/94 EMI NO. 6219
A
SHEET 1 of 3



DESIGN	SHS
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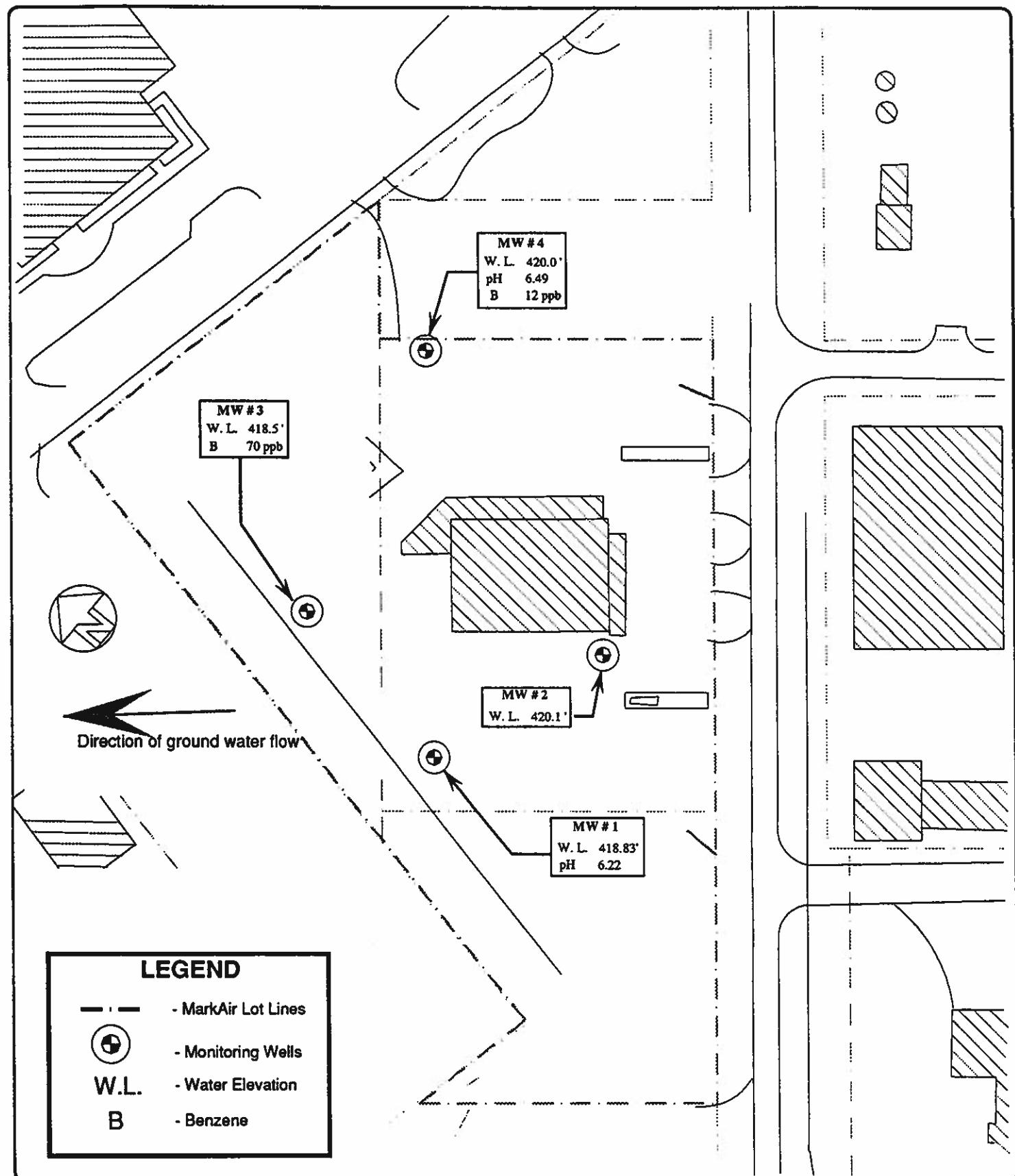
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NO.	DATE	BY



MARKAIR FAIRBANKS FACILITY

MONITORING WELL RESULTS
December 30, 1993
HANGAR/OFFICE BUILDING
Not to scale

DATE 2/25/94 EMI NO. 6219	A
SHEET 2 OF 3	



DESIGN SHS
DRAWN SHS
CHECKED JES

REVISIONS

NO.	DATE	BY

ENVIRONMENTAL
MANAGEMENT
INCORPORATED
2060 EAST FIREWEED LANE - SUITE 201
ANCHORAGE, ALASKA 99503
(907) 272-9336 -FAX 272-4159

MARKAIR FAIRBANKS FACILITY
Monitoring Well Results
December 30, 1993
Weaver Brothers Building
Not to Scale

DATE 2/24/94
EMI NO. 6219
A
SHEET 3 OF 3

Table #1
Summary of Field Analysis of Monitoring Well Water Elevations
June 30, 1993 thru December 30, 1993

Well ID	Runway Station	Offset Left	MW Elevation (feet)	Water Elevation (6/30/93) (feet)	Water Elevation (9/30/93) (feet)	Water Elevation (12/30/93) (feet)
MW#1 @ WB	101+47	2081	428.79	421.21	420.91	418.83
MW#2 @ WB	102+50	1941	431.48	422.44	421.19	420.10
MW#3 @ WB	102+62	2191	427.33	420.44	420.79	418.50
MW#4 @ WB	104+86	2142	428.49	421.74	421.16	420.00
MW#1 @ H	87+26	1603	429.72	423.22	422.14	420.76
MW#2 @ H	90+83	1391	434.57	423.65	422.40	421.57
MW#3 @ H	91+32	1653	430.04	423.37	422.37	420.87
MW#4 @ H	93+86	1582	430.94	423.53	422.32	421.16
MW#5 @ H	96+16	1571	430.78	423.78	422.70	420.90

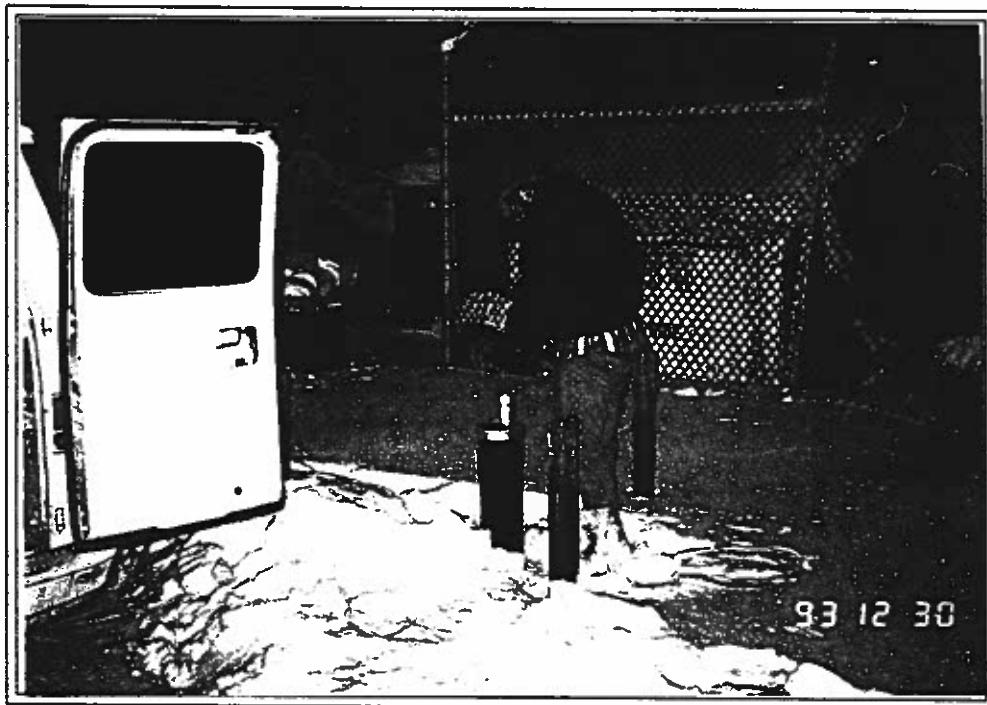
LEGEND:
WB = Weaver Bros.
H = Hanger

ATTACHMENT B

PHOTOGRAPHS



PHOTO PAGE
MARKAIR FAIRBANKS, ALASKA
DECEMBER 30, 1993



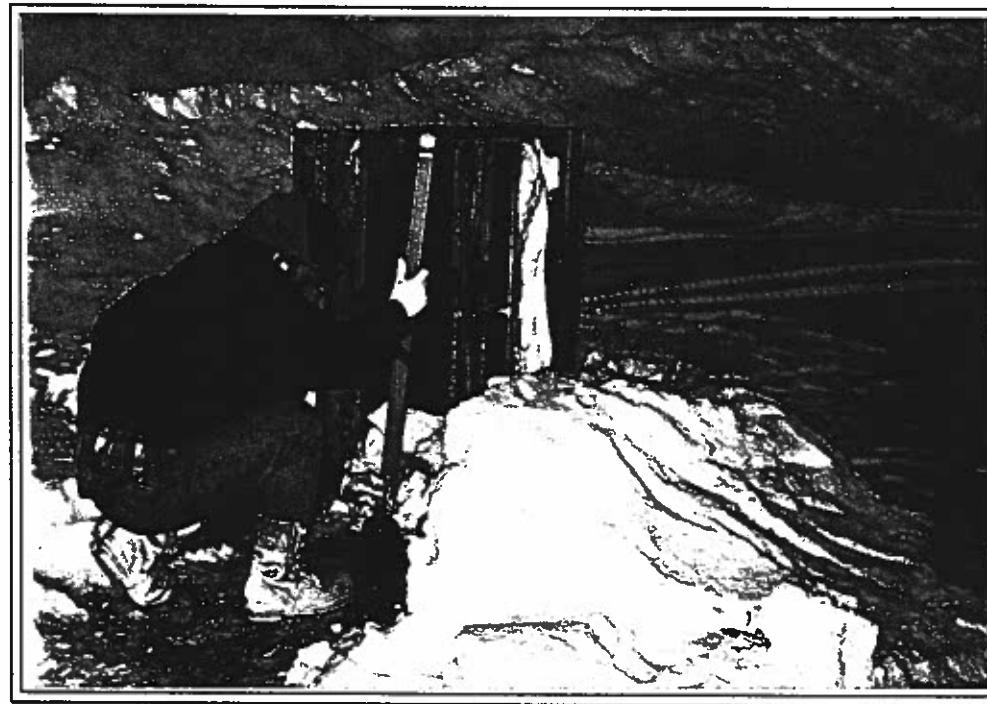
Water sample collection from MW #4 located on the northeast side of the Weaver Brothers Bldg.



Water quality parameter check of sample collected from MW #4



PHOTO PAGE
MARKAIR FAIRBANKS, ALASKA
DECEMBER 30, 1993



Water sample collection from MW #3 located on the northwest side of the Weaver Brothers Bldg.



Water quality parameter check of sample collected from MW#3



PHOTO PAGE
MARKAIR FAIRBANKS, ALASKA
DECEMBER 30, 1993



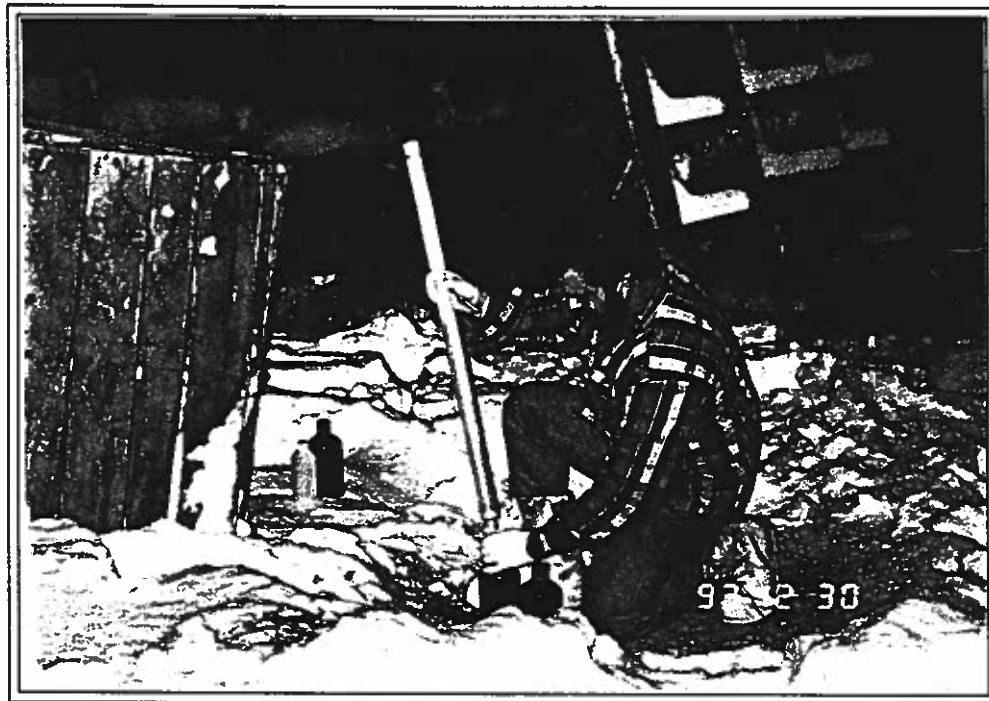
Water sample collection from MW #2 located on the southwest side of the Weaver Brothers Bldg.



Water level reading from MW #1 located on the northwest side of the Weaver Brothers Bldg.



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DECEMBER 30, 1993



**Water sample collection from MW #1 located on the west corner of the
Mark Air hangar lot.**



Water sample collection for volatile aromatic hydrocarbons from MW #1



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DECEMBER 30, 1993



Water level reading from MW #2 located next to the Mark Air hangar



Water sample collection from MW #2 at the hangar



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DECEMBER 30, 1993



Water level reading from MW #4 located in front of the Mark Air hangar



Water sample collection from MW #4 located at the hangar



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MARKAIR FAIRBANKS, ALASKA
DECEMBER 30, 1993



Water level reading from MW #3 located in front of the Mark Air hangar



Water sample collection at MW #5 located in front of the Mark Air hangar

ATTACHMENT C

TABLES

Table #2
Summary of Analytical Monitoring Well Water Samples for Diesel
Samples Collected on June 30, 1993 Thru December 30,1993

Well ID	Sample ID#	DRPH(6/30/93) 3510/8100M(ppb)	DRPH(9/30/93) 3510/8100M(ppb)	DRPH(12/30/93) 3510/8100M(ppb)	DRPH(3/30/94) 3510/8100M(ppb)	DRPH(6/30/94) 3510/8100M(ppb)
MW#1 @ WB	6179-03	ND (100 ppb)	ND (100 ppb)	ND (100 ppb)	ND (100 ppb)	
Duplicate	6179-04	ND (100 ppb)	ND (100 ppb)	ND (100 ppb)	ND (100 ppb)	
MW#2 @ WB	6179-05	210	ND (100 ppb)	ND (100 ppb)	ND (100 ppb)	
MW#3 @ WB	6179-02	ND (100 ppb)	ND (100 ppb)	ND (100 ppb)	ND (100 ppb)	
MW#4 @ WB	6179-01	140	ND (100 ppb)	ND (100 ppb)	ND (100 ppb)	
MW#1 @ H	6179-09	ND (100 ppb)	ND (100 ppb)	320	ND (100 ppb)	
MW#2 @ H	6179-10	470	ND (100 ppb)	420	ND (100 ppb)	
MW#3 @ H	6179-08	ND (100 ppb)	ND (100 ppb)	ND (100 ppb)	ND (100 ppb)	
MW#4 @ H	6179-07	ND (100 ppb)	ND (100 ppb)	ND (100 ppb)	ND (100 ppb)	
MW#5 @ H	6179-06	ND (100 ppb)	ND (100 ppb)	ND (100 ppb)	ND (100 ppb)	

LEGEND: WB = Weaver Brothers Bldg.
 Duplicate = Duplicate of MW#1
 H = Hanger
 DRPH = Diesel Range Petroleum Hydrocarbons
 ND () = Not Detected (Detection Limit)
 ppb = parts per billion

Table #3
Summary of Analytical Monitoring Well Water Samples for Gasoline
Samples Collected on June 30, 1993 thru December 30, 1993

Well ID	Sample ID#	GRPH(6/30/93) 5030/8015M(ppb)	GRPH(9/30/93) 5030/8015M(ppb)	GRPH(12/30/93) 5030/8015M(ppb)	GRPH(3/30/94) 5030/8015M(ppb)	GRPH(6/30/94) 5030/8015M(ppb)
MW#1 @ WB	6179-03	ND (100 ppb)	ND (50 ppb)	ND (50 ppb)	ND (50 ppb)	ND (50 ppb)
Duplicate	6179-04	ND (100 ppb)	ND (50 ppb)	ND (50 ppb)	ND (50 ppb)	ND (50 ppb)
MW#2 @ WB	6179-05	ND (100 ppb)	ND (50 ppb)	ND (50 ppb)	ND (50 ppb)	ND (50 ppb)
MW#3 @ WB	6179-02	130	350	9 9	..	..
MW#4 @ WB	6179-01	ND (100 ppb)	ND (50 ppb)	ND (50 ppb)	ND (50 ppb)	ND (50 ppb)
		..	..	..	52	..
		..	..	..	ND (50 ppb)	..
		..	..	..	ND (50 ppb)	..
		..	..	..	ND (50 ppb)	..

Table #4
Summary of Analytical Monitoring Well Water Samples for PCBs
Samples Collected on June 30, 1993 thru December 30, 1993

Well ID	Sample ID#	PCBs(6/30/93) 3550/8080(ppb)	PCBs(9/30/93) 3550/8080(ppb)	PCBs(12/30/93) 3550/8080(ppb)	PCBs(3/30/94) 3550/8080(ppb)	PCBs(6/30/94) 3550/8080(ppb)
MW#1 @ WB	6179-03	ND (0.1 ppb)	ND (0.1 ppb)	ND (0.1 ppb)	ND (0.1 ppb)	ND (0.1 ppb)
Duplicate	6179-04	ND (0.1 ppb)	ND (0.1 ppb)	ND (0.1 ppb)	ND (0.1 ppb)	ND (0.1 ppb)
MW#2 @ WB	6179-05	ND (0.1 ppb)	ND (0.1 ppb)	ND (0.1 ppb)	ND (0.1 ppb)	ND (0.1 ppb)
MW#3 @ WB	6179-02	NA	NA	NA	NA	NA
MW#4 @ WB	6179-01	NA	NA	NA	NA	NA

Table #5
Summary of Analytical Monitoring Well Water Samples for TPH
Samples Collected on June 30, 1993 thru December 30, 1993

Well ID	Sample ID#	TPH (6/30/93) 418.1 (ppm)	TPH (9/30/93) 418.1 (ppm)	TPH (12/30/93) 418.1 (ppm)	TPH (3/30/94) 418.1 (ppm)	TPH (6/30/94) 418.1 (ppm)
MW#1 @ WB	6179-03	ND (1 ppm)	ND (1 ppm)	ND (1 ppm)	ND (1 ppm)	
Duplicate	6179-04	ND (1 ppm)	ND (1 ppm)	ND (1 ppm)	ND (1 ppm)	
MW#2 @ WB	6179-05	ND (1 ppm)	ND (1 ppm)	ND (1 ppm)	ND (1 ppm)	
MW#3 @ WB	6179-02	NA	NA	NA	NA	

Table #6
Summary of Analytical Monitoring Well Water Samples for VCS
Samples Collected on June 30, 1993 Thru December 30, 1993

Well ID	Sample ID#	VCS (6/30/93) 5030/601 (ppb)	VCS (9/30/93) 5030/601 (ppb)	VCS (12/30/93) 5030/601 (ppb)	VCS (3/30/94) 5030/601 (ppb)	VCS (6/30/94) 5030/601 (ppb)
MW#1 @ WB	6179-03	ND (1.0 ppb)	ND (0.5 ppb)*	ND (0.5 ppb)*		
Duplicate	6179-04	ND (1.0 ppb)	ND (0.5 ppb)*	ND (0.5 ppb)*		
MW#2 @ WB	6179-05	ND (1.0 ppb)	†	†		
MW#3 @ WB	6179-02	NA	NA	NA		
MW#4 @ WB	6179-01	NA	NA	NA		
MW#1 @ H	6179-09	ND (1.0 ppb)	ND (0.5 ppb)*	ND (0.5 ppb)*		
MW#2 @ H	6179-10	a	b	c		

Table #7
Summary of Analytical Monitoring Well Water Samples for Benzene
Samples Collected on June 30, 1993 Thru December 30, 1993

Well ID	Sample ID#	Ben(6/30/93) 5030/602 (ppb)	Ben(9/30/93) 5030/602 (ppb)	Ben(12/30/93) 5030/602 (ppb)	Ben(3/30/94) 5030/602 (ppb)	Ben(6/30/94) 5030/602 (ppb)
MW#1 @ WB	6179-03	ND (1 ppb)	†	ND (0.5 ppb)		
Duplicate	6179-04	ND (1 ppb)	†	†		
MW#2 @ WB	6179-05	ND (1 ppb)	ND (0.5 ppb)	†		
MW#3 @ WB	6179-02	52	240	70		
MW#4 @ WB	6179-01	†	6.1	12		

Table #8
Summary of Analytical Monitoring Well Water Samples for Ethyl Benzene
Samples Collected on June 30, 1993 Thru December 30, 1993

Well ID	Sample ID#	EB(6/30/93) 5030/602 (ppb)	EB(9/30/93) 5030/602 (ppb)	EB(12/30/93) 5030/602 (ppb)	EB(3/30/94) 5030/602 (ppb)	EB(6/30/94) 5030/602 (ppb)
MW#1 @ WB	6179-03	ND (1 ppb)	ND (0.5 ppb)	ND (0.5 ppb)	ND (0.5 ppb)	
Duplicate	6179-04	ND (1 ppb)	ND (0.5 ppb)	ND (0.5 ppb)	ND (0.5 ppb)	
MW#2 @ WB	6179-05	ND (1 ppb)	ND (0.5 ppb)	ND (0.5 ppb)	ND (0.5 ppb)	
MW#3 @ WB	6179-02	ND (1 ppb)	ND (0.5 ppb)	ND (0.5 ppb)	ND (0.5 ppb)	
MW#4 @ WB	6179-01	ND (1 ppb)	ND (0.5 ppb)	ND (0.5 ppb)	ND (0.5 ppb)	
MW#1 @ U	6179-09	+	ND (0.5 ppb)	ND (0.5 ppb)	ND (0.5 ppb)	

Table #9
Summary of Analytical Monitoring Well Water Samples for Toluene
Samples Collected on June 30, 1993 Thru December 30, 1993

Well ID	Sample ID#	Tol(6/30/93) 5030/602 (ppb)	Tol(9/30/93) 5030/602 (ppb)	Tol(12/30/93) 5030/602 (ppb)	Tol(3/30/94) 5030/602 (ppb)	Tol(6/30/94) 5030/602 (ppb)
MW#1 @ WB	.					
Duplicate	6179-04	†	†	†	†	
MW#2 @ WB	6179-05		†	†	†	
MW#3 @ WB	6179-02		†	†	†	
MW#4 @ WB	6179-01		†	†	†	

Table #10
Summary of Analytical Monitoring Well Water Samples for Xylenes
Samples Collected on June 30, 1993 Thru December 30, 1993

Well ID	Sample ID#	Xyl(6/30/93) 5030/602 (ppb)	Xyl(9/30/93) 5030/602 (ppb)	Xyl(12/30/93) 5030/602 (ppb)	Xyl(3/30/94) 5030/602 (ppb)	Xyl(6/30/94) 5030/602 (ppb)
MW#1 @ WB	6179-03	ND (3 ppb)	ND (1.5 ppb)	ND (0.5 ppb)		
Duplicate	6179-04	ND (3 ppb)	ND (1.5 ppb)	ND (0.5 ppb)		
MW#2 @ WB	6179-05	ND (3 ppb)	ND (1.5 ppb)	ND (0.5 ppb)		
MW#3 @ WB	6179-02	†	ND (1.5 ppb)	†		
MW#4 @ WB	6179-01	ND (3 ppb)	ND (1.5 ppb)	ND (0.5 ppb)		
MW#1 @ H	6179-09	†	ND (1.5 ppb)	ND (0.5 ppb)		

**Table #11
Summary of Analytical Monitoring Well Water Samples for Arsenic
Samples Collected on June 30, 1993 Thru December 30, 1993**

Well ID	Sample ID#	As(6/30/93) 3020/7060 (ppm)	As(9/30/93) 3020/7060 (ppm)	As(12/30/93) 3020/7060 (ppm)	As(3/30/94) 3020/7060 (ppm)	As(6/30/94) 3020/7060 (ppm)
MW#1 @ WB	6179-03	ND (0.01ppm)	ND (0.01ppm)	†		
Duplicate	6179-04	ND (0.01ppm)	†	†		
MW#2 @ WB	6179-05	†	†	†		
MW#3 @ WB	6179-02	NA	NA	NA	NA	
MW#4 @WB	6179-01	NA	NA	NA	ND(0.01ppm)	
MW#1 @ H	6179-09	†	†	†	†	
MW#2 @ H	6179-10	†	NA	NA	ND(0.01ppm)	
ANALYSIS	C-170 NO					

Table #12
Summary of Analytical Monitoring Well Water Samples for Cadmium
Samples Collected on June 30, 1993 Thru December 30, 1993

Well ID	Sample ID#	Cd(6/30/93) 3010/6010 (ppm)	Cd(9/30/93) 3010/6010 (ppm)	Cd(12/30/93) 3010/6010 (ppm)	Cd(3/30/94) 3010/6010 (ppm)	Cd(6/30/94) 3010/6010 (ppm)
MW#1 @ WB	6179-03	ND (0.01ppm)	ND (0.01ppm)	ND (0.01ppm)	ND (0.01ppm)	
Duplicate	6179-04	ND (0.01ppm)	ND (0.01ppm)	ND (0.01ppm)	ND (0.01ppm)	
MW#2 @ WB	6179-05	ND (0.01ppm)	ND (0.01ppm)	ND (0.01ppm)	ND (0.01ppm)	
MW#3 @ WB	6179-02	NA	NA	NA	NA	
MW#4 @WB	6179-01	NA	NA	NA	NA	

Table #13
Summary of Analytical Monitoring Well Water Samples for Chromium
Samples Collected on June 30, 1993 Thru December 30, 1993

Well ID	Sample ID#	Cr(6/30/93) 3010/6010 (ppm)	Cr(9/30/93) 3010/6010 (ppm)	Cr(12/30/93) 3010/6010 (ppm)	Cr(3/30/94) 3010/6010 (ppm)	Cr(6/30/94) 3010/6010 (ppm)
MW#1 @ WB	6179-03	ND (0.05 ppm)	ND (0.05 ppm)	ND (0.05 ppm)	ND (0.05 ppm)	ND (0.05 ppm)
Duplicate	6179-04	ND (0.05 ppm)	ND (0.05 ppm)	ND (0.05 ppm)	ND (0.05 ppm)	ND (0.05 ppm)
MW#2 @ WB	6179-05	ND (0.05 ppm)	ND (0.05 ppm)	ND (0.05 ppm)	ND (0.05 ppm)	ND (0.05 ppm)
MW#3 @ WB	6179-02	NA	NA	NA	NA	NA
MW#4 @WB	6179-01	NA	NA	NA	NA	NA
MW#1 @ H	6179-09	ND (0.05 ppm)	ND (0.05 ppm)	ND (0.05 ppm)	ND (0.05 ppm)	ND (0.05 ppm)
MW#2 @ H	6179-10	ND (0.05 ppm)	ND (0.05 ppm)	ND (0.05 ppm)	ND (0.05 ppm)	ND (0.05 ppm)

Table #14
Summary of Analytical Monitoring Well Water Samples for Lead
Samples Collected on June 30, 1993 Thru December 30, 1993

Well ID	Sample ID#	Pb(6/30/93) 3020/7421 (ppm)	Pb(9/30/93) 3020/7421 (ppm)	Pb(12/30/93) 3020/7421 (ppm)	Pb(3/30/94) 3020/7421 (ppm)	Pb(6/30/94) 3020/7421 (ppm)
MW#1 @ WB	6179-03	†	ND (0.005 ppm)	ND (0.1 ppm)		
Duplicate	6179-04	†	ND (0.005 ppm)	ND (0.1 ppm)		
MW#2 @ WB	6179-05	†	†	ND (0.1 ppm)		
MW#3 @ WB	6179-02	NA	NA	NA		
MW#4 @ WB	6179-01	NA	NA	NA		
		+	ND (0.005 ppm)	ND (0.1 ppm)		

Table #15
Summary of Field Analysis of Monitoring Well Water
Samples Collected on June 30 1993 & September 30,1993

Well ID	June 30 1993				September 30 1993			
	Temp degrees C (F)	pH	Cond. uS	D.O. %	Temp degrees C (F)	pH	Cond. uS	D.O. %
MW#1 @ WB	4.5 (40)	6.41	380	R	4.5 (40)	†	360	44.2
MW#2 @ WB	5.0 (41)	†	370	R	4.5 (40)	†	390	42.1
MW#3 @ WB	5.5 (42)	†	410	R	5.0 (41)	†	390	38

Table #16
Summary of Field Analysis of Monitoring Well Water
Samples Collected on December 30 1993 & March 30,1994

Well ID	December 30 1993				March 30 1994			
	Temp degrees C (F)	pH	Cond. uS	D.O. %	Temp degrees C (F)	pH	Cond. uS	D.O. %
MW#1 @ WB	3.9 (39.0)	†	365	44.5				
MW#2 @ WB	3.8 (38.8)	†	350	44.1				
MW#3 @ WB	3.9 (39.0)	†	390	36.3				

Ta
Laboratory :

QC Designation	Tolerance
Laboratory Precision	
8100M,DRPH,water	30
8015M,GRPH,water	30
418.1,TPH,water	30
8020,BTEX,water	30
8010,HVO,water	30
8080,PCBs,water	30
7060,Arsenic,water	20
6010,Cadmium,water	20
6010,Chromium,water	20
7421,Lead,water	20
Field Precision	
8100M,DRPH,water	30
8015M,GRPH,water	30
418.1,TPH,water	30
8020,BTEX,water	30
8010,HVO,water	30
8080,PCBs,water	30
7060,Arsenic,water	20
6010,Cadmium,water	20
6010,Chromium,water	20
7421,Lead,water	20

Ta
Holding Times a

QC DESIGNATION	TOLERANCE
Holding Times	
8100M,DRPH,water	extraction 1 analysis 4
8015M,GRPH,water	analysis 1
418.1,TPH,water	extraction 1 analysis 4
8020,BTEX,water	analysis 1
8010,HVO,water	analysis 1
8080,PCBs,water	extraction 1 analysis 4
7060,Arsenic,water	analysis 1
6010,Cadmium,water	analysis 1
6010,Chromium,water	analysis 1
7421,Lead,water	analysis 1
Surrogate Recovery	
8100M,DRPH,water	60%
8015M,GRPH,water	60%

T:

Laboratory Acc

QC Designation	1
Laboratory Accuracy	
8100M, DRPH, water	60
8015M, GRPH, water	60
418.1, TPH, water	60
8020, BTEX, water	60
8010, HVO, water	40
8080, PCBs, water	60
7060, Arsenic, water	80
6010, Cadmium, water	80
6010, Chromium, water	80
7421, Lead, water	80
Completeness	
8100M, DRPH, water	
8015M, GRPH, water	
418.1, TPH, water	
8020, BTEX, water	
8010, HVO, water	
8080, PCBs, water	
7060, Arsenic, water	
6010, Cadmium, water	
6010, Chromium, water	
7421, Lead, water	

Table #20
Water Elevations and Benzene Levels
MW #3 at Weaver Brothers Bldg.

SAMPLE DATE	ELEVATION	BENZENE (ppb)
6/30/93	420.44	52
9/30/93	420.79	240
12/30/93	418.5	70
3/30/94		
6/30/94		

MW#4 @ WEAVER BROTHERS (Benzene)



T 250



ATTACH
LABORATOR



Superior Precision A

825 Arnold Drive, Suite 114 • Martinez, California

ENVIRONMENTAL MANAGEMENT INC
Attn: STAN DOLLOFF

ANALYSIS FOR POLYCHLOROPHENOLS

Sample preparation by EPA Method 8010
chromatography using an electrochemical detector

8010

Chronology

Identification	Sampled	Received
6219-03	12/03/94	01/04/95
6219-04	12/03/94	01/04/95
6219-05	12/03/94	01/04/95
6219-08	12/03/94	01/04/95
6219-09	12/03/94	01/04/95
6219-10	12/03/94	01/04/95

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ANALYSIS FOR POLYCHLORINATED BIPHENOLS

Laboratory Number Sample Ident.

90885- 3	6219-03
90885- 4	6219-04
90885- 5	6219-05
90885- 8	6219-08
90885- 9	6219-09
90885-10	6219-10

RESULTS OF ANALYSIS

Laboratory Number: 90885- 3 908

AROCLOR 1016:	ND<0.1	N
AROCLOR 1221:	ND<0.1	N
AROCLOR 1232:	ND<0.1	N
AROCLOR 1242:	ND<0.1	N
AROCLOR 1248:	ND<0.1	N
AROCLOR 1254:	ND<0.1	N
AROCLOR 1260:	ND<0.1	N

Concentration: ug/L u

-- Surrogate % Recoveries --

TCMX: 96 1

Laboratory Number: 90885-10

AROCLOR 1016:	ND<0.1
AROCLOR 1221:	ND<0.1
AROCLOR 1232:	ND<0.1
AROCLOR 1242:	ND<0.1
AROCLOR 1248:	ND<0.1
AROCLOR 1254:	ND<0.1
AROCLOR 1260:	ND<0.1

Concentration: ug/L

-- Surrogate % Recoveries --

TCMX: 111

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ANALYSIS FOR POLYCHLORINATED DIBENZO-P-DIOXINS Quality Assurance analysis

Laboratory Report

Compound	Method	Blank (ug/L)	RL (ug/L)
AROCLOR 1016:	ND<0.1	0.1	
AROCLOR 1221:	ND<0.1	0.1	
AROCLOR 1232:	ND<0.1	0.1	
AROCLOR 1242:	ND<0.1	0.1	
AROCLOR 1248:	ND<0.1	0.1	
AROCLOR 1254:	ND<0.1	0.1	
AROCLOR 1260:	ND<0.1	0.1	

Definitions:

ND = Not Detected

RPD = Relative Percent Difference

RL = Reporting Limit

ug/L = Parts per billion (ppb)

QC File No. 90885

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DIESEL RANGE ORGANICS by
Diesel range quantitated as

Chronology

Identification	Sampled	Receive
6219-01	12/30/94	01/04/9
6219-02	12/30/94	01/04/9
6219-03	12/30/94	01/04/9
6219-04	12/30/94	01/04/9
6219-05	12/30/94	01/04/9
6219-06	12/30/94	01/04/9
6219-07	12/30/94	01/04/9
6219-08	12/30/94	01/04/9
6219-09	12/30/94	01/04/9
6219-10	12/30/94	01/04/9

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DIESEL RANGE ORGANICS by

Laboratory Number	Sample Iden
-------------------	-------------

90885- 1	6219-01
90885- 2	6219-02
90885- 3	6219-03
90885- 4	6219-04
90885- 5	6219-05
90885- 6	6219-06
90885- 7	6219-07
90885- 8	6219-08
90885- 9	6219-09
90885-10	6219-10

RESULTS O

Laboratory Number: 90885- 1 908

Diesel: ND<100 N

Concentration: ug/L u

-- Surrogate % Recoveries --

Tetracosane Recovery: 84 1

Laboratory Number: 90885- 6 908

Diesel: ND<100 N

Concentration: ug/L u

-- Surrogate % Recoveries --

Tetracosane Recovery: 91 6

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DIESEL RANGE ORGANICS by Quality Assurance an

Laboratory :

Compound	Method	
	Blank (ug/L)	RL (ug/L)
Diesel:	ND<100	100

Definitions:

ND = Not Detected

RPD = Relative Percent Difference

RL = Reporting Limit

ug/L = Parts per billion (ppb)

QC File No. 90885

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HALOGENATED VOLATILE ORGANICS

Chronology

Identification	Sampled	Receive
6219-03	12/30/94	01/04/9
6219-04	12/30/94	01/04/9
6219-05	12/30/94	01/04/9
6219-08	12/30/94	01/04/9
6219-09	12/30/94	01/04/9
6219-10	12/30/94	01/04/9

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HALOGENATED VOLATILE ORGANICS]

Laboratory Number Sample Ident

90885- 3	6219-03
90885- 4	6219-04
90885- 5	6219-05
90885- 8	6219-087
90885- 9	6219-09

RESULTS OF

Laboratory Number: 90885- 3 90885- 4

Chloromethane/Vinyl Ch:	ND<1	N
Bromomethane:	ND<0.5	N
Chloroethane:	ND<0.5	N
Trichlorofluoromethane:	ND<0.5	N
1,1-Dichloroethene:	ND<0.5	N
Dichloromethane:	ND<0.5	N
t-1,2-Dichloroethene:	ND<0.5	N
1,1-Dichloroethane:	ND<0.5	N
c-1,2-Dichloroethene:	ND<0.5	N
Chloroform:	ND<0.5	N
1,1,1-Trichloroethane:	ND<0.5	N
Carbon tetrachloride:	ND<0.5	N
1,2-Dichloroethane:	ND<0.5	N
Trichloroethene:	ND<0.5	N
c-1,3-Dichloropropene:	ND<0.5	N
1,2-Dichloropropane:	ND<0.5	N
t-1,3-Dichloropropene:	ND<0.5	N
Bromodichloromethane:	ND<0.5	N
1,1,2-Trichloroethane:	ND<0.5	N
Tetrachloroethene:	ND<0.5	N
Dibromochloromethane:	ND<0.5	N
Chlorobenzene:	ND<0.5	N
Bromoform:	ND<0.5	N
1,1,2,2-Tetrachloroeth:	ND<0.5	N
1,3-Dichlorobenzene:	ND<0.5	N
1,2-Dichlorobenzene:	ND<0.5	N
1,4-Dichlorobenzene:	ND<0.5	N

Concentration: ug/L ug/L

Surrogate Recovery: 111% 1%

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HALOGENATED VOLATILE ORGANICS

Laboratory Number Sample Iden

90885-10 6219-10

RESULTS O

Laboratory Number: 90885-10

Chloromethane/Vinyl Ch:ND<1
Bromomethane: ND<0.5
Chloroethane: ND<0.5
Trichlorofluoromethane:ND<0.5
1,1-Dichloroethene: ND<0.5
Dichloromethane: ND<0.5
t-1,2-Dichloroethene: ND<0.5
1,1-Dichloroethane: 36
c-1,2-Dichloroethene: 12
Chloroform: ND<0.5
1,1,1-Trichloroethane: 40
Carbon tetrachloride: ND<0.5
1,2-Dichloroethane: ND<0.5
Trichloroethene: 37
c-1,3-Dichloropropene: ND<0.5
1,2-Dichloropropane: ND<0.5
t-1,3-Dichloropropene: ND<0.5
Bromodichloromethane: ND<0.5
1,1,2-Trichloroethane: ND<0.5
Tetrachloroethene: ND<0.5
Dibromochloromethane: ND<0.5
Chlorobenzene: ND<0.5
Bromoform: ND<0.5
1,1,2,2-Tetrachloroeth:ND<0.5
1,3-Dichlorobenzene: ND<0.5
1,2-Dichlorobenzene: ND<0.5
1,4-Dichlorobenzene: ND<0.5

Concentration: ug/L

Surrogate Recovery: 106%

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Superior Precision A

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HALOGENATED VOLATILE ORGANICS Quality Assurance and

Laboratory

Compound	Method	
	Blank	RL
	(ug/L)	(ug/L)
Chloromethane/Vinyl Ch:	ND<1	1
Bromomethane:	ND<0.5	0.5
Chloroethane:	ND<0.5	0.5
Trichlorofluoromethane:	ND<0.5	0.5
1,1-Dichloroethene:	ND<0.5	0.5
Dichloromethane:	ND<0.5	0.5
t-1,2-Dichloroethene:	ND<0.5	0.5
1,1-Dichloroethane:	ND<0.5	0.5
c-1,2-Dichloroethene:	ND<0.5	0.5
Chloroform:	ND<0.5	0.5
1,1,1-Trichloroethane:	ND<0.5	0.5
Carbon tetrachloride:	ND<0.5	0.5
1,2-Dichloroethane:	ND<0.5	0.5
Trichloroethene:	ND<0.5	0.5
c-1,3-Dichloropropene:	ND<0.5	0.5
1,2-Dichloropropane:	ND<0.5	0.5
t-1,3-Dichloropropene:	ND<0.5	0.5
Bromodichloromethane:	ND<0.5	0.5
1,1,2-Trichloroethane:	ND<0.5	0.5
Tetrachloroethene:	ND<0.5	0.5
Dibromochloromethane:	ND<0.5	0.5
Chlorobenzene:	ND<0.5	0.5
Bromoform:	ND<0.5	0.5
1,1,2,2-Tetrachloroeth:	ND<0.5	0.5
1,3-Dichlorobenzene:	ND<0.5	0.5
1,2-Dichlorobenzene:	ND<0.5	0.5
1,4-Dichlorobenzene:	ND<0.5	0.5
Freon 113:		
Definitions:		
ND = Not Detected		
RPD = Relative Percent Difference		
RL = Reporting Limit		
ug/L = Parts per billion (ppb)		
QC File No. 90885		

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Superior Precision A

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ENVIRONMENTAL MANAGEMENT INC
Attn: STAN DOLLOFF

VOLATILE PETROL
Sample preparation by Purge and Trap
analysis by SW-846 method 8015 modified
compounds between C6 and C10. Benzene
analyses by EPA S

Chronology

Identification	Sampled	Received
6219-01	12/03/94	01/04/94
6219-02	12/03/94	01/04/94
6219-03	12/03/94	01/04/94
6219-04	12/03/94	01/04/94
6219-05	12/03/94	01/04/94
6219-06	12/03/94	01/04/94
6219-07	12/03/94	01/04/94
6219-08	12/03/94	01/04/94
6219-09	12/03/94	01/04/94
6219-10	12/03/94	01/04/94

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Superior Precision A

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ENVIRONMENTAL MANAGEMENT INC
Attn: STAN DOLLOFF

VOLATILE PETROLEUM

Laboratory Number Sample Iden

90885- 1	6219-01
90885- 2	6219-02
90885- 3	6219-03
90885- 4	6219-04
90885- 5	6219-05
90885- 6	6219-06
90885- 7	6219-07
90885- 8	6219-08
90885- 9	6219-09
90885-10	6219-10

RESULTS OF

Laboratory Number: 90885- 1 90885- 1

Gasoline:	ND<50	9:
Benzene:	12	7:
Toluene:	1	1
Ethyl Benzene:	ND<0.5	NI
Total Xylenes:	ND<0.5	0

Concentration: ug/L ug

-- Surrogate % Recoveries --
Trifluorotoluene (SS): 103 1:

Laboratory Number: 90885- 6 90885- 6

Gasoline:	ND<50	NI
Benzene:	ND<0.5	NI
Toluene:	0.8	0
Ethyl Benzene:	ND<0.5	NI
Total Xylenes:	ND<0.5	NI

Concentration: ug/L ug

-- Surrogate % Recoveries --
Trifluorotoluene (SS): 102 1:

Page : 1



Superior Precision A

825 Arnold Drive, Suite 114 • Martinez, California

VOLATILE PETROLI Quality Assurance and

Laboratory 1

Compound	Method	Blank (ug/L)	RL (ug/L)
Gasoline:	ND<50	50	
Benzene:	ND<0.5	0.5	
Toluene:	ND<0.5	0.5	
Ethyl Benzene:	ND<0.5	0.5	
Total Xylenes:	ND<0.5	0.5	

Definitions:

ND = Not Detected

RPD = Relative Percent Difference

RL = Reporting Limit

ug/L = Parts per billion (ppb)

QC File No. 90885



Superior Precision A

825 Arnold Drive, Suite 114 • Martinez, California

ENVIRONMENTAL MANAGEMENT INC
Attn: STAN DOLLOFF

TOTAL RECOVERABLE HYDROC

Chronology

Identification	Sampled	Receive
6219-03	12/30/94	01/04/9
6219-04	12/30/94	01/04/9
6219-05	12/30/94	01/04/9
6219-08	12/30/94	01/04/9
6219-09	12/30/94	01/04/9
6219-10	12/30/94	01/04/9

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ENVIRONMENTAL MANAGEMENT INC
Attn: STAN DOLLOFF

TOTAL RECOVERABLE HYDROCARBONS

Laboratory Number Sample Ident.

90885- 3	6219-03
90885- 4	6219-04
90885- 5	6219-05
90885- 8	6219-08
90885- 9	6219-09
90885-10	6219-10

RESULTS OF

Laboratory Number: 90885- 3 90885-10

PETROLEUM HYDROCARBONS:ND<1 ND

Concentration: mg/L mg/L

Laboratory Number: 90885-10

PETROLEUM HYDROCARBONS:ND<1

Concentration: mg/L

Page



Superior Precision A

825 Arnold Drive, Suite 114 • Martinez, California

TOTAL RECOVERABLE HYDROCARBONS Quality Assurance and

Laboratory

Compound	Method	
	Blank	RL
	(mg/L)	(mg/L)
PETROLEUM HYDROCARBONS:	ND<1	1

Definitions:

ND = Not Detected

RPD = Relative Percent Difference

RL = Reporting Limit

mg/L = Parts per million (ppm)

QC File No. 90885

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ENVIRONMENTAL MANAGEMENT INC
Attn: STAN DOLLOFF

**ANALYSIS FOR ARSENIC,
by EPA Method SW-84**

Chronology

Identification	Sampled	Receive
6219-03	12/03/94	01/04/9
6219-04	12/03/94	01/04/9
6219-05	12/03/94	01/04/9
6219-08	12/03/94	01/04/9
6219-09	12/03/94	01/04/9
6219-10	12/03/94	01/04/9

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Attn: STAN DOLLOFF

ANALYSIS FOR ARSENIC,

Laboratory Number	Sample Iden
-------------------	-------------

90885- 3	6219-03
90885- 4	6219-04
90885- 5	6219-05
90885- 8	6219-08
90885- 9	6219-09
90885-10	6219-10

RESULTS O

Laboratory Number: 90885- 3 908

Arsenic	(As) :	0.01	0
Cadmium	(Cd) :	ND<0.01	N
Chromium	(Cr) :	ND<0.05	N
Lead	(Pb) :	ND<0.1	N

Concentration: mg/L m

Laboratory Number: 90885-10

Arsenic	(As) :	0.04	
Cadmium	(Cd) :	ND<0.01	
Chromium	(Cr) :	ND<0.05	
Lead	(Pb) :	ND<0.1	

Concentration: mg/L

Page :

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825 Arnold Drive, Suite 114 • Martinez, California

**ANALYSIS FOR ARSENIC,
Quality Assurance an**

Laboratory

Compound	Method	Blank (mg/L)	RL (mg/L)
Arsenic	(As) :	ND<0.01	0.0
Cadmium	(Cd) :	ND<0.01	0.0
Chromium	(Cr) :	ND<0.05	0.0
Lead	(Pb) :	ND<0.1	0.1

Definitions:

ND = Not Detected

RPD = Relative Percent Difference

RL = Reporting Limit

mg/L = Parts per million (ppm)

QC File No. 90885

Page

Certified Lab

3	6219-03	w	x	x	y	x	x	y	x	12-30	11am	10	yes
4	6219-04	w	x	x	y	x	x	y	x	12-30	11:20am	10	yes
5	6219-05	w	x	x	y	x	x	y	x	12-30	11:40am	10	yes
6	6219-06	w	x	x	y	x	x	y	x	12-30	2pm	4	yes
7	6219-07	w	x	x	y	x	x	y	x	12-30	2:23pm	4	yes
8	6219-08	w	x	x	y	x	x	y	x	12-30	2:59pm	10	yes
9	6219-09	w	x	x	y	x	x	y	x	12-30	4:05pm	10	yes
10	6219-10	w	x	x	y	x	x	y	x	12-30	3:30pm	10	yes
11													
12													
Relinquished By:	<u>Steve Miller</u>	Date/Time	Received By:	<u>SJL</u>	Date/Time	Lab: Please initial the following:	<u>SJL</u>						
Organization:	<u>FBI</u>	Organization:	<u>Subject</u>		Organization:	Samples Stored in Ice:	<u>✓</u>						
Relinquished By:		Date/Time	Received By:	<u>JM</u>	Date/Time	Appropriate Containers:	<u>✓</u>						
Organization:			Organization:			Samples Preserved:	<u>✓</u>						
Relinquished By:		Date/Time	Received By:		Date/Time	VOCs without headspace:	<u>No</u>						
Organization:						Comments:	<u>OK</u>						

PURCHASE

Environmental Management, Inc., 700 E. 6th Street, Suite 1000, Austin, TX 78701

TO:

Superior Precision Analytical

	QTY	
	10	DRPH 8100M @ \$85/ea
	10	GRPH/BTEX 5030/180151
	6	TPH 418.1 @ \$45/ea
	6	VCS 5030/1601 @ \$75/ea
	6	PCB's 8080 @ \$75/ea
	6	Arsenic 3020/7060 @
	6	Cadmium/Chromium 3010
	6	Lend 3020/7421 €

20% ADEL deliverable

APPROVAL: