

Hydrocarbon Evaluation
East and West Fuel Farms
Snohomish County Airport
Snohomish County, Washington

February 26, 2002

RELEASE # 2730
SNOHOMISH COUNTY
AIRPORT
"PAINE FIELD"
RELEASE # 2730
EVERETT
U18T SITE # 350

Prepared For:

Snohomish County Public Works Dept.
2930 Wetmore Avenue
Everett, Washington 98201

Prepared By:

CDM

11811 NE 1st Street, Suite 201
Bellevue, Washington 98005

CDM Project No. 19947-34153-Task 1

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11811 N.E. 1st Street, Suite 201
Bellevue, Washington 98005
tel: 425 453-8383
fax: 425 646-9523

February 26, 2002

Mr. John Bails

Department of Ecology, NW Regional Office
Toxics Cleanup Program
3190 160th Avenue SE
Bellevue, Washington 98008-5452

Subject: Tank Nos. 93, 96, 97
East and West Fuel Farm
Snohomish County Airport - Paine Field
Snohomish County, Washington

Dear Mr. Bails:

This letter transmits Camp Dresser & McKee Inc.'s (CDM) evaluation of hydrocarbons at the East and West Fuel Farms located near the south end of Paine Field in Snohomish County, Washington. Tank No. 93 is at the East Fuel Farm and Tank Nos. 96 and 97 are at the West Fuel Farm. Mr. Andrew Rardin at Paine Field requested that a copy of this report be submitted to you.

Please call if you have any questions.

Very truly yours,

Pamela J. Morrill, CHMM
Project Manager
Camp Dresser & McKee Inc.

cc: Mr. Andrew Rardin, Paine Field

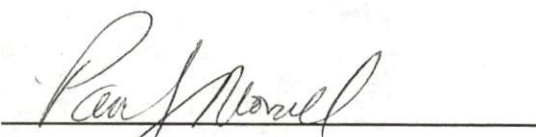
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A Report Prepared For :

Snohomish County Public Works Department
2930 Wetmore Avenue
Everett, Washington 98201

**HYDROCARBON EVALUATION
EAST AND WEST FUEL FARMS
SNOHOMISH COUNTY AIRPORT
SNOHOMISH COUNTY, WASHINGTON**

February 26, 2002



Pamela J. Morrill, CHMM
Scientist

*TANKS 93, 96, 97 NOT LISTED
@ SITE 350. TANKS ARE CLOSED.
FILED WITH RELEASE #5538.*

CDM

11811 N.E. 1st Street, Suite 201
Bellevue, Washington 98005
425/453-8383

CDM Project No. 19947-34153-Task 1

Introduction

This report presents Camp Dresser & McKee Inc.'s (CDM) evaluation of petroleum hydrocarbon contamination at the East and West Fuel Farms located at the Snohomish County Airport (SCA) in Snohomish County, Washington. Snohomish County Public Works Department (the County) retained CDM to perform this evaluation in accordance with our October 4, 2001 proposal. CDM's services were performed under Master Agreement OC02-00, Work Authorization No. 12.

Background

The East and West Fuel Farms are located east and west of Goodrich Hangar 1 at the south end of Snohomish County Airport - Paine Field as shown on **Figure 1**. Underground Storage Tanks (USTs) at both fuel farms have been emptied and cleaned. During 2000 a change in service for USTs at the West Fuel Farm was submitted to Washington State Department of Ecology. USTs at the West Fuel Farm are used by the airport fire department as "Draft Pits" for testing water pumps on fire trucks. USTs at the East Fuel Farm are inactive.

In 1994 CDM conducted a subsurface contamination assessment at both fuel farms (AGI Technologies, 1994). Subsurface soils at both fuel farms consisted of fill within the UST cavities and very dense glacial till as native soils. Hydrocarbon contamination was identified in soil at the West Fuel Farm and in both soil and perched groundwater at the East Fuel Farm. Four monitoring wells (MW1 through MW4) were installed at the East Fuel Farm.

In response to a letter submitted by Washington State Department of Ecology (Ecology) requesting information on the status of remedial actions, Andrew Rardin at SCA requested an evaluation of current conditions with respect to hydrocarbon contamination and the potential for migration

Purpose and Scope of Services

The purpose of CDM's services was to evaluate changes in hydrocarbon contamination in perched groundwater, the potential for natural attenuation, and potential contaminant migration. The scope of our services included:

- Purge and sample five existing monitoring wells at the East Fuel Farm.
- Analyze collected water samples for fuel hydrocarbons.
- Evaluate natural attenuation processes.
- Review historical data collected on the sites. Compare historical and current groundwater analytical data.
- Prepare this report documenting our findings.

Sampling and Analysis

MW1 through MW4 were purged and sampled on October 24, 2001. An additional well (DW2) at the East Fuel Farm is screened in the aquifer. DW2 was also sampled. **Figure 2** shows the well locations and **Table 1** shows the screened interval and depth to water in each well. Wells installed in the perched groundwater range from 16 to 23 feet deep and have 5 to 10 feet of screen. At the time of sampling water levels in MW2 through MW4 ranged from about 4 to 4.5 feet below ground surface (ft bgs). The water level in MW1 was deeper at 9.6 ft bgs. MW1 is screened in a different interval than MW2 through MW4, which accounts for the difference in water levels. This difference in the water level at MW1 as compared to the other three wells exemplifies the discontinuity of perched water in the general area. DW2 is 147 feet deep with the water level at about 134 ft bgs.

The water in each well was purged until pH, specific conductivity, and temperature were stable or the well bailed dry. MW1 through MW4 were purged and sampled using disposable bailers. MW1 bailed dry and water levels in MW2 through MW4 dropped substantially (below the top of the screen) during purging. DW1 was purged and sampled using a Grundfos submersible pump. The water level in DW1 did not drop significantly during purging and sampling. Groundwater samples from each well were collected in 40-milliliter VOA vials and 1-liter amber glass bottles containing hydrochloric acid as a preservative. The samples were stored in a chilled cooler and transported directly to the CCI Analytical laboratory in Everett, Washington under chain-of-custody protocol.

The samples were analyzed for volatile and semivolatile petroleum hydrocarbons by Northwest Methods NWTPH-Gx and NWTPH-Dx, respectively, and for benzene, ethylbenzene, toluene, and xylenes (BETX) by EPA method 8021. Copies of the laboratory's analytical reports are included in the Appendix to this report.

Analytical Results

Analytical results for groundwater samples collected during this study are summarized in **Table 2** and compared against hydrocarbon analytical data from April 1994 and the State of Washington Model Toxics Control Act (MTCA) Method A cleanup levels. Petroleum hydrocarbons in the 1994 samples were analyzed by EPA method 8015 modified with quantification in the gasoline ($C_7 - C_{12}$), diesel ($C_{12} - C_{24}$), oil ($C_{22} - C_{34}$), and Jet A fuel ($C_7 - C_{22}$) ranges. The current analytical methods quantify two ranges of hydrocarbons: volatile ($C_8 - C_{12}$) and semivolatile ($C_{12} - C_{34}$). Thus, the comparison between historical and current analytical data is not direct.

Petroleum hydrocarbons were not detected in the aquifer well DW2, but were detected in MW1 through MW4. The chromatograms were reviewed and the profiles indicate that there are two different types of hydrocarbons present. Volatile, or gasoline-range, hydrocarbons were detected in MW2 and MW4 and semivolatile hydrocarbons were detected in all four shallow wells. The semivolatile hydrocarbons

are a very weathered diesel or similar product, but do not appear to be Jet A fuel. During the 1994 sampling, gasoline and/or Jet A fuel were identified in all four shallow wells, but not diesel or oil range hydrocarbons. The chromatograms of these earlier samples were reviewed, but the scale was so large that no pattern could be deciphered; thus they could not be compared to the current sample chromatograms.

What is evident is a significant decrease in total petroleum hydrocarbon (TPH) concentrations for all four monitoring wells, especially MW1 through MW3. Both volatile and semivolatile TPH concentrations in these three monitoring wells are less than current MTCA Method A cleanup levels. Previously, TPH concentrations exceeded cleanup levels in these three wells. TPH concentrations do not appear to have declined as much in MW4 as the other wells. However, it should be noted that CDM sampled these wells for another project in 1999 (see below), and at that time the water in MW4 exhibited a strong petroleum odor and sheen. During the current sampling round, the water had no sheen or obvious hydrocarbon odor.

BETX concentrations in these wells do not show the same overall decline as observed for TPH. Benzene concentrations are essentially the same as they were in 1994. In MW2, ethylbenzene, toluene, and total xylene concentrations are significantly lower than those observed in 1994. Concentrations of ethylbenzene, toluene, and xylenes in the remaining wells appear essentially unchanged; however, elevated detection limits for the 2001 sampling round hinders direct comparison.

Discussion of Natural Attenuation Processes

CDM did not conduct a formal study of natural attenuation processes at this site. However, existing data on wells MW1 through MW4 indicate contaminants are being biodegraded. In 1996 and 1999, MW1 through MW4 were sampled and analyzed for volatile organic compounds (VOCs) as a part of an investigation of the neighboring facility referred to as All Fab (former). Various chlorinated aliphatic hydrocarbons (CAHs)—including trichloroethene (TCE), cis-1,2-dichloroethene (cis-1,2-DCE), and vinyl chloride (VC)—were detected in all four wells as summarized in Table 3. Previously, CDM reviewed the general history of chlorinated solvent use by All Fab. Results of that investigation determined that the TCE and 1,1,1-trichloroethane (1,1,1-TCA) were the only chlorinated solvents likely to have been used at the site and that the CAHs are likely to be degradation, or “daughter,” products of TCE (CDM, 2000).

Biodegradation Pathways

The method in which specific chemical contaminants are biologically transformed varies. Some contaminants are transformed by both anaerobic and aerobic processes, while others will degrade strictly by one process or the other. Further complicating the process, some contaminants degrade in a stepwise fashion via different mechanisms. The East Fuel Farm contains petroleum hydrocarbons and chlorinated

solvents, which follow divergent degradation pathways. The following sections discuss the degradation mechanisms of these compounds.

Petroleum Hydrocarbons

Petroleum hydrocarbons biodegrade in virtually all soil and groundwater systems. In most subsurface environments, both aerobic and anaerobic degradation of fuel hydrocarbons can occur, often simultaneously in different parts of the plume (Weidemeier et al., 1998). However, because aerobic metabolism is the most energetically favorable, this is the fastest and most efficient method of hydrocarbon degradation. Anaerobic degradation processes were originally thought to be too slow to be of significance in groundwater. It is now generally accepted that this is not the case. An exception to this is the aromatic hydrocarbons, BETX. Although anaerobic biodegradation of aromatic hydrocarbons has been reported, it is uncommon and slow relative to aerobic biodegradation (Wrenn, 1998).

Chlorinated Compounds

Highly chlorinated compounds such as tetrachloroethene (PCE), TCE, and 1,1,1-TCA can be transformed by biological and abiotic processes to form a variety of other CAHs. These include chloroform, methylene chloride, *cis*-1,2-DCE, *trans*-1,2-DCE, 1,1-DCE, VC, 1,1-dichloroethane, and chloroethane. Contrary to the petroleum hydrocarbons, reductive dechlorination is the most common method by which chlorinated VOCs are biologically transformed. **Figure 3** shows the reductive dechlorination sequences of the chlorinated ethenes and ethanes.

The major environmental requirement for anaerobic reductive transformation of CAHs is the presence of sufficient concentrations of other organics that serve as electron donors for energy metabolism (McCarty, 1997). Unfortunately, direct dechlorinators must compete for available H_2 with the hydrogenotrophic methanogens and sulfate reducers (Gossett and Zinder, 1997). Consequently, systems contaminated with petroleum hydrocarbons tend to be more conducive toward degradation of CAHs.

Conclusions

Based on the variety and relatively high concentrations of the degradation products of TCE in groundwater at the East Fuel Farm, reductive dechlorination is actively occurring. These processes are likely being assisted by the presence of fuel hydrocarbons. TPH concentrations have declined significantly over the past years. The exception to this appears to be BETX— most notably benzene. Given the reducing conditions at the site, this would be expected. BETX are not expected to degrade substantially until the other hydrocarbons are depleted and the system becomes more aerobic.

The lateral migration of contamination in perched groundwater at the East Fuel Farm will be limited by: 1) natural biodegradation processes that are currently occurring, 2)

the density of the till soils at SCA, and 3) the discontinuous nature of the perched water. Further, chemical analysis of the water in the aquifer shows that hydrocarbon contamination has not migrated vertically to the aquifer and density of the till soils.

Hydrocarbons at the West Fuel Farm are also expected to naturally attenuate at a very slow rate. Contaminant migration beyond the current locations will be very limited due to the lack of groundwater at this facility.

Based on our review of current and historical data, petroleum hydrocarbon contamination at the East and West Fuel Farms does not pose an imminent threat to human health and the environment.

Limitations

This report was prepared for the exclusive use of Snohomish County Public Works Department and SCA for this project only. The analyses, conclusions, and recommendations in this report are based on conditions encountered at the time of our field investigation, information you provided, and our experience and engineering judgment. CDM cannot be responsible for interpretation by others of the data contained herein.

Our work has been performed in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing under similar conditions in the area. No other warranty, express or implied, is made.

References

AGI Technologies (now CDM). 1994. Final Report, Contamination Assessment, Paine Field Fuel Farms and Old Mike Soil Stockpile, Snohomish County Airport, Snohomish County, Washington. Prepared for Snohomish County Public Works Department. Project No. 15,512.206. August 12.

CDM. 2000. Aquifer Investigation, All Fab (Former), Snohomish County Airport, Everett, Washington. Prepared for Snohomish County Public Works Department. Project No. 19947-29702-15512334.

Gossett, James M. and Stephen H. Zinder. 1997. Microbiological Aspects Relevant to Natural Attenuation of Chlorinated Ethenes. In Proceedings of the Symposium on Natural Attenuation of Chlorinated Organics in Ground Water. EPA/540/R-97/504. May 1997.

McCarty, Perry L. 1997. Biotic and Abiotic Transformations of Chlorinated Solvents in Ground Water. In Proceedings of the Symposium on Natural Attenuation of Chlorinated Organics in Ground Water. EPA/540/R-97/504. May 1997.

Wiedemeier, Todd H., Matthew A. Swanson, David E. Moutoux, and E. Kinzie Gordon of Parsons Engineering Science, Inc.; John T. Wilson, Barbara H. Wilson, and

Donald H. Kampbell of the U.S. Environmental Protection Agency, National Risk Management Research Laboratory; Patrick Haas, Ross N. Miller, and Jerry E. Hansen of U.S. Air Force Center for Environmental Excellence, Technology Transfer Division; and Francis H. Chapelle, United States Geological Survey. 1998. Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Ground Water. EPA/600/R-98/128. September 1998.

Wrenn, Brian. 1998. Biodegradation of Aromatic Hydrocarbons. April 21, 1998.
<http://www.glue.umed.edu>

Distribution

1 Copy

Snohomish County Public Works Department
2930 Wetmore Avenue
Everett, Washington 98201

Attention: Mr. Dale Topham, P.E.

2 Copies

Paine Field
3220 100th Street S.W.
Everett, Washington 98204-1390

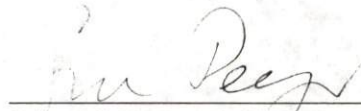
Attention: Mr. Andrew Rardin

1 Copy

Department of Ecology, NW Regional Office
Toxics Cleanup Program
3190 160th Avenue SE
Bellevue, Washington 98008-5452

Attention: Mr. John Bails

Quality Assurance / Technical Review by:



Susan J. Penoyar, P.E.
Principal

Tables

Tables

Table 1
Static Groundwater Level Data Summary
 Snohomish County Public Works Department/SCA
 Everett, Washington

Well I.D.	Total Boring Depth (ft bgs)	Depth of Screened Interval (ft bgs)	Date Measured	Depth to Water (ft TOC)	Top of Casing Elevation (ft)	Water Surface Elevation (ft)
MW1	25.5	14.5 - 24.5	04/22/94	11.90	99.12	87.22
			10/24/01	9.58		89.54
MW2	23.0	12 - 17	04/22/94	4.97	98.69	93.72
			10/24/01	4.52		94.17
MW3	24.0	12.5 - 17.5	04/22/94	4.78	98.69	93.91
			10/24/01	4.16		94.53
MW4	17.5	7 - 17	04/22/94	4.39	99.08	94.69
			10/24/01	4.05		95.03
DW2	147	137 - 147	10/24/01	134.39	--	--

Notes:

- a) Top of casing elevations relative to an arbitrary benchmark with an arbitrary datum of 100.00 feet.
 ft bgs - feet below ground surface.
 ft TOC - feet below top of casing.

Table 2

Analytical Summary - Hydrocarbons in Groundwater

Snohomish County Public Works Department/SCA

Snohomish County, Washington

Well I.D.		Date Sampled		EPA Test Method							
				8015 Modified/NWTPH ^a				8020/8021 ^b			
				Gasoline/ TPH-Volatile	Diesel/ TPH-Semivolatile	Oil	Jet A	Benzene	Ethylbenzene	Toluene	Total Xylenes
µg/L											
Shallow Wells											
MW1	04/27/94	1,000	<1,000	<20,000	<1,000	7.8	2	3.7	1.8		
	10/24/01	<50	320			33	<10	<10	<30		
MW2	04/27/94	2,000	<1,000	<20,000	1,000	13	88	47	470		
	10/24/01	55	150			12	5	2	4		
MW3	04/27/94	<1,000	<1,000	<20,000	1,300	65	0.6	3.2	1.8		
	10/24/01	<50	380			42	<10	<10	<30		
MW4	04/27/94	2,000	<1,000	<20,000	1,100	130	75	8.7	80		
	10/24/01	1,100	990			160	96	<10	<130		
Deep Well											
DW2	10/24/01	<50	<130			<1	<1	<1	<3		
Cleanup Level ^c											
		800	500		500	5	700	1,000	1,000		

Notes:

Shaded value indicates concentration exceeds Method A cleanup level.

The 2001 testing used Northwest test methods NWTPH-Gx and NWTPH-Dx to quantify hydrocarbons in the volatile and semivolatile range.

a) Earlier testing used method EPA 8015 Modified to quantify hydrocarbons as gasoline, diesel, oil, and Jet A fuel.

b) EPA Test Method 8020 is an earlier method. EPA Method 8021 is a revised method of EPA Method 8020.

c) Washington Administrative Code Chapter 173-340 Model Toxics Control Act Cleanup Regulation Method A cleanup level for groundwater.

µg/L - micrograms per liter.

Table 3
Analytical Summary - Chlorinated VOCs in Perched Groundwater
 Snohomish County Public Works Department/SCA
 Everett, Washington

Well I.D.	Date Sampled	Tetra-chloroethene (PCE)	Trichloroethene (TCE)	<i>cis</i> -1,2-Dichloroethene (<i>cis</i> -1,2-DCE)	<i>trans</i> -1,2-Dichloroethene (<i>trans</i> -1,2-DCE)	1,1-Dichloroethene (1,1-DCE)	Vinyl Chloride (VC)	1,2-Dichloroethane (1,2-DCA)	Chloroethane (Ethylchloride)
		µg/L							
MW1	05/07/96	--	1,490	3,730	189	--	(80 ND)	--	--
	02/24/99	ND	4,400	6,700	460	34	85	ND	ND
MW2	05/07/96	--	33.9	301	(8 ND)	--	131	--	--
	02/24/99	ND	79	2,600	50	9	920	8	ND
MW3	02/24/99	ND	7,900	9,400	530	120	440	180	ND
MW4	02/24/99	ND	19	83	58	ND	1,100	ND	ND
Detection Limit		4	5	5	5	5	5	5	5
Cleanup Level ^a		5	5				0.2	5	

Notes:

Shaded value indicates concentration exceeds Method A cleanup level.

Data from CDM, 2000, Aquifer Investigation, All Fab (Former) Snohomish County Airport.

a) Washington Administrative Code Chapter 173-340 Model Toxics Control Act Cleanup Regulation Method A cleanup level for groundwater.

NA - not analyzed.

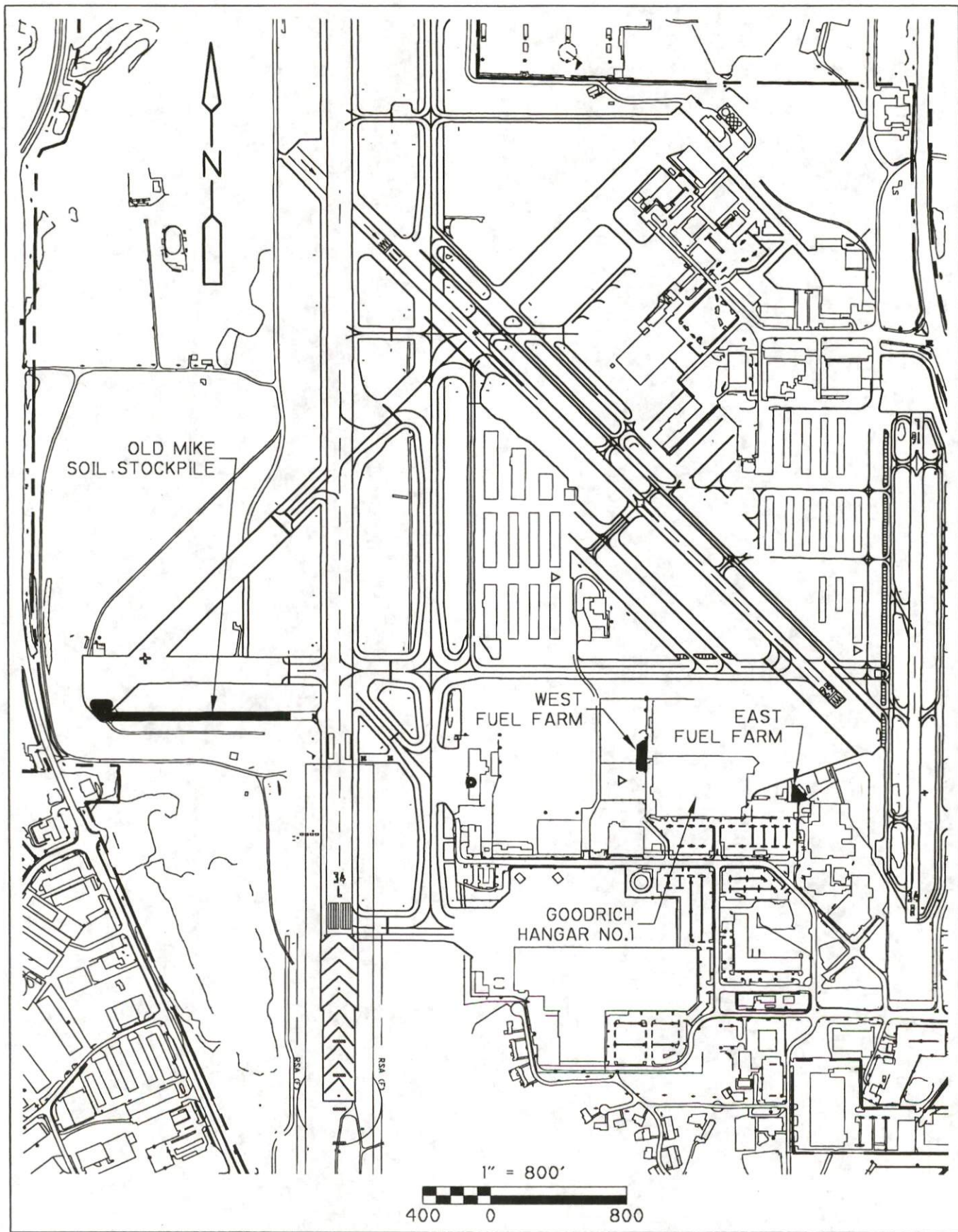
ND - not detected.

-- not reported (presumably analyzed and not detected, but detection limit not reported).

µg/L - microgram per liter.

Figures

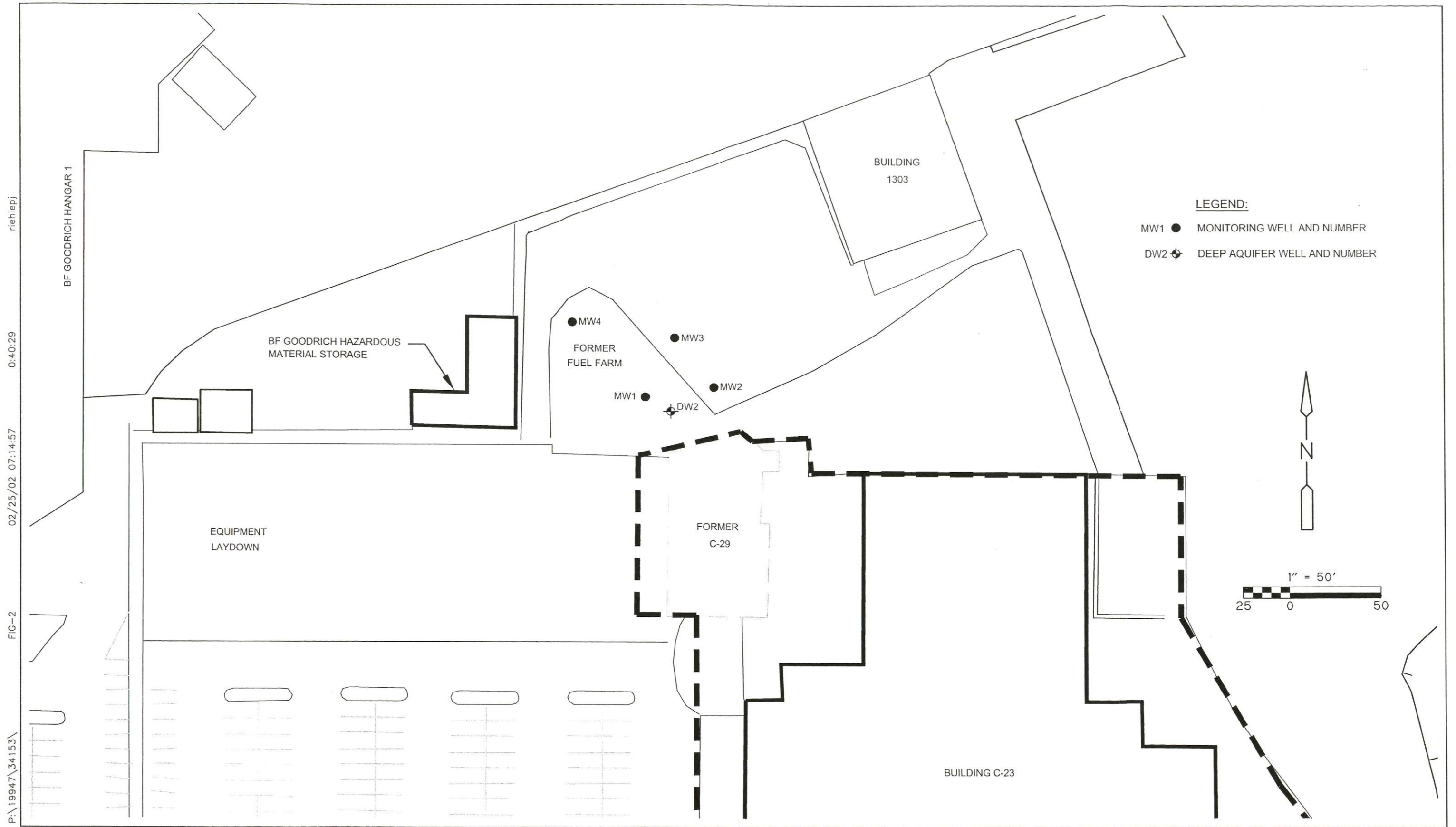
Figures



SNOHOMISH COUNTY PUBLIC WORKS DEPT. / SCA
SNOHOMISH COUNTY, WASHINGTON

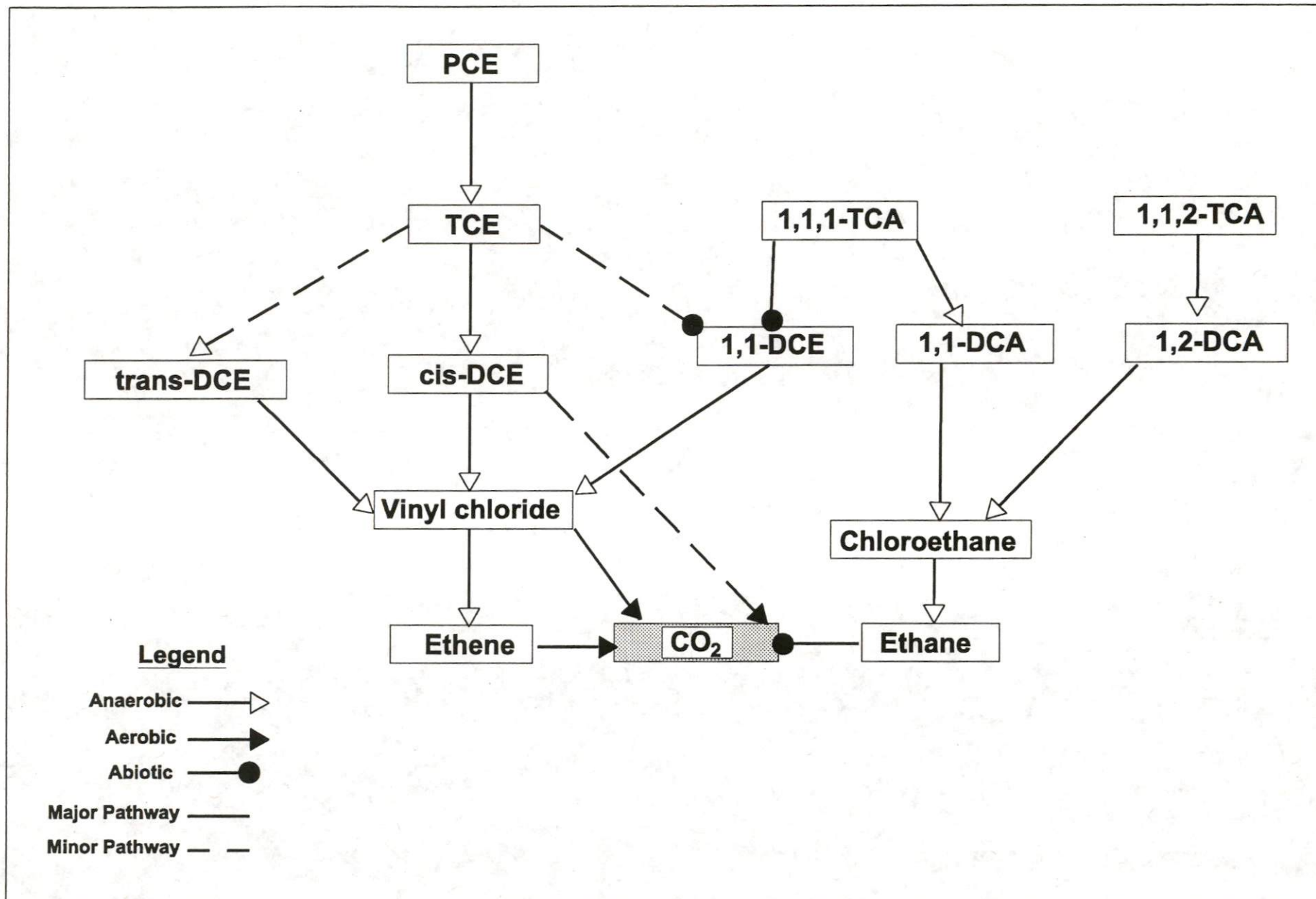
CDM Camp Dresser & McKee

Figure No. 1
Vicinity Map



SNOHOMISH COUNTY PUBLIC WORKS DEPT. / SCA
SNOHOMISH COUNTY, WASHINGTON

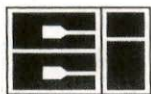
Figure No. 2
Monitoring Well Locations - East Fuel Farm



SNOHOMISH COUNTY PUBLIC WORKS DEPT. / SCA
SNOHOMISH COUNTY, WASHINGTON

Figure No. 3
Biodegradation Pathways of Chlorinated Compounds

Attachments



CCI
ANALYTICAL
LABORATORIES, INC.

CERTIFICATE OF ANALYSIS

CLIENT: CAMP DRESSER & MCKEE INC.
11811 N.E. FIRST ST., SUITE 201
BELLEVUE, WA 98005

DATE: 10/31/01
CCIL JOB #: 110108
CCIL SAMPLE #: 1
DATE RECEIVED: 10/24/01
WDOE ACCREDITATION #: C142

CLIENT CONTACT: PAM MORRILL

CLIENT PROJECT ID: EAST FUEL FARM 19947-34153-TASK1
CLIENT SAMPLE ID: MW1-10/01 10/24/01 1400

DATA RESULTS

ANALYTE	METHOD	RESULTS*	UNITS**	ANALYSIS DATE	ANALYSIS BY
TPH-VOLATILE RANGE	NWTPH-GX	ND	UG/L	10/25/01	LAH
MTBE***	EPA-8021	ND(<10)	UG/L	7/10/01	LAH
BENZENE	EPA-8021	33	UG/L	10/29/01	LAH
TOLUENE	EPA-8021	ND(<10)	UG/L	10/29/01	LAH
ETHYLBENZENE	EPA-8021	ND(<10)	UG/L	10/29/01	LAH
XYLENES	EPA-8021	ND(<30)	UG/L	10/29/01	LAH
TPH-SEMIVOLATILE RANGE	NWTPH-DX	320	UG/L	10/28/01	MHR

NOTE: CHROMATOGRAM INDICATES SAMPLE CONTAINS PRODUCT WHICH IS LIKELY DIESEL

* "ND" INDICATES ANALYTE NOT DETECTED AT LEVEL ABOVE REPORTING LIMIT. REPORTING LIMIT IS GIVEN IN PARENTHESES

GASOLINE(VOLATILE RANGE) REPORTING LIMIT IS 50 UG/L

DIESEL RANGE REPORTING LIMIT IS 130 UG/L

LUBE OIL RANGE REPORTING LIMIT IS 250 UG/L

** UNITS FOR ALL NON LIQUID SAMPLES ARE REPORTED ON A DRY WEIGHT BASIS

*** ANY POSITIVE MTBE RESULT SHOULD BE CONFIRMED BY GC/MS ANALYSIS

APPROVED BY: 



CERTIFICATE OF ANALYSIS

CLIENT: CAMP DRESSER & MCKEE INC.
11811 N.E. FIRST ST., SUITE 201
BELLEVUE, WA 98005

DATE: 10/31/01
CCIL JOB #: 110108
CCIL SAMPLE #: 2
DATE RECEIVED: 10/24/01
WDOE ACCREDITATION #: C142

CLIENT CONTACT: PAM MORRILL

CLIENT PROJECT ID: EAST FUEL FARM 19947-34153-TASK1
CLIENT SAMPLE ID: MW2-10/01 10/24/01 1340

DATA RESULTS

ANALYTE	METHOD	RESULTS*	UNITS**	ANALYSIS DATE	ANALYSIS BY
TPH-VOLATILE RANGE	NWTPH-GX	55	UG/L	10/29/01	LAH
MTBE***	EPA-8021	ND(<1)	UG/L	7/10/01	LAH
BENZENE	EPA-8021	12	UG/L	10/29/01	LAH
TOLUENE	EPA-8021	2	UG/L	10/29/01	LAH
ETHYLBENZENE	EPA-8021	5	UG/L	10/29/01	LAH
XYLENES	EPA-8021	4	UG/L	10/29/01	LAH
TPH-SEMIVOLATILE RANGE	NWTPH-DX	150	UG/L	10/28/01	MHR

NOTE: CHROMATOGRAM INDICATES SAMPLE CONTAINS HIGHLY WEATHERED GASOLINE AND UNIDENTIFIED DIESEL RANGE PRODUCT

* "ND" INDICATES ANALYTE NOT DETECTED AT LEVEL ABOVE REPORTING LIMIT. REPORTING LIMIT IS GIVEN IN PARENTHESES

GASOLINE(VOLATILE RANGE) REPORTING LIMIT IS 50 UG/L

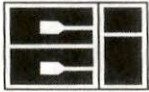
DIESEL RANGE REPORTING LIMIT IS 130 UG/L

LUBE OIL RANGE REPORTING LIMIT IS 250 UG/L

** UNITS FOR ALL NON LIQUID SAMPLES ARE REPORTED ON A DRY WEIGHT BASIS

*** ANY POSITIVE MTBE RESULT SHOULD BE CONFIRMED BY GC/MS ANALYSIS

APPROVED BY: 



CCI
ANALYTICAL
LABORATORIES, INC.

CERTIFICATE OF ANALYSIS

CLIENT: CAMP DRESSER & MCKEE INC.
11811 N.E. FIRST ST., SUITE 201
BELLEVUE, WA 98005

DATE: 10/31/01
CCIL JOB #: 110108
CCIL SAMPLE #: 3
DATE RECEIVED: 10/24/01
WDOE ACCREDITATION #: C142

CLIENT CONTACT: PAM MORRILL

CLIENT PROJECT ID: EAST FUEL FARM 19947-34153-TASK1
CLIENT SAMPLE ID: MW3-10/01 10/24/01 1000

DATA RESULTS

ANALYTE	METHOD	RESULTS*	UNITS**	ANALYSIS DATE	ANALYSIS BY
TPH-VOLATILE RANGE	NWTPH-GX	ND	UG/L	10/25/01	LAH
MTBE***	EPA-8021	ND(<10)	UG/L	7/10/01	LAH
BENZENE	EPA-8021	42	UG/L	10/29/01	LAH
TOLUENE	EPA-8021	ND(<10)	UG/L	10/29/01	LAH
ETHYLBENZENE	EPA-8021	ND(<10)	UG/L	10/29/01	LAH
XYLENES	EPA-8021	ND(<30)	UG/L	10/29/01	LAH
TPH-SEMIVOLATILE RANGE	NWTPH-DX	380	UG/L	10/28/01	MHR

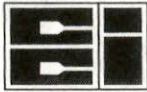
NOTE: CHROMATOGRAM INDICATES SAMPLE CONTAINS PRODUCT WHICH IS LIKELY DIESEL

* "ND" INDICATES ANALYTE NOT DETECTED AT LEVEL ABOVE REPORTING LIMIT. REPORTING LIMIT IS GIVEN IN PARENTHESES
GASOLINE(VOLATILE RANGE) REPORTING LIMIT IS 50 UG/L
DIESEL RANGE REPORTING LIMIT IS 130 UG/L
LUBE OIL RANGE REPORTING LIMIT IS 250 UG/L

** UNITS FOR ALL NON LIQUID SAMPLES ARE REPORTED ON A DRY WEIGHT BASIS

*** ANY POSITIVE MTBE RESULT SHOULD BE CONFIRMED BY GC/MS ANALYSIS

APPROVED BY: 



CCI
ANALYTICAL
LABORATORIES, INC.

CERTIFICATE OF ANALYSIS

CLIENT: CAMP DRESSER & MCKEE INC.
11811 N.E. FIRST ST., SUITE 201
BELLEVUE, WA 98005

DATE: 10/31/01
CCIL JOB #: 110108
CCIL SAMPLE #: 4
DATE RECEIVED: 10/24/01
WDOE ACCREDITATION #: C142

CLIENT CONTACT: PAM MORRILL

CLIENT PROJECT ID: EAST FUEL FARM 19947-34153-TASK1
CLIENT SAMPLE ID: MW4-10/01 10/24/01 1042

DATA RESULTS

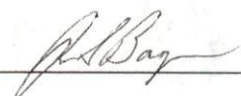
ANALYTE	METHOD	RESULTS*	UNITS**	ANALYSIS DATE	ANALYSIS BY
TPH-VOLATILE RANGE	NWTPH-GX	1100	UG/L	10/25/01	LAH
MTBE***	EPA-8021	ND(<10)	UG/L	7/10/01	LAH
BENZENE	EPA-8021	160	UG/L	10/25/01	LAH
TOLUENE	EPA-8021	ND(<10)	UG/L	10/25/01	LAH
ETHYLBENZENE	EPA-8021	96	UG/L	10/25/01	LAH
XYLENES	EPA-8021	ND(<130)	UG/L	10/25/01	LAH
TPH-SEMIVOLATILE RANGE	NWTPH-DX	990	UG/L	10/28/01	MHR

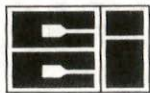
NOTES: CHROMATOGRAM INDICATES SAMPLE CONTAINS PRODUCTS WHICH ARE LIKELY WEATHERED GASOLINE AND DIESEL
DIESEL RANGE RESULT BIASED HIGH DUE TO VOLATILE RANGE OVERLAP

* "ND" INDICATES ANALYTE NOT DETECTED AT LEVEL ABOVE REPORTING LIMIT. REPORTING LIMIT IS GIVEN IN PARENTHESES
GASOLINE(VOLATILE RANGE) REPORTING LIMIT IS 500 UG/L
DIESEL RANGE REPORTING LIMIT IS 130 UG/L
LUBE OIL RANGE REPORTING LIMIT IS 250 UG/L

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CERTIFICATE OF ANALYSIS

CLIENT: CAMP DRESSER & MCKEE INC.
11811 N.E. FIRST ST., SUITE 201
BELLEVUE, WA 98005

DATE: 10/31/01
CCIL JOB #: 110108
CCIL SAMPLE #: 5
DATE RECEIVED: 10/24/01
WDOE ACCREDITATION #: C142

CLIENT CONTACT: PAM MORRILL

CLIENT PROJECT ID: EAST FUEL FARM 19947-34153-TASK1
CLIENT SAMPLE ID: DW2-10/01 10/24/01 1140

DATA RESULTS

ANALYTE	METHOD	RESULTS*	UNITS**	ANALYSIS DATE	ANALYSIS BY
TPH-VOLATILE RANGE	NWTPH-GX	ND	UG/L	10/26/01	LAH
MTBE***	EPA-8021	ND(<3)	UG/L	7/10/01	LAH
BENZENE	EPA-8021	ND(<1)	UG/L	10/26/01	LAH
TOLUENE	EPA-8021	ND(<1)	UG/L	10/26/01	LAH
ETHYLBENZENE	EPA-8021	ND(<1)	UG/L	10/26/01	LAH
XYLENES	EPA-8021	ND(<3)	UG/L	10/26/01	LAH
TPH-SEMIVOLATILE RANGE	NWTPH-DX	ND	UG/L	10/28/01	MHR

* "ND" INDICATES ANALYTE NOT DETECTED AT LEVEL ABOVE REPORTING LIMIT. REPORTING LIMIT IS GIVEN IN PARENTHESES

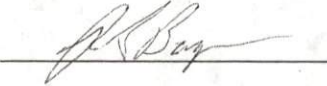
GASOLINE(VOLATILE RANGE) REPORTING LIMIT IS 50 UG/L

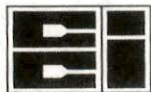
DIESEL RANGE REPORTING LIMIT IS 130 UG/L

LUBE OIL RANGE REPORTING LIMIT IS 250 UG/L

** UNITS FOR ALL NON LIQUID SAMPLES ARE REPORTED ON A DRY WEIGHT BASIS

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APPROVED BY: 



CERTIFICATE OF ANALYSIS

CLIENT: CAMP DRESSER & MCKEE INC.
11811 N.E. FIRST ST., SUITE 201
BELLEVUE, WA 98005

DATE: 10/31/01
CCIL JOB #: 110108

DATE RECEIVED: 10/24/01
WDOE ACCREDITATION #: C142

CLIENT CONTACT: PAM MORRILL

CLIENT PROJECT ID: EAST FUEL FARM 19947-34153-TASK1

DATA RESULTS

SURROGATE RECOVERY

CCIL SAMPLE ID	ANALYTE	SUR ID	% RECV
110108-01	NWTPH-GX	TFT	*
110108-01	EPA-8021	TFT	101
110108-01	NWTPH-DX	C25	87
110108-02	NWTPH-GX	TFT	94
110108-02	EPA-8021	TFT	136
110108-02	NWTPH-DX	C25	129
110108-03	NWTPH-GX	TFT	134
110108-03	EPA-8021	TFT	79
110108-03	NWTPH-DX	C25	114
110108-04	NWTPH-GX	TFT	109
110108-04	EPA-8021	TFT	101
110108-04	NWTPH-DX	C25	89
110108-05	NWTPH-GX	TFT	117
110108-05	EPA-8021	TFT	119
110108-05	NWTPH-DX	C25	77

BLANK AND DUPLICATE RESULTS

METHOD	BLK RESULT	ASSOC SMPLS	DUP RESULT	ORIG RESULT	%RDP	ASSOC SMPLS
NWTPH-GX (GAS)	ND(<50)	110108-01 TO 05	ND(<50)	ND(<50)	****	SAME
EPA-8021(MTBE)	ND(<3)	110108-01 TO 05	ND(<3)	ND(<3)	****	SAME
EPA-8021(BENZENE)	ND(<1)	110108-01 TO 05	ND(<1)	ND(<1)	****	SAME
EPA-8021(TOLUENE)	ND(<1)	110108-01 TO 05	ND(<1)	ND(<1)	****	SAME
EPA-8021(ETHYLBENZ)	ND(<1)	110108-01 TO 05	ND(<1)	ND(<1)	****	SAME
EPA-8021(XYLENE)	ND(<3)	110108-01 TO 05	ND(<3)	ND(<3)	****	SAME
NWTPH-DX (DSL)	ND(<130)	110108-01 TO 05	ND(<130)	150	****	SAME
NWTPH-DX (OIL)	ND(<250)	110108-01 TO 05	ND(<250)	ND(<250)	****	SAME



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DATE: 10/31/01
CCIL JOB #: 110108

DATE RECEIVED: 10/24/01
WDOE ACCREDITATION #: C142

CLIENT CONTACT: PAM MORRILL

CLIENT PROJECT ID: EAST FUEL FARM 19947-34153-TASK1

DATA RESULTS

SPIKE/ SPIKE DUPLICATE RESULTS

METHOD	SPIKE ID	ASSOCIATED SAMPLES	% SPIKE RECOVERY	% SPIKE DUP RECOVERY	REL % DIFF
EPA-8021	MTBE	110108-01 TO 05	104	N/A	N/A
EPA-8021	BENZENE	110108-01 TO 05	101	N/A	N/A
EPA-8021	TOLUENE	110108-01 TO 05	99	N/A	N/A
EPA-8021	ETHYLBENZENE	110108-01 TO 05	97	N/A	N/A
EPA-8021	XYLENE	110108-01 TO 05	97	N/A	N/A

* SURROGATE DILUTED OUT OF CALIBRATION RANGE

**** %RPD NOT REPORTED FOR VALUES <X5 THE REPORTING LIMIT

APPROVED BY: 

Data file : D:\HPCHEM\2\DATA\70110251\003F1501.D

Gas/BTEX 1 Report Created on 10/30/01 3:41:22 PM

Injection Date & Time: Thu, 25. Oct. 2001 6:32:54 PM

Sample Name : GAS-2001PB-110108-51 5mL

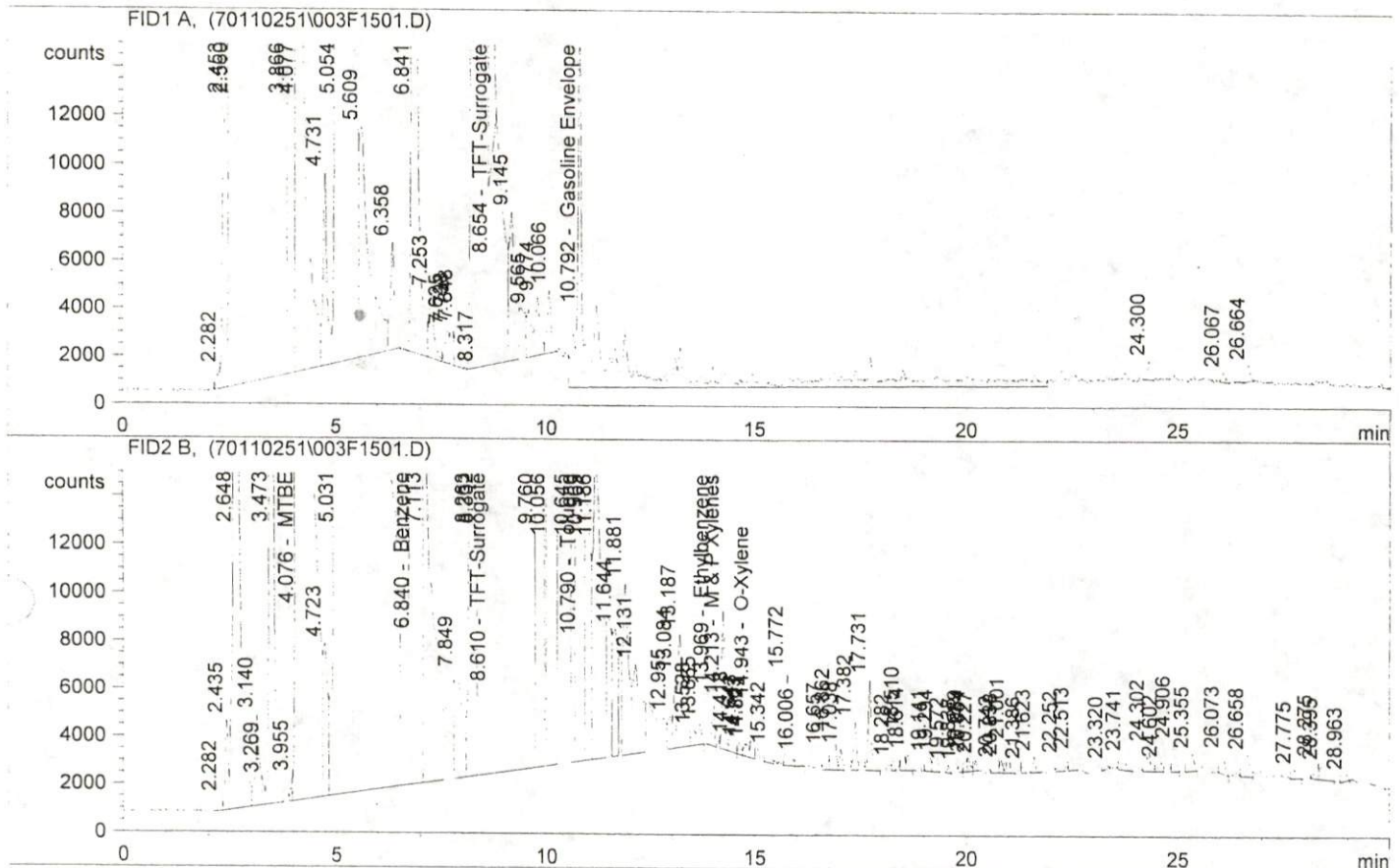
Acq Operator : LAH

Acq. Method : 70GB1001.M

Analysis Method : D:\HPCHEM\5\METHODS\70GB1001.M

FID1 A equivalent to FID analysis.

FID2 B equivalent to PID analysis.



Ret.	Compound Name	Area	Amount ug/L
8.654	TFT-Surrogate	148762.828	14.458*
10.792	Gasoline Envelope	386654.531	46.142

Gas = 50ug/L

REVIEWED BY *LAH*
DATE 10/31/01

Ret.	Compound Name	Area	Amount ug/L
4.076	MTBE	16696363.000	681.627
6.840	Benzene	2394359.000	35.978
8.610	TFT-Surrogate	730220.813	29.479*
10.790	Toluene	430148.250	6.107
13.969	Ethylbenzene	11532.104	0.142
14.213	M & P Xylenes	24937.354	0.243
14.943	O-Xylene	9670.364	0.131

MTBE, B on other run T = 6ug/L E = 1ug/L X = 3ug/L * high due to matrix L interference LAH
MTBE BTEX off 500ul blk of interference. 11-20-1114

Data file : D:\HPCHEM\2\DATA\70110291\013F1301.D

Gas/BTEX 1 Report Created on 10/30/01 2:43:23 PM

Injection Date & Time: Mon, 29. Oct. 2001 4:08:23 PM

Sample Name : 110108-1c RR 500

Acq Operator : LAH

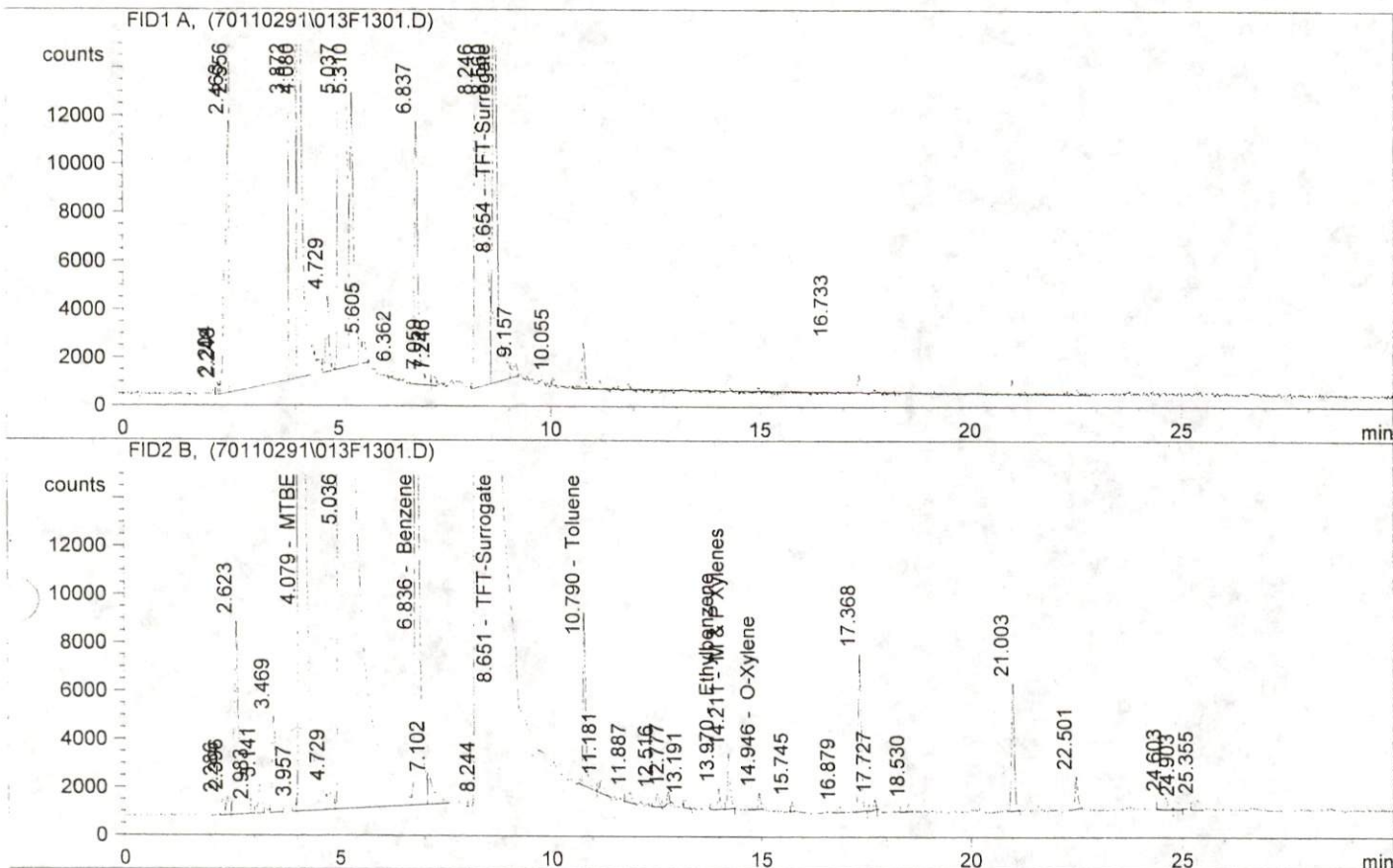
Acq. Method : 70GB1001.M

Analysis Method : D:\HPCHEM\5\METHODS\70GB1001.M

FID1 A equivalent to FID analysis.

FID2 B equivalent to PID analysis.

X10



Ret.	Compound Name	Area	Amount ug/L
8.654	TFT-Surrogate	102396.437	10.236 102%
0.000	Gasoline Envelope	0.000	0.000

REVIEWED BY RB
& DATE 10/31/01

Gas = 500 ug/L Gas on previous run

Ret.	Compound Name	Area	Amount ug/L
4.148	4.079 MTBE	1780835.000	72.130 RT
	6.836 Benzene	235115.078	3.274
	8.651 TFT-Surrogate	257436.438	10.106 10%
	10.790 Toluene	32941.223	0.357
	13.970 Ethylbenzene	3744.323	0.046
	14.211 M & P Xylenes	10345.644	0.101
	14.946 O-Xylene	2556.566	0.035

MTBE = 720 ug/L
MTBE < 10 ug/L

B = 330 ug/L
33 ug/L

T, E < 10 ug/L

X < 30 ug/L

11-31-11H

External Standard Report

Data File Name : D:\HPCHEM\4\DATA\41102801\011F0801.D
 Operator : LAH Page Number : 1
 Instrument : DIESEL #2 Vial Number : 11
 Sample Name : 110108-1 Injection Number : 1
 Run Time Bar Code: - Sequence Line : 8
 Acquired on : 28 Oct 01 04:23 PM Instrument Method: 4DXT1001.MTH
 Report Created on: 29 Oct 01 11:27 AM Analysis Method : 4DSL1001.MTH
 Last Recalib on : 25 OCT 01 07:45 AM Sample Amount : 0
 Multiplier : 1 ISTD Amount :

Sig. 1 in D:\HPCHEM\4\DATA\41102801\011F0801.D

Ret Time	Area	Type	Width	Ref#	ug/ml	Name
9.092	528485	MM	1.221	1	129.059	TPH-Dsl envelope
20.571	170477	MM T	0.028	1	34.710	nC-25 surrogate

User Modified

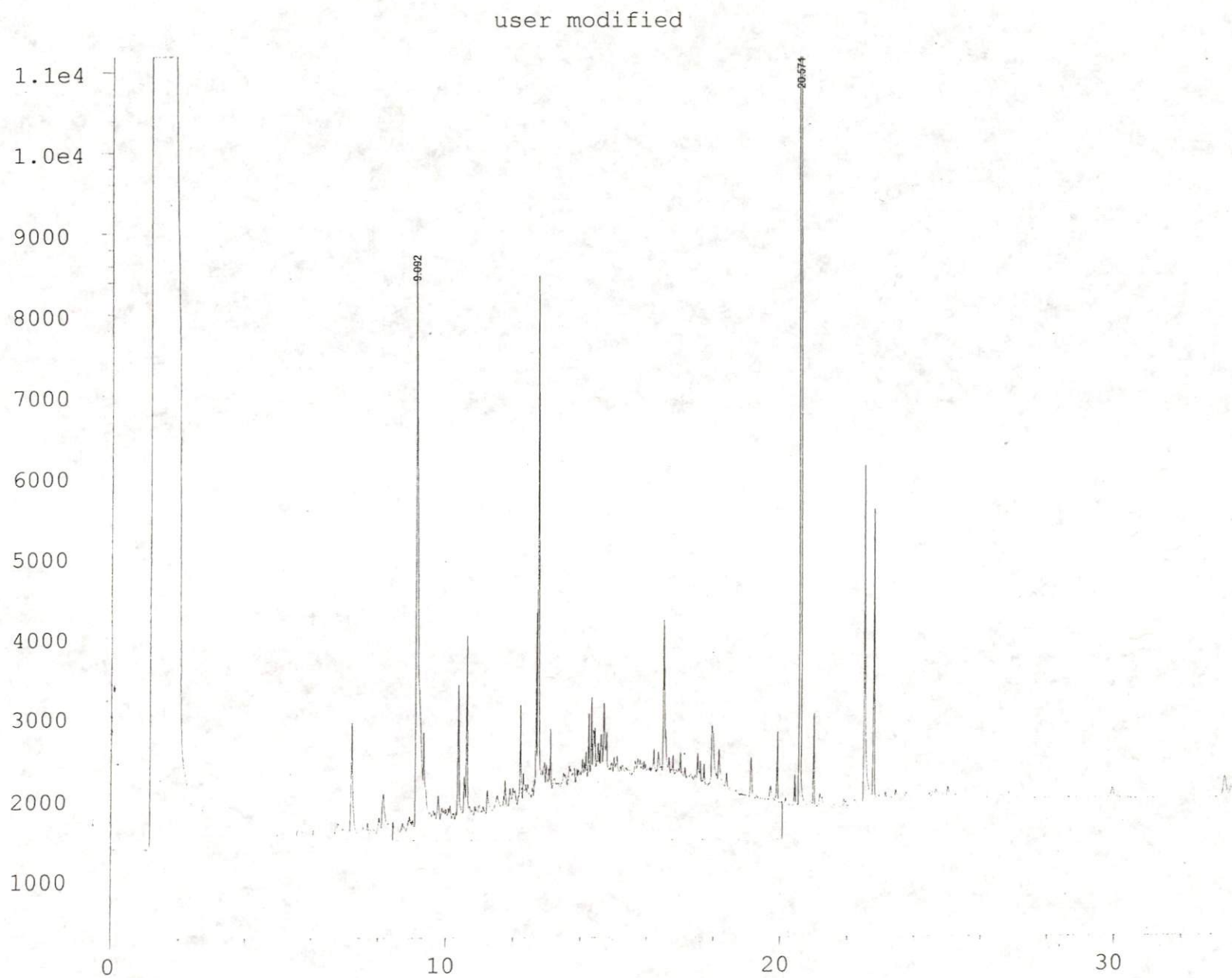
$$D = 129.059 \text{ mg/l} + \frac{1 \text{ ml}}{400 \text{ ml}} = 0.32 \text{ mg/l}$$

Diesel
 MO 2 .25 mg/l

REVIEWED BY RS
 & DATE 10/31/01

MA 10 29-01

mw1



Data file : D:\HPCHEM\2\DATA\70110291\010F1001.D

Gas/BTEX 1 Report Created on 10/29/01 3:20:10 PM

Injection Date & Time: Mon, 29. Oct. 2001 2:21:35 PM

Sample Name : 110108-2d RR 5ML

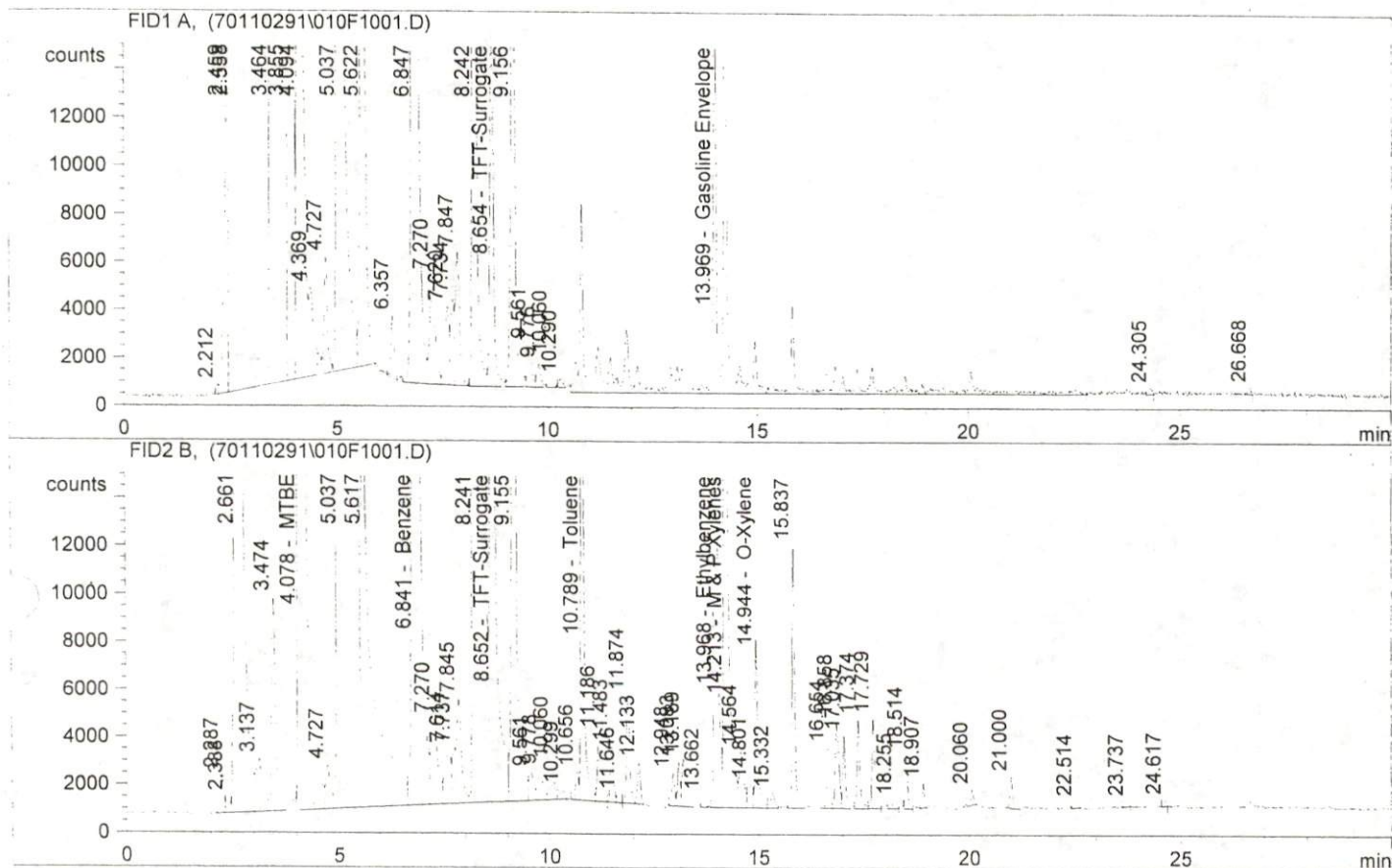
Acq Operator : LAH

Acq. Method : 70GB1001.M

Analysis Method : D:\HPCHEM\5\METHODS\70GB1001.M

FID1 A equivalent to FID analysis.

FID2 B equivalent to PID analysis.



Ret.	Compound Name	Area	Amount ug/L
8.654	TFT-Surrogate	93721.375	9.446 94%
13.969	Gasoline Envelope	455747.500	54.914

Gas = 55 ug/L

REVIEWED BY RB
DATE 10/31/01

Ret.	Compound Name	Area	Amount ug/L
4.078	MTBE	2228942.500	90.441 RT
6.841	Benzene	826562.625	12.232
8.652	TFT-Surrogate	343051.875	13.614 136%
10.789	Toluene	135871.672	1.659
13.968	Ethylbenzene	319998.094	5.075
14.213	M & P Xylenes	376913.969	4.445
14.944	O-Xylene	33828.059	0.458

MTBE < 1 ug/L B = 12 ug/L T = 2 ug/L E = 5 ug/L X = 4 ug/L

11-20-1111

External Standard Report

Data File Name : D:\HPCHEM\4\DATA\41102801\012F0801.D
 Operator : LAH Page Number : 1
 Instrument : DIESEL #2 Vial Number : 12
 Sample Name : 110108-2 Injection Number : 1
 Run Time Bar Code: Sequence Line : 8
 Acquired on : 28 Oct 01 05:07 PM Instrument Method: 4DXT1001.MTH
 Report Created on: 29 Oct 01 11:28 AM Analysis Method : 4DSL1001.MTH
 Last Recalib on : 25 OCT 01 07:45 AM Sample Amount : 0
 Multiplier : 1 ISTD Amount :

Sig. 1 in D:\HPCHEM\4\DATA\41102801\012F0801.D

Ret Time	Area	Type	Width	Ref#	ug/ml	Name
12.653	259287	MM	0.899	1	60.074	TPH-Dsl envelope
20.578	253751	MM T	0.030	1	51.688	nC-25 surrogate

User Modified

$$D = 60.074 \text{ mg/l} \times \frac{1 \text{ ml}}{400 \text{ ml}} = 0.15 \text{ mg/l}$$

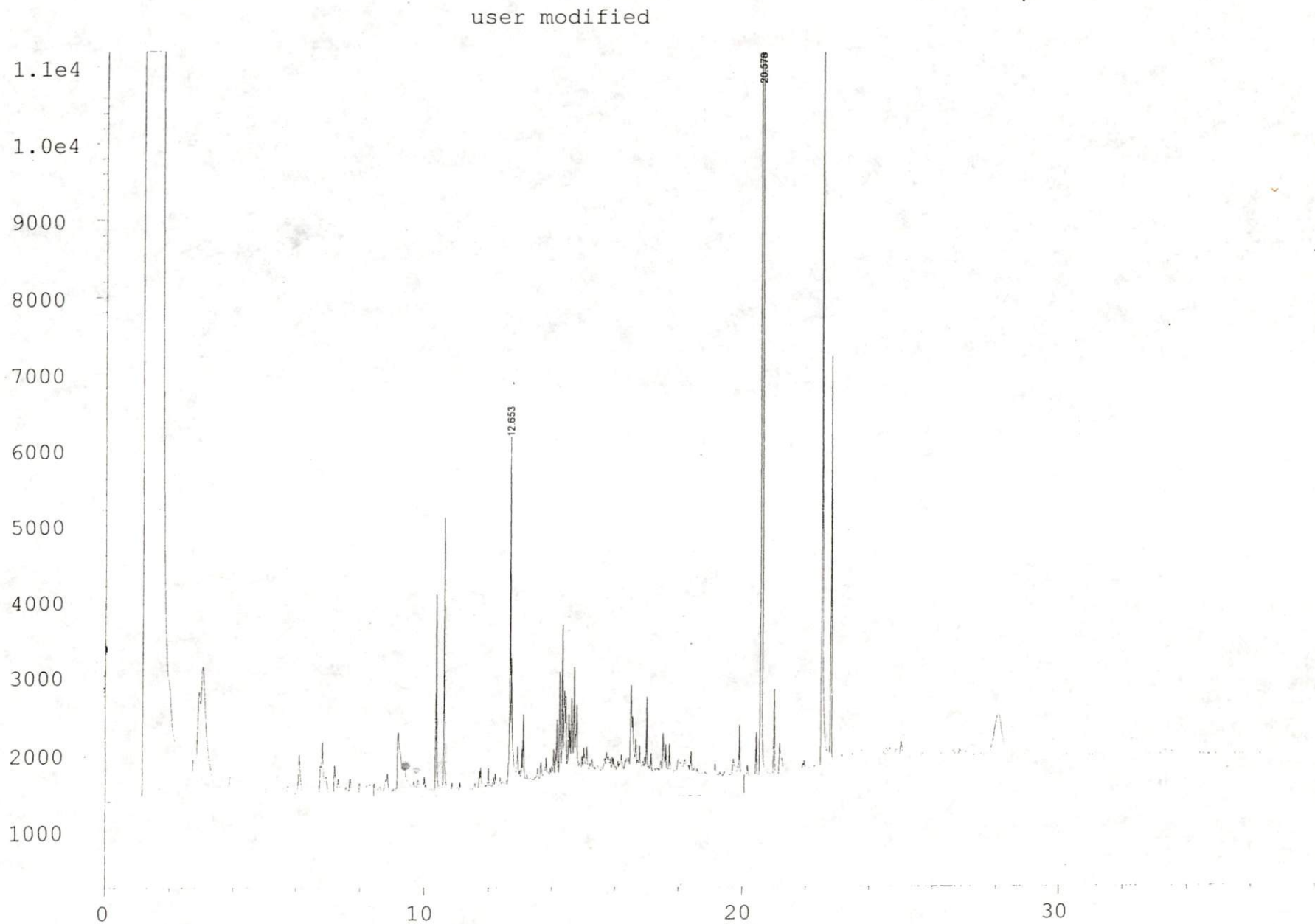
unidentified Diesel range product

MC L 25 mg/l

REVIEWED BY KB
 & DATE 10/31/01

M 10-29-01

mw2



Data file : D:\HPCHEM\2\DATA\70110251\019F2001.D

Gas/BTEX 1 Report Created on 10/30/01

3:58:31 PM

Injection Date & Time: Thu, 25. Oct. 2001 9:29:30 PM

Sample Name : 110108-3 5ML

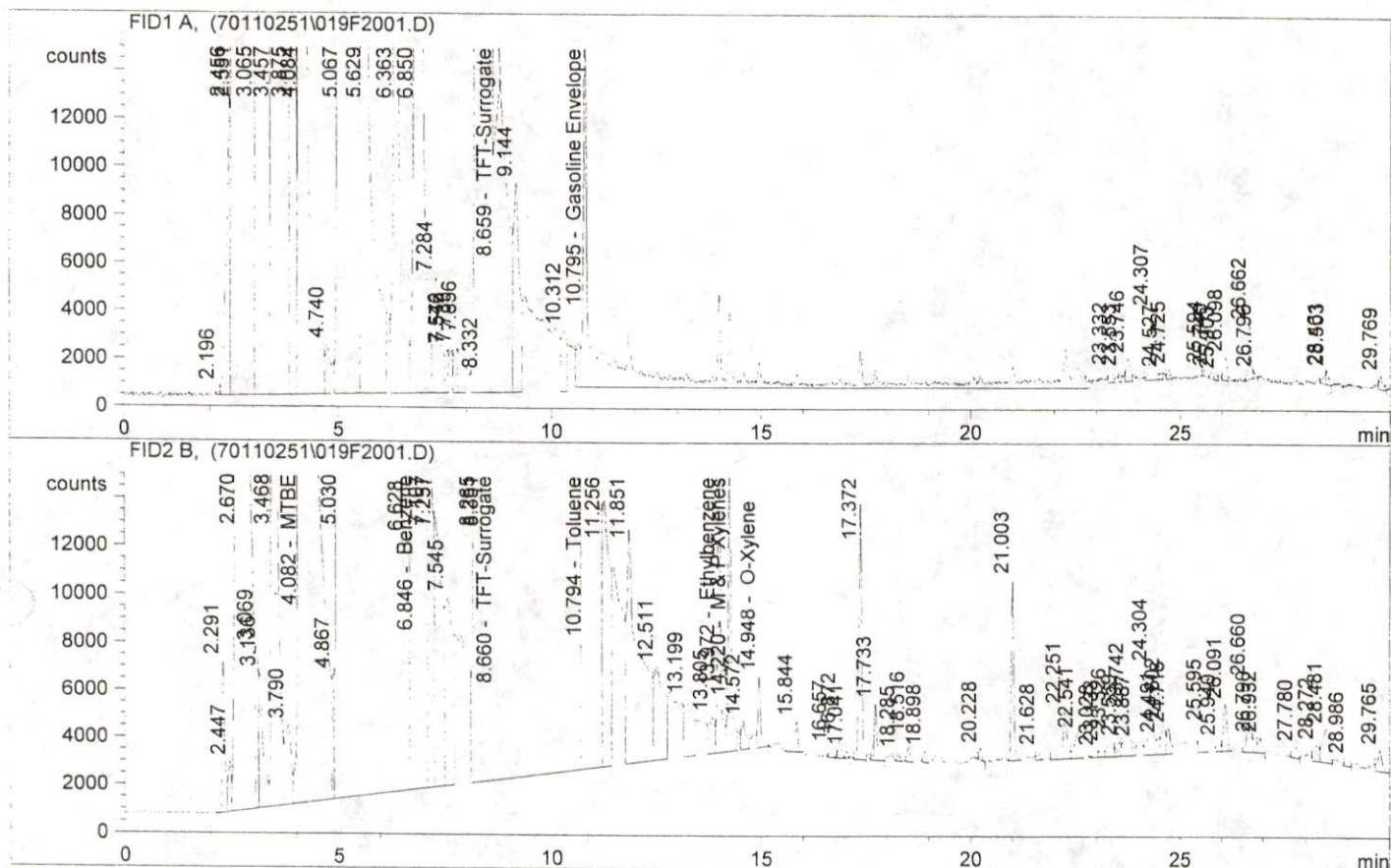
Eq Operator : LAH

Acq. Method : 70GB1001.M

Analysis Method : D:\HPCHEM\5\METHODS\70GB1001.M

FID1 A equivalent to FID analysis.

FID2 B equivalent to PID analysis.



Ret.	Compound Name	Area	Amount ug/L
8.659	TFT-Surrogate	137321.375	13.416 134%
10.795	Gasoline Envelope	393862.562	47.003

Gas < 50ug/L

REVIEWED BY RB
DATE 10/30/01

Ret.	Compound Name	Area	Amount ug/L
4.082	MTBE	20219874.000	825.609
6.846	Benzene	2522872.000	37.925
8.660	TFT-Surrogate	122480.203	4.576
10.794	Toluene	613740.000	8.883
13.972	Ethylbenzene	62950.957	0.774
14.220	M & P Xylenes	60159.926	0.587
14.948	O-Xylene	14275.330	0.193

Too much peak
overlap
can't get
accurate T or
Surv. Use
500ul

BTEX use 500ul

11-30-01LH

Data file : D:\HPCHEM\2\DATA\70110291\015F1501.D

Gas/BTEX 1 Report Created on 10/30/01 4:01:22 PM

Injection Date & Time: Mon, 29. Oct. 2001 5:38:34 PM

Sample Name : 110108-3c RR 500

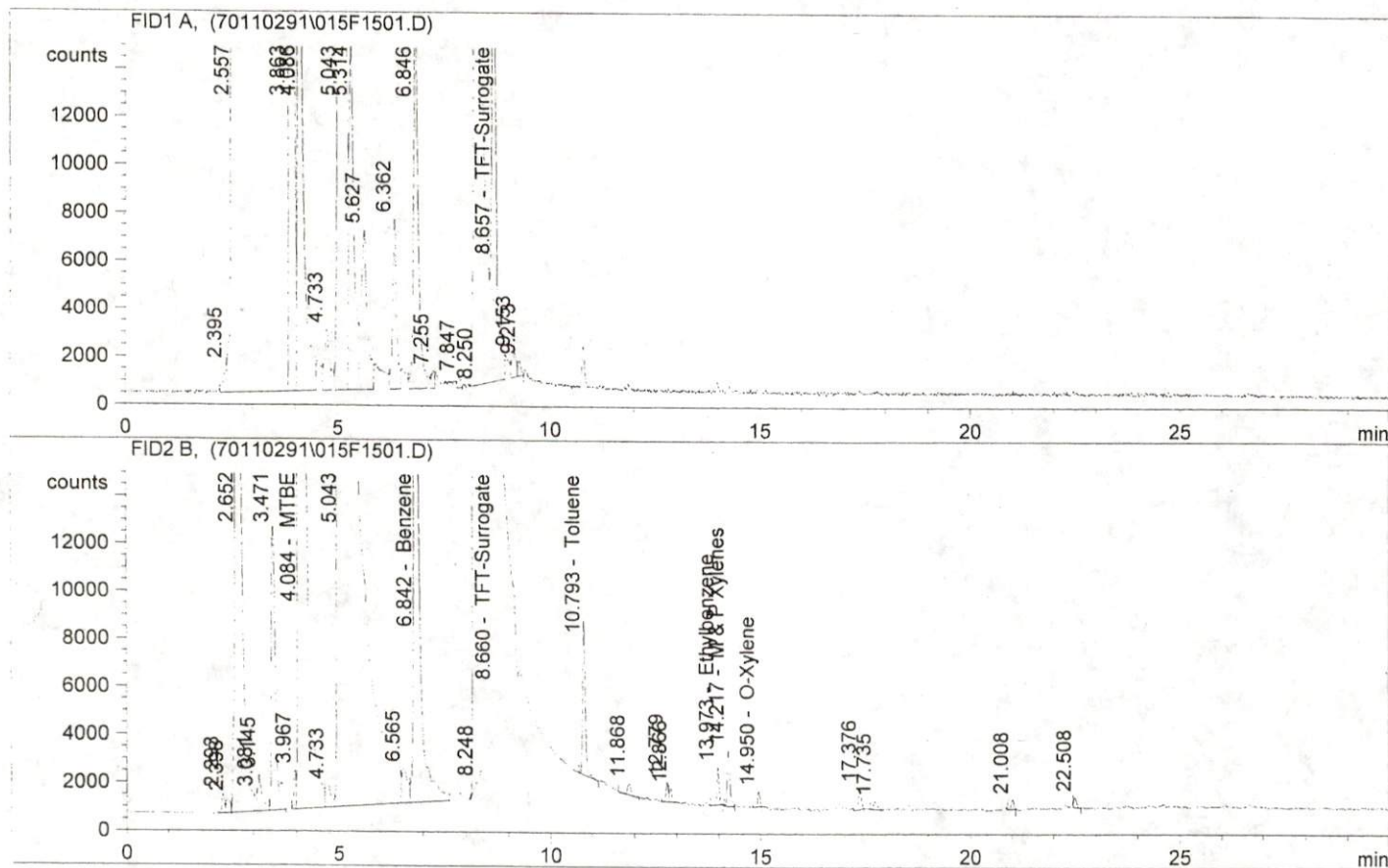
Operator : LAH

Acq. Method : 70GB1001.M

Analysis Method : D:\HPCHEM\5\METHODS\70GB1001.M

FID1 A equivalent to FID analysis.

FID2 B equivalent to PID analysis.



Ret.	Compound Name	Area	Amount ug/L
8.657	TFT-Surrogate	99661.523	9.987 100%
0.000	Gasoline Envelope	0.000	0.000

Gas = 500 ug/L On previous run

Ret.	Compound Name	Area	Amount ug/L
4.084	MTBE	2341644.250	95.046
6.842	Benzene	294886.187	4.179
8.660	TFT-Surrogate	202550.078	7.857 79%
10.793	Toluene	28746.342	0.311
13.973	Ethylbenzene	5895.010	0.072
14.217	M & P Xylenes	10723.673	0.105
14.950	O-Xylene	2395.888	0.032

MTBE < 10 ug/L B = 42 ug/L T.E < 10 ug/L X < 3 ug/L

REVIEWED BY RB

111-22414

External Standard Report

Data File Name : D:\HPCHEM\4\DATA\41102801\014F0801.D
 Operator : LAH Page Number : 1
 Instrument : DIESEL #2 Vial Number : 14
 Sample Name : 110108-3 Injection Number : 1
 Run Time Bar Code: Sequence Line : 8
 Acquired on : 28 Oct 01 06:35 PM Instrument Method: 4DXT1001.MTH
 Report Created on: 29 Oct 01 11:33 AM Analysis Method : 4DSL1001.MTH
 Last Recalib on : 25 OCT 01 07:45 AM Sample Amount : 0
 Multiplier : 1 ISTD Amount :

Sig. 1 in D:\HPCHEM\4\DATA\41102801\014F0801.D

Ret Time	Area	Type	Width	Ref#	ug/ml	Name
12.653	610326	MM	2.174	1	150.032	TPH-Dsl envelope
20.573	224822	MM T	0.029	1	45.790	nC-25 surrogate

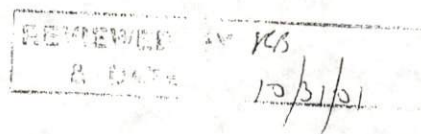
User Modified

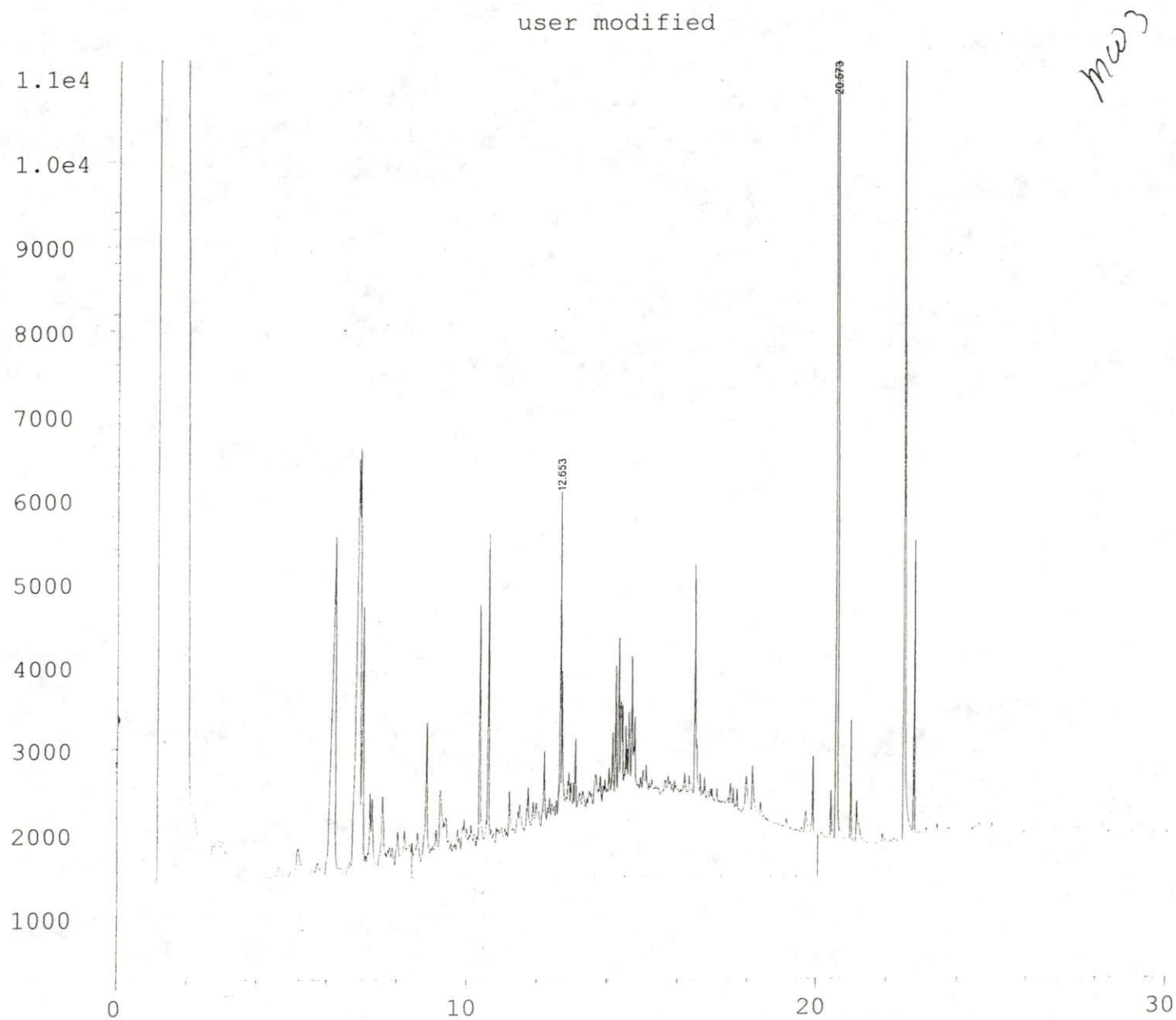
$$D = 150.032 \text{ mg/l} \times \frac{1 \text{ ml}}{400 \text{ ml}} = 0.38 \text{ mg/l}$$

Diesel

110 L 0.25 mg/l

10-29-01





Data file : D:\HPCHEM\2\DATA\70110251\020F2201.D

Gas/BTEX 1 Report Created on 10/26/01

11:56:33 AM

Injection Date & Time: Thu, 25. Oct. 2001 10:40:09 PM

Sample Name : 110108-4 500UL

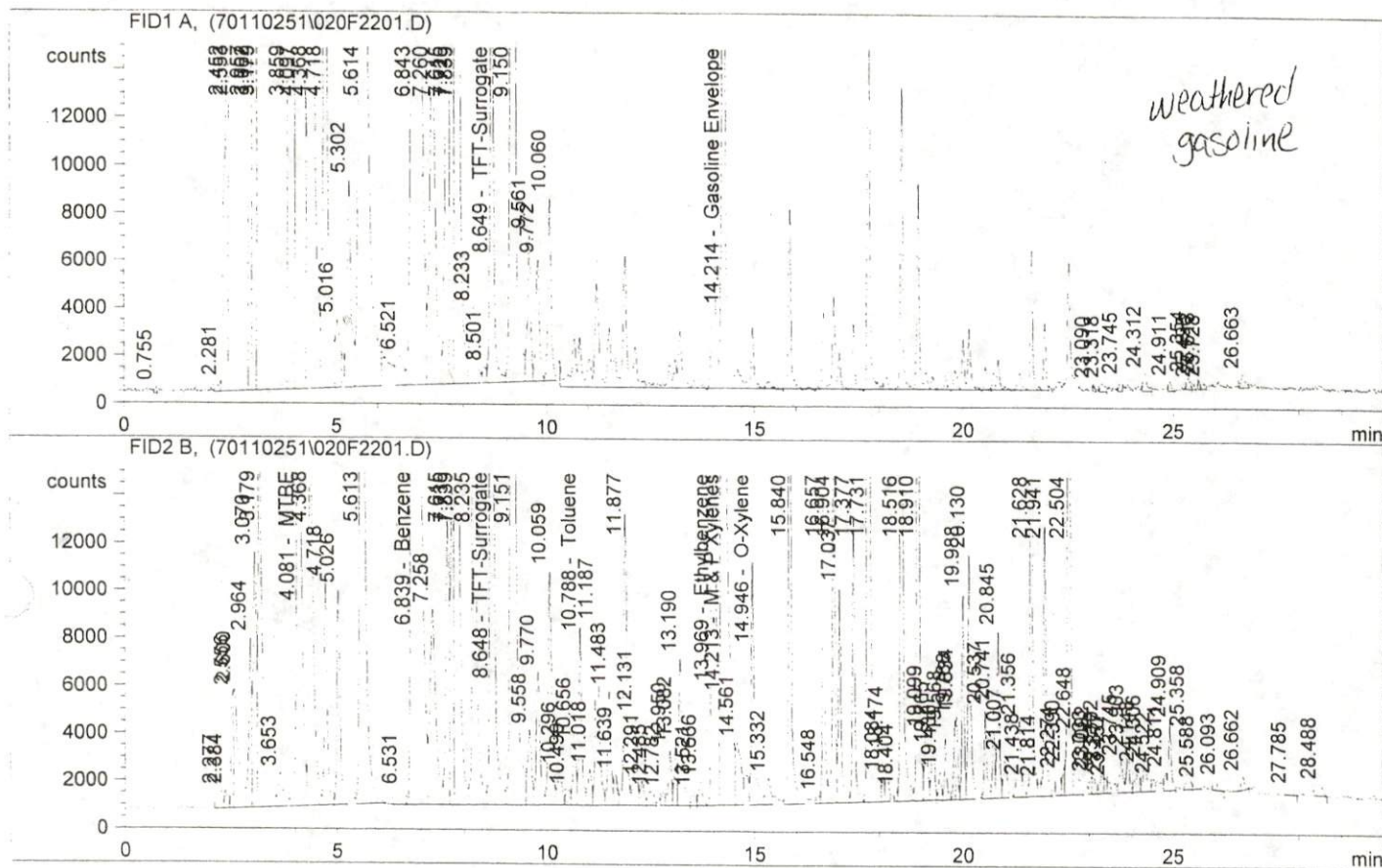
Acq Operator : LAH

Acq. Method : 70GB1001.M

Analysis Method : D:\HPCHEM\5\METHODS\70GB1001.M

FID1 A equivalent to FID analysis.

FID2 B equivalent to PID analysis.



weathered gasoline

Ret.	Compound Name	Area	Amount ug/L
8.649	TFT-Surrogate	109794.047	10.909 109%
14.214	Gasoline Envelope	873434.188	110.740

Gas = 110 ug/L

REVIEWED BY RP
DATE 10/31/01

Ret.	Compound Name	Area	Amount ug/L
4.148	4.081 MTBE	193865.188	7.281
	6.839 Benzene	1094089.000	16.284
	8.648 TFT-Surrogate	257324.062	10.102 101%
	10.788 Toluene	36624.563	0.397
	13.969 Ethylbenzene	584028.188	9.585
	14.213 M & P Xylenes	974232.063	12.935
	14.946 O-Xylene	50222.555	0.680

MTBE < 10 ug/L B = 160 ug/L T < 10 ug/L E = 96 ug/L X = 130 ug/L
10-30-01 LA

External Standard Report

Data File Name : D:\HPCHEM\4\DATA\41102801\015F0801.D
 Operator : LAH Page Number : 1
 Instrument : DIESEL #2 Vial Number : 15
 Sample Name : 110108-4 Injection Number : 1
 Run Time Bar Code: Sequence Line : 8
 Acquired on : 28 Oct 01 07:18 PM Instrument Method: 4DXT1001.MTH
 Report Created on: 29 Oct 01 11:34 AM Analysis Method : 4DSL1001.MTH
 Last Recalib on : 25 OCT 01 07:45 AM Sample Amount : 0
 Multiplier : 1 ISTD Amount :

Sig. 1 in D:\HPCHEM\4\DATA\41102801\015F0801.D

Ret Time	Area	Type	Width	Ref#	ug/ml	Name
15.543	1575673	MM	1.033	1	397.412	TPH-Dsl envelope
20.571	175589	MM T	0.029	1	35.752	nC-25 surrogate

User Modified

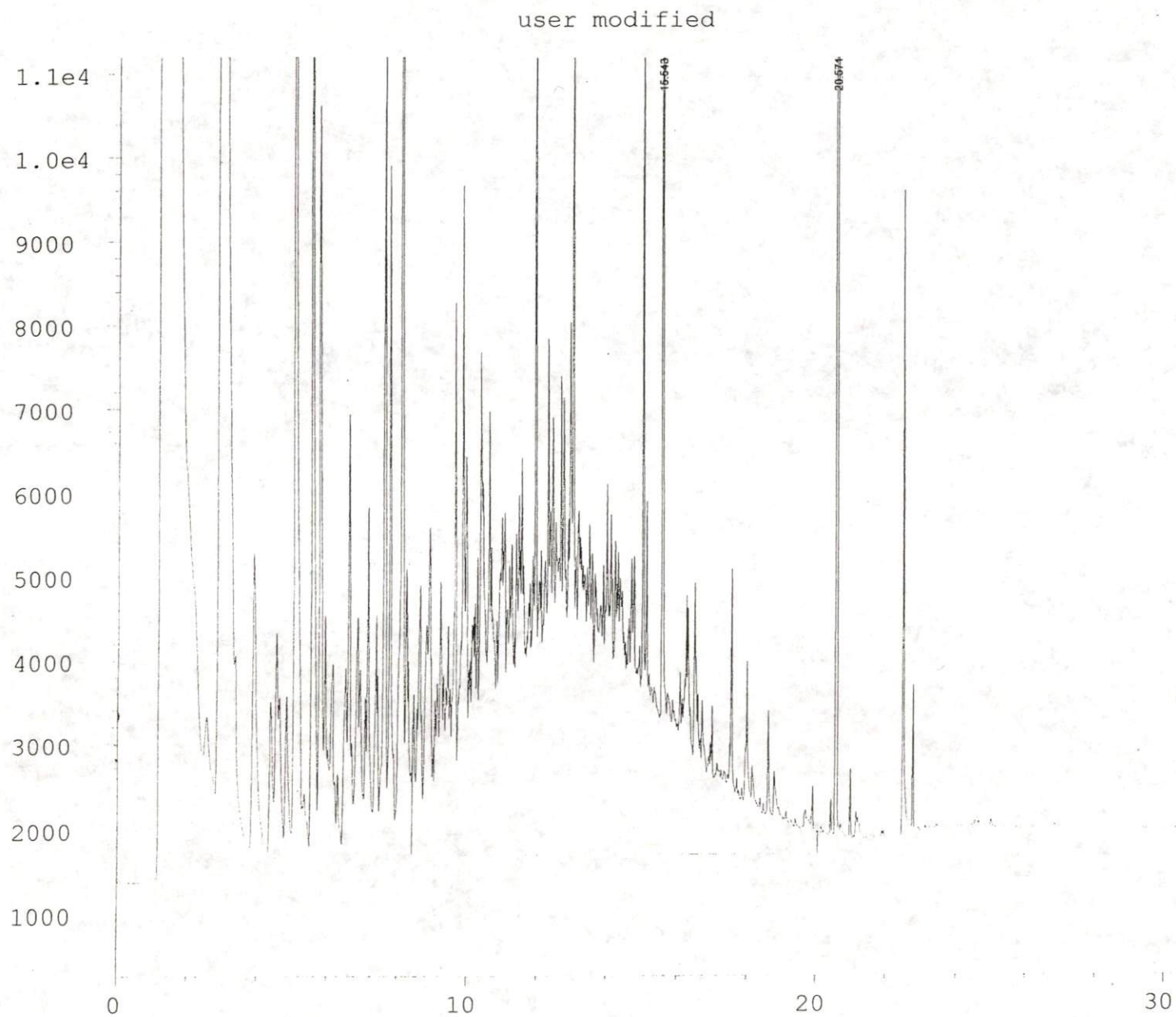
$$D = 397.412 \text{ ng/l} \times \frac{1 \text{ ml}}{400 \text{ ml}} = 0.99 \text{ ng/l}$$

Diesel biased high due to volatile range overlap.

MO L 0.25 ng/l

AK 10-29-01

REVIEWED BY RB
 DATE 10/31/01



Data file : D:\HPCHEM\2\DATA\70110261\010F1001.D

Gas/BTEX 2 Report Created on 10/27/01

3:37:24 PM

Injection Date & Time: Fri, 26. Oct. 2001 5:06:44 PM

Sample Name : 110108-5 5ML

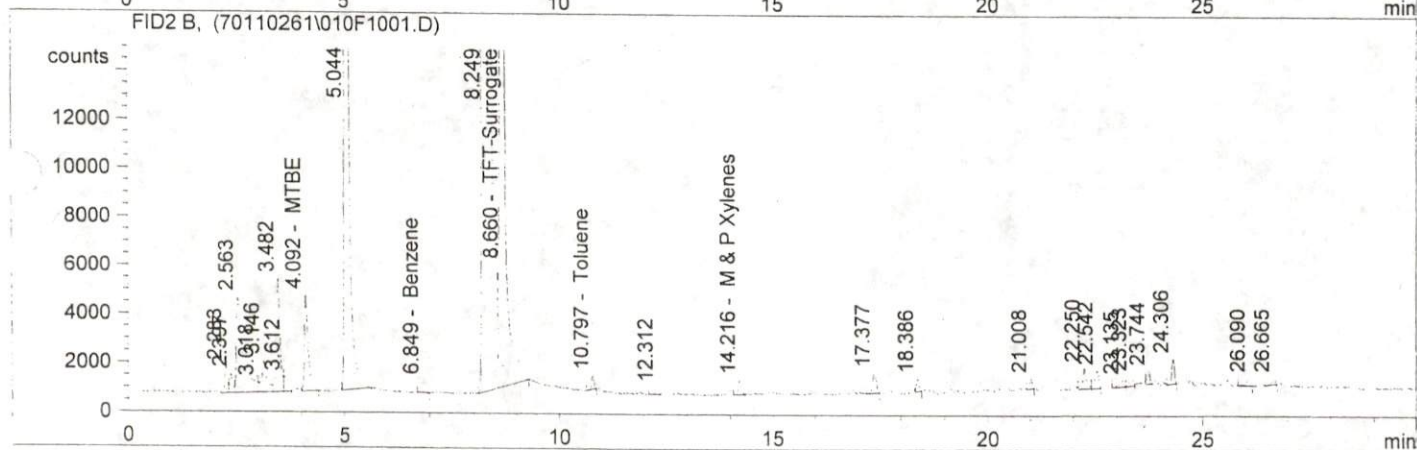
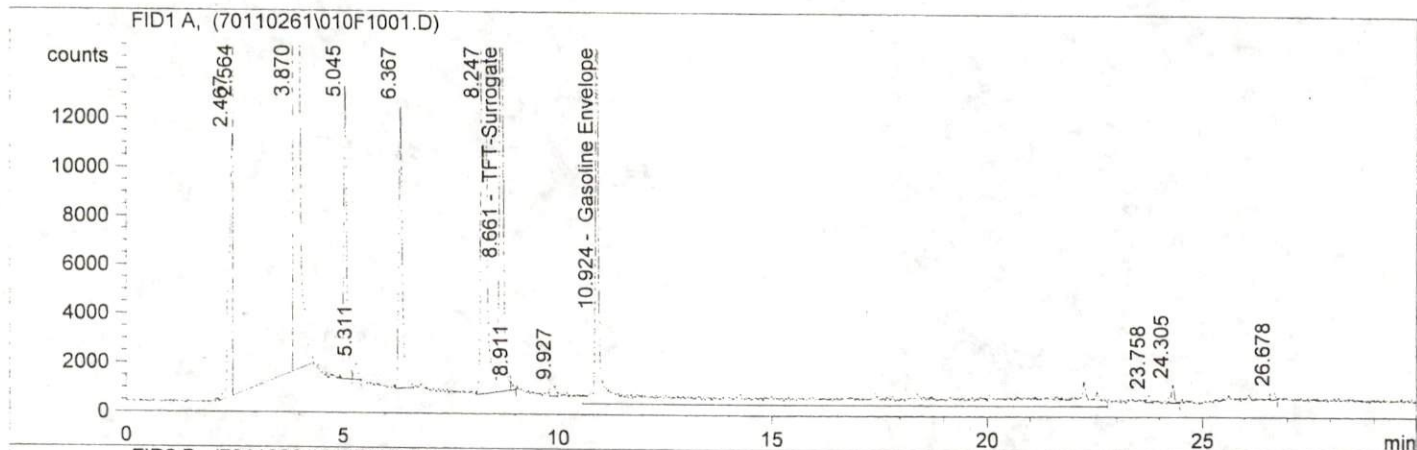
Operator : LAH

Acq. Method : 70GB1001.M

Analysis Method : D:\HPCHEM\5\METHODS\70GB1001.M

FID1 A equivalent to FID analysis.

FID2 B equivalent to PID analysis.



Ret.	Compound Name	Area	Amount ug/L
8.661	TFT-Surrogate	118053.539	11.662 $\frac{118053.539}{10000000}$
10.924	Gasoline Envelope	306072.937	36.526

Gas < 50 ug/L

REVIEWED BY RS
DATE 10/31/01

Ret.	Compound Name	Area	Amount ug/L
4.092	MTBE	22795.135	0.705
6.849	Benzene	2819.386	0.033
8.660	TFT-Surrogate	301333.281	11.905 $\frac{301333.281}{10000000}$
10.797	Toluene	2261.184	0.025
0.000	Ethylbenzene	0.000	0.000
14.216	M & P Xylenes	3041.305	0.030
0.000	O-Xylene	0.000	0.000

MTBE < 3 ug/L B.T.E < 1 ug/L X < 3 ug/L

10-27-01LAH

External Standard Report

Data File Name : D:\HPCHEM\4\DATA\41102801\016F0801.D
 Operator : LAH Page Number : 1
 Instrument : DIESEL #2 Vial Number : 16
 Sample Name : 110108-5 Injection Number : 1
 Run Time Bar Code: Sequence Line : 8
 Acquired on : 28 Oct 01 08:02 PM Instrument Method: 4DXT1001.MTH
 Report Created on: 29 Oct 01 11:35 AM Analysis Method : 4DSL1001.MTH
 Last Recalib on : 25 OCT 01 07:45 AM Sample Amount : 0
 Multiplier : 1 ISTD Amount :

Sig. 1 in D:\HPCHEM\4\DATA\41102801\016F0801.D

Ret Time	Area	Type	Width	Ref#	ug/ml	Name
15.543	*	not found	*	1		TPH-Dsl envelope
20.568	152097	PB	0.026	1	30.963	nC-25 surrogate

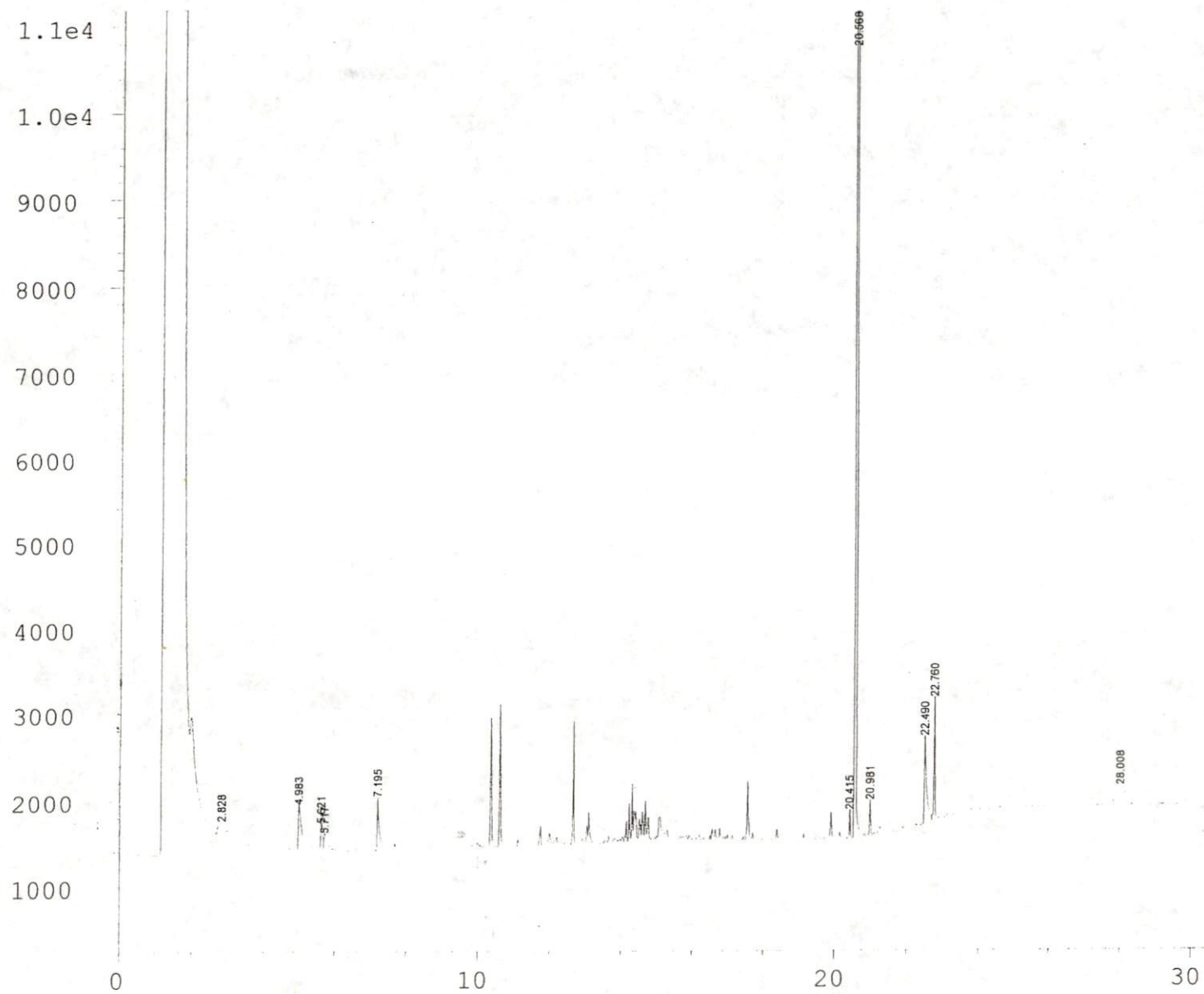
103.1 77.1
mL

Not all calibrated peaks were found

D.L. 0.13 mg/e
 MO.L 0.25 L

MA10-29-01

REVIEWED BY RB
 10/31/01



Date 10/24/01 Page 1 of 1

PROJECT INFORMATION					Laboratory Number:																																																								
Project Manager: <u>Pam Merrill</u>					ANALYSIS REQUEST <table border="1" style="width:100%; border-collapse: collapse; font-size: 0.8em;"> <tr> <th colspan="3">PETROLEUM HYDROCARBONS</th> <th colspan="3">ORGANIC COMPOUNDS</th> <th colspan="2">PESTS/PCBs</th> <th colspan="2">METALS</th> <th colspan="2">LEACHING TESTS</th> <th colspan="3">OTHER</th> <th rowspan="2">NUMBER OF CONTAINERS</th> </tr> <tr> <th>TPH-HCID</th> <th>TPH-G</th> <th>TPH-D</th> <th>8015M Fuel Hydrocarbon</th> <th>8010 Halogenated VOCs</th> <th>8020 Aromatic VOCs</th> <th>8020M - BETX only</th> <th>8240 GC/MS Volatiles</th> <th>8270 GC/MS Semivolatiles</th> <th>8310 PAHs</th> <th>8040 Phenols</th> <th>DWS - Volatiles and Semivolatiles</th> <th>8080 OC Pest/PCBs</th> <th>8140 OP Pesticides</th> <th>8150 OC Herbicides</th> <th>DWS - Herb/Pest</th> <th>Selected Metals: list</th> <th>Organic Lead (Ca)</th> <th>TCL Metals (23)</th> <th>Priority Poll. Metals (13)</th> <th>DWS - Metals</th> <th>MESP - Metals (Wa)</th> <th>TCLP - Volatiles (ZHE)</th> <th>TCLP - Semivolatiles</th> <th>TCLP - Pesticides</th> <th>TCLP - Metals</th> </tr> </table>															PETROLEUM HYDROCARBONS			ORGANIC COMPOUNDS			PESTS/PCBs		METALS		LEACHING TESTS		OTHER			NUMBER OF CONTAINERS	TPH-HCID	TPH-G	TPH-D	8015M Fuel Hydrocarbon	8010 Halogenated VOCs	8020 Aromatic VOCs	8020M - BETX only	8240 GC/MS Volatiles	8270 GC/MS Semivolatiles	8310 PAHs	8040 Phenols	DWS - Volatiles and Semivolatiles	8080 OC Pest/PCBs	8140 OP Pesticides	8150 OC Herbicides	DWS - Herb/Pest	Selected Metals: list	Organic Lead (Ca)	TCL Metals (23)	Priority Poll. Metals (13)	DWS - Metals	MESP - Metals (Wa)	TCLP - Volatiles (ZHE)	TCLP - Semivolatiles	TCLP - Pesticides	TCLP - Metals
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Project Name: <u>East Fuel Farm</u>																																																													
Project Number: <u>19947-34133-Task 1</u>																																																													
Site Location: <u>Paine Field</u> Sampled By: <u>PSM</u>																																																													
DISPOSAL INFORMATION																																																													
☒ Lab Disposal (return if not indicated)																																																													
Disposal Method: _____																																																													
Disposed by: _____ Disposal Date: _____																																																													
QC INFORMATION (check one)																																																													
☐ SW-846 ☐ CLP ☐ Screening ☐ CDM Std. ☐ Special																																																													
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MW1-10/01	10/24/01	1400	Water	1	X	X																								3																															
MW2-10/01		1340		2	X	X																								9																															
MW3-10/01		1000		3	X	X																								2																															
MW4-10/01		1042		4	X	X																								2																															
* DW2-10/01		1140		5	X	X																								2																															
* Sample ID on bottle is DW1-10/01																																																													

LAB INFORMATION		SAMPLE RECEIPT		RELINQUISHED BY: 1.		RELINQUISHED BY: 2.		RELINQUISHED BY: 3.		
Lab Name: <u>CCI</u>	Total Number of Containers: <u>1</u>	Chain-of-Custody Seals: Y/N/NA Intact?: Y/N/NA Received in Good Condition/Cold: _____		Signature: <u>Pam Merrill</u>	Time: <u>1430</u>	Signature: _____	Time: _____	Signature: _____	Time: _____	
Lab Address: <u>Everett</u>				Printed Name: <u>Pamela J. Merrill</u>	Date: <u>10-24-01</u>	Printed Name: _____	Date: _____	Printed Name: _____	Date: _____	
Via: <u>Sampler</u>				Company: <u>CDM</u>		Company: _____		Company: _____		
Turn Around Time: ☒ Standard ☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 1 wk.					RECEIVED BY: 1.		RECEIVED BY: 2.		RECEIVED BY: 3.	
PRIOR AUTHORIZATION IS REQUIRED FOR RUSH DATA Special Instructions: _____				Signature: <u>C Merrill</u>	Time: <u>1430</u>	Signature: _____	Time: _____	Signature: _____	Time: _____	
				Printed Name: <u>C Merrill</u>	Date: <u>10-24-01</u>	Printed Name: _____	Date: _____	Printed Name: _____	Date: _____	
				Company: <u>CDM</u>		Company: _____		Company: _____		