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ENVIRONMENTAL AND
ENGINEERING CONSULTANTS

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RALEIGH, N.C.
WILMINGTON, N.C.

**FIRST SEMI-ANNUAL GROUNDWATER
MONITORING REPORT**

**BUILDINGS M232-1 TO M236-1
MARINE CORPS BASE
CAMP LEJEUNE, NORTH CAROLINA**

Issued: December 13, 2000

**Navy Contract No. N62470-95-D-6009
Delivery Order No. 0088
LAW Job No. 30740-6-0600-0088**

**Law Engineering and Environmental Services, Inc.
3301 Atlantic Avenue
Raleigh, North Carolina 27604**

CATLIN

ENVIRONMENTAL AND
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LAW

WILMINGTON, N.C.
RALEIGH, N.C.

December 13, 2000

Commander
LANTNAVFACENGCOM
1510 Gilbert Street
Norfolk, Virginia 23511-2699

Attention: Ms. Lori P. Reuther, Code: EV21LR

Subject: **First Semi-Annual Groundwater Monitoring Report
Former USTs M232-1 to M236-1
Marine Corps Base
Camp Lejeune, North Carolina
Navy Contract Number N62470-95-D-6009
Delivery Order Number: 0088
Law Job Number: 30740-6-0600-0088**

Dear Ms. Reuther:

In accordance with Naval Facilities Engineering Command Order for Supplies and Services Contract No. N62470-95-D-6009, Delivery Order Number 0088, Law Engineering and Environmental Services, Inc. (LAW) is pleased to provide this Semi-Annual Groundwater Monitoring Report for the above referenced site. Our services included groundwater level gauging, and collection and analysis of groundwater samples from selected, existing monitoring wells at the subject site. The purpose of our services was to document the presence or absence of free product, determine groundwater flow conditions across the site, and evaluate groundwater quality at selected locations.

Background Information

LAW has completed the first two rounds of quarterly water-table monitoring, and the first of two semi-annual groundwater sampling events at the Building M232 to M236 site, located at the Marine Corps Base (MCB) Camp Lejeune, North Carolina. Four 550-gallon capacity heating oil underground storage tanks (UST) and one 530-gallon capacity heating oil UST were formerly operated adjacent to Buildings M232, M233, M234, M235 and M236. The USTs were reportedly installed in 1942, supplied No. 2 fuel oil to furnaces located within the five buildings, and were taken out of service in the late 1980's. The USTs were removed in April or early May of 1990.

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Free product was identified within monitoring well UST M232-MW19 during LAW's August, 1999 Risk Characterization Assessment fieldwork. Free product was again identified in well UST M232-MW19 during LAW's July 2000 gauging event and the October 2000 groundwater sampling event. A petroleum-typical sheen was observed in the purge water removed from existing monitoring well UST M232-MW07 (formerly designated as well UST M232-MW3) in both the August 1999, and October 2000, sampling events. Additionally, a petroleum-typical sheen was observed in the purge water removed from existing monitoring well UST M232-MW05 during the October 2000, sampling event.

The table below lists known environmental assessment or remediation reports prepared for the subject site. Please reference the reports listed for additional background information and study findings associated with the Building M232 to M236 site.

Previous Environmental Reports for Buildings M232-M236

NO.	REPORT TITLE	DATE	AUTHOR
1	Report of Underground Storage Tank Abandonment, Buildings M232 - M236 and Building H-28	5/90	UTTS Environmental
2	Site Assessment, Tanks M232-M236, Camp Johnson, Marine Corps Base	1/92	O'Brien & Gere
3	Addendum Site Assessment, Tanks M232 to M236, Marine Corps Base	7/93	O'Brien & Gere
4	Report of Natural Attenuation Monitoring, Buildings M232 to M236	5/98	Law Engineering and Environmental Services, Inc.
5	Risk Characterization Assessment, former USTs M232-1 through M236-1	11/99	Law Engineering and Environmental Services, Inc.

Current Groundwater Sampling and Gauging Event

LAW gauged 22 existing monitoring wells in July and October 2000, and collected groundwater samples from six selected wells in October 2000. The presence of free product in well UST M232-MW19 was documented on both occasions. The depth to groundwater was measured in monitoring wells UST M232-MW01 through UST M232-MW22 using an electronic interface probe or water gauging meter on July 19, 2000 and October 17, 2000. Groundwater elevations were calculated by subtracting the water-table depth from surveyed top-of-casing elevations where available (see Tables 1 & 2). Figures 1 and 2 are water-table elevation contour maps, as prepared from water-table measurements obtained during July and October 2000. The groundwater flow direction determined for the October 2000 gauging event (Figure 2) is similar to that depicted on the water-table contour map by LAW for May 1998 (Report No. 4: Figure 1). Groundwater elevations measured during the July 2000 gauging event however, indicate an approximately three foot drop in water table elevation and a reversal of the groundwater flow direction determined from May 1998 and October 2000 gauging data (Figure 1). The apparent reversal in the direction of groundwater flow may be a function of seasonal variation of groundwater table elevations and variable subsurface geology across the site.

Groundwater samples were collected from selected monitoring wells (UST M232-MW05, UST M232-MW07, UST M232-MW18, UST M232-MW20, UST M232-MW21 and UST M232-MW22) on October 17-19, 2000. The six monitoring wells were purged prior to sample collection. The stagnant water from the well casing and sand pack was removed in an effort to collect samples representative of the water quality in the aquifer surrounding the screened interval. Each well was purged and sampled using a new, dedicated disposable bailer. LAW personnel donned a new pair of laboratory grade gloves prior to purging, sampling and collecting water-level measurements at each well to minimize the potential for cross contamination. Specific conductance, pH, groundwater temperature, turbidity and dissolved oxygen were measured and recorded throughout the purging process. Well purging continued until three standing well volumes were removed and indicator parameters had stabilized. Groundwater samples were then collected and decanted from the bailer into pre-labeled sample containers. These containers were sealed, and stored in a chilled cooler. Custody of the samples was maintained by LAW personnel, from the time of collection through delivery to the analytical laboratory.

The groundwater samples from the six wells, one duplicate sample, and a trip blank, were submitted to Paradigm Analytical Laboratory. The samples were analyzed for volatile organic compounds (VOCs) by Standard Method 6210D, for semi-volatile organic compounds (SVOCs) plus Tentatively Identified

Compounds (TICs) by EPA Method 625, and volatile petroleum hydrocarbons (VPH) and extractable petroleum hydrocarbons (EPH) by the Massachusetts Department of Environmental Protection (MADEP) method.

Comments

The attached tables (Tables 3 and 4) summarize the laboratory results from the October 2000 and August 1999 sampling events. Laboratory reports for the October 2000 sampling event are attached.

A total of ten unknown SVOC TICs, were detected in the groundwater sample from well UST M232-MW07, however no VOCs or SVOCs were detected in the sample (Table 3). VPH hydrocarbon chains were not detected in the sample, however detectable concentrations of EPH hydrocarbon chains C9 to C18 aliphatics, C19 to C36 aliphatics, and C11 to C22 aromatics were identified. The detected concentration of C11 to C22 aromatics in the sample from well UST M232-MW07 exceeds its Interim Groundwater Standard (Table 4). The State of North Carolina has not established Gross Contaminant Levels (GCLs) for MADEP VPH and EPH hydrocarbon chains.

Low concentrations of four VOCs, two SVOCs, four known and six unknown SVOC TICs were identified in the groundwater sample from well UST M232-MW18. With the exception of the TICs, none of the concentrations of compounds identified exceeded their respective Groundwater Standards (Table 3). The SVOC bis (2-ethylexyl) phthalate was previously detected in the sample from UST M232-MW18, however, that compound was not detected during the October 2000 sampling event. Detectable concentrations of VPH hydrocarbon chain C9 to C12 aliphatics and C9 to C10 aromatics, as well as EPH C9 to C18 aliphatics and C11 to C22 aromatics were identified. The combined concentration of VPH and EPH C11 to C22 aromatics exceeds its Interim Groundwater Standard.

Low concentrations of three VOCs and one SVOC TIC were detected in the sample from well UST M232-MW20. The concentrations of VOCs detected did not exceed their respective Groundwater Standards. A detectable concentration of VPH hydrocarbon chain C9 to C12 aliphatics was identified at a concentration below its Groundwater Standard. The concentrations of this hydrocarbon chain and of VPH C9 to C10 aromatics have decreased since August 1999.

Low concentrations of nine VOCs, five known and five unknown SVOC TICs were identified in the groundwater sample from well UST M232-MW21. With the exception of the SVOC TICs, none of the concentrations exceeded their respective Groundwater Standards. Detectable concentrations of VPH hydrocarbon chain C9 to C12 aliphatics, and EPH C9 to C18 aliphatics and C11 to C22 aromatics were also identified in the sample. The combined concentration of VPH and EPH C11 to C22 aromatics exceeded its Interim Groundwater Standard.

Low concentrations of nine VOCs, one SVOC, and six known and four unknown SVOC TICs were identified in the groundwater sample from well UST M232-MW22. The naphthalene concentration in the sample from UST M232-MW22 was slightly above its Groundwater Standard according to VOC analysis, but according to SVOC analysis was below its standard. Bis (2-ethylexyl) phthalate was previously detected in August 1999, however this compound was not detected during this sampling event. Detectable concentrations of VPH hydrocarbon chain C9 to C12 aliphatics and EPH C9 to C18 aliphatics and C11 to C22 aromatics were identified in the sample. The combined concentration of VPH and EPH C11 to C22 aromatics exceeds its Interim Groundwater Standard.

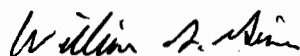
Results of groundwater analysis for this sampling event generally indicate the presence of low and decreasing concentrations of petroleum hydrocarbons, all of which are below established GCLs. The presence of free product within well UST M232-MW19 will continue to cause the Risk Classification for this site to remain Intermediate. LAW recommends that you continue free product recovery efforts at this well location.

This report is intended for the exclusive use of Naval Facilities Engineering Command, Atlantic Division. The contents should not be relied upon by any other parties without the expressed written consent of LAW. The findings are relevant to the dates of our site work and should not be relied upon to represent site conditions on other dates.

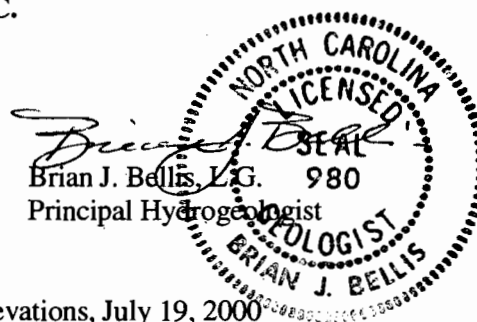
We appreciate the opportunity to provide environmental services on this project. If any questions arise, please contact us at (919) 876-0416.

Sincerely,

LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.



William S. Grimes
Staff Geologist



Attachments: Table 1 – Monitoring Well Casing and Groundwater Elevations, July 19, 2000
Table 2 – Monitoring Well Casing and Groundwater Elevations, October 17, 2000
Table 3 – Summary of Laboratory Analytical Results, Volatile and Semi-Volatile Organic Compounds (5 pages)
Table 4 – Summary of MADEP VPH and EPH Laboratory Analytical Results (5 pages)
Figure 1 – Water Table Elevation Contour Map for July 2000
Figure 2 – Water Table Elevation Contour Map for October 2000
Laboratory Report and Chain of Custody Record

cc: Mr. Neal Paul, Marine Corps Base Camp Lejeune
Ms. Christine Foskey, LANTNAVFACENGOM – Contracts, Correspondence Only
Mr. Michael E. Mason, Program Manager, Catlin Engineers and Scientists, Inc., Correspondence Only

TABLE 1
BUILDINGS M-232 to M-236
MONITORING WELL CASING
AND GROUNDWATER ELEVATIONS
JULY 19, 2000

DATA POINT	TOP OF CASING ELEVATION (feet)	DEPTH TO WATER (feet)	FREE PRODUCT THICKNESS (feet)	WATER TABLE ELEVATION (feet)
UST M232-MW01	14.2	14.49	NMT	-0.29
UST M232-MW02	NA	14.30	NMT	--
UST M232-MW03	12.91	11.01	NMT	1.90
UST M232-MW04	12.90	11.43	NMT	1.47
UST M232-MW05	12.80	11.23	NMT	1.57
UST M232-MW06	NA	11.05	NMT	--
UST M232-MW07	16.33	12.11	NMT	4.22
UST M232-MW08	16.48	12.11	NMT	4.37
UST M232-MW09	13.88	12.64	NMT	1.24
UST M232-MW10	14.43	12.14	NMT	2.29
UST M232-MW11	10.87	10.60	NMT	0.27
UST M232-MW12	NA	9.39	NMT	--
UST M232-MW13	16.10	13.51	NMT	2.59
UST M232-MW14	15.97	13.68	NMT	2.29
UST M232-MW15	NA	12.87	NMT	--
UST M232-MW16	NA	13.01	NMT	--
UST M232-MW17	NA	12.04	NMT	--
UST M232-MW18	NA	9.30	NMT	--
UST M232-MW19	NA	9.84	0.56	--
UST M232-MW20	NA	9.37	NMT	--
UST M232-MW21	NA	9.56	NMT	--
UST M232-MW22	NA	9.45	NMT	--

NMT = No Measurable Thickness

NA= Not Available

Top of casing elevations provided to LAW by O'Brien and Gere (Report No. 2)

TABLE 2
BUILDINGS M-232 to M-236
MONITORING WELL CASING
AND GROUNDWATER ELEVATIONS
OCTOBER 17, 2000

DATA POINT	TOP OF CASING ELEVATION (feet)	DEPTH TO WATER (feet)	FREE PRODUCT THICKNESS (feet)	WATER TABLE ELEVATION (feet)
UST M232-MW01	14.20	9.81	NMT	4.39
UST M232-MW02	NA	10.71	NMT	--
UST M232-MW03	12.91	9.88	NMT	3.03
UST M232-MW04	12.90	7.10	NMT	5.80
UST M232-MW05	12.80	8.12	NMT	4.68
UST M232-MW06	NA	9.90	NMT	--
UST M232-MW07	16.33	12.92	NMT	3.41
UST M232-MW08	16.48	13.22	NMT	3.26
UST M232-MW09	13.88	11.60	NMT	2.28
UST M232-MW10	14.43	10.83	NMT	3.60
UST M232-MW11	10.87	5.12	NMT	5.75
UST M232-MW12	NA	7.90	NMT	--
UST M232-MW13	16.10	12.05	NMT	4.05
UST M232-MW14	15.97	12.39	NMT	3.58
UST M232-MW15	NA	11.51	NMT	--
UST M232-MW16	NA	11.80	NMT	--
UST M232-MW17	NA	10.63	NMT	--
UST M232-MW18	NA	8.10	NMT	--
UST M232-MW19	NA	8.53	0.52	--
UST M232-MW20	NA	7.97	NMT	--
UST M232-MW21	NA	8.05	NMT	--
UST M232-MW22	NA	7.9	NMT	--

NMT = No Measurable Thickness

NA= Not Available

Top of casing elevations provided to LAW by O'Brien and Gere (Report No. 2)

TABLE 3 (PAGE 1 OF 5)
SUMMARY OF LABORATORY ANALYTICAL RESULTS (GROUNDWATER SAMPLES)
VOLATILE AND SEMI-VOLATILE ORGANIC COMPOUNDS
FORMER USTs M232-MW05 & M232-MW07 MARINE CORPS BASE
CAMP LEJEUNE, NORTH CAROLINA

PARAMETER	GROUNDWATER SAMPLE ID WELL SCREEN DEPTH (ft)	USTM232 GW05-00D 5 to 15	USTM232 GW07-00D 5 to 15	GROSS CONTAMINATION LEVELS	NC GROUNDWATER QUALITY STANDARD
STANDARD METHOD 6210D (including historical results by Method 602) – VOLATILE ORGANIC COMPOUNDS (mg/L)					
Benzene		ND	ND	5.0	.001
sec-Butylbenzene		ND	ND	8.5	.070
Ethylbenzene		ND	ND	29.0	.029
Isopropylbenzene		ND	ND	25.0	.070
Naphthalene		ND	ND	15.5	.021
n-Propyl benzene		ND	ND	30.0	.070
1,2,4-Trimethylbenzene		ND	ND	28.5	.350
1,3,5-Trimethylbenzene		ND	ND	25.0	.350
Toluene		ND	ND	257.5	1.000
Xylenes (Total)		ND	ND	87.5	.530
Total EPA Method 602		--	--	N/A	N/A
Total Standard Method 6210D		--	--	N/A	N/A
EPA METHOD 625 – BASE, NEUTRAL AND ACID EXTRACTABLE SEMIVOLATILE ORGANIC COMPOUNDS (mg/L)					
Acenaphthene		ND	ND	2.12	.08
Anthracene		ND	ND	.645	2.10
Bis (2-ethylhexyl) phthalate		ND	ND	Not Established	.003
4,6-Dinitro-2-methylphenol		ND	ND	Not Established	PQL
Fluorene		ND	ND	.950	.28
Naphthalene		ND	ND	15.5	.021
Phenanthrene		ND	ND	.41	.21
Pyrene		ND	ND	.210	.21
Total EPA Method 625		--	--	N/A	N/A
EPA METHOD 625, TENTATIVELY IDENTIFIED COMPOUNDS – TICs (mg/L)					
Known TICs [Concentration]		--	--	N/A	N/A
Unknown TICs [Concentration]		--	10[1.024]	N/A	N/A

Shaded cells = Concentrations exceed the NC Groundwater Quality Standard, but are below the Gross Contamination Levels.

MDL = Method Detection Limit (see Lab Report)

ND = Not Detected above the laboratory practical quantitation limit (PQL). See laboratory report.

TABLE 3 (PAGE 2 OF 5)
SUMMARY OF LABORATORY ANALYTICAL RESULTS (GROUNDWATER SAMPLES)
VOLATILE AND SEMI-VOLATILE ORGANIC COMPOUNDS
FORMER UST M236-MW18, MARINE CORPS BASE
CAMP LEJEUNE, NORTH CAROLINA

PARAMETER	GROUNDWATER SAMPLE ID WELL SCREEN DEPTH (ft)	UST M232 GW18-99C 5 to 15	UST M232 GW18-00D 5 to 15	GROSS CONTAMINATION LEVELS	NC GROUNDWATER QUALITY STANDARD
	SAMPLE DATE	8/18/99	10/19/00		
STANDARD METHOD 6210D (including historical results by Method 602) – VOLATILE ORGANIC COMPOUNDS (mg/L)					
Benzene		ND	ND	5.0	.001
sec-Butylbenzene		--	.004	8.5	.070
tert-Butylbenzene		--	.0007	15.0	.070
Ethylbenzene		ND	ND	29.0	.029
Isopropylbenzene		--	ND	25.0	.070
Naphthalene		--	.003	15.5	.021
n-Propyl benzene		--	ND	30.0	.070
1,2,4-Trimethylbenzene		--	ND	28.5	.350
1,3,5-Trimethylbenzene		--	.0005	25.0	.350
Toluene		ND	ND	257.5	1.000
Xylenes (Total)		ND	ND	87.5	.530
Total EPA Method 602		ND	--	N/A	N/A
Total Standard Method 6210D		--	.0052	N/A	N/A
EPA METHOD 625 – BASE, NEUTRAL AND ACID EXTRACTABLE SEMIVOLATILE ORGANIC COMPOUNDS (mg/L)					
Acenaphthene		ND	ND	2.12	.08
Anthracene		--	ND	.645	2.10
Bis (2-ethylhexyl) phthalate		159	ND	Not Established	.003
4,6-Dinitro-2-methylphenol		--	ND	Not Established	PQL
Fluorene		ND	.012	.950	.28
Naphthalene		.006	ND	15.5	.021
Phenanthrene		ND	.011	.41	.21
Pyrene		--	ND	.210	.21
Total EPA Method 625		.165	.023	N/A	N/A
EPA METHOD 625, TENTATIVELY IDENTIFIED COMPOUNDS – TICs (mg/L)					
Known TICs [Concentration]		3 [.013]	4 [.072]	N/A	N/A
Unknown TICs [Concentration]		2 [.006]	6 [.150]	N/A	N/A

Shaded cells = Concentrations exceed the NC Groundwater Quality Standard, but are below the Gross Contamination Levels.

* = VOCs determined by EPA method 602. Data from LAW Risk Characterization Report, November 1999; Delivery Order 0062

MDL = Method Detection Limit (see Lab Report)

ND = Not Detected above the laboratory practical quantitation limit (PQL). See laboratory report.

TABLE 3 (PAGE 3 OF 5)
SUMMARY OF LABORATORY ANALYTICAL RESULTS (GROUNDWATER SAMPLES)
VOLATILE AND SEMI-VOLATILE ORGANIC COMPOUNDS
FORMER UST M234-MW20 MARINE CORPS BASE
CAMP LEJEUNE, NORTH CAROLINA

PARAMETER	GROUNDWATER SAMPLE ID WELL SCREEN DEPTH(ft)	UST M232 GW20-99C 5 to 15	UST M232 GW20-00D 5 to 15	GROSS CONTAMINATION LEVELS	NC GROUNDWATER QUALITY STANDARD
	SAMPLE DATE	8/18/99	10/19/00		
STANDARD METHOD 6210D (including historical results by Method 602) – VOLATILE ORGANIC COMPOUNDS (mg/L)					
Benzene		ND	ND	5.0	.001
sec-Butylbenzene		--	.002	8.5	.070
Ethylbenzene		.007	ND	29.0	.029
Isopropylbenzene		--	ND	25.0	.070
Naphthalene		--	.001	15.5	.021
n-Propyl benzene		--	.0007	30.0	.070
1,2,4-Trimethylbenzene		--	ND	28.5	.350
1,3,5-Trimethylbenzene		--	ND	25.0	.350
Toluene		ND	ND	257.5	1.000
Xylenes (Total)		ND	ND	87.5	.530
Total EPA Method 602		.007	--	N/A	N/A
Total Standard Method 6210D		--	.0037	N/A	N/A
EPA METHOD 625 – BASE, NEUTRAL AND ACID EXTRACTABLE SEMIVOLATILE ORGANIC COMPOUNDS (mg/L)					
Acenaphthene		.003	ND	2.12	.08
Anthracene		--	ND	.645	2.10
Bis (2-ethylhexyl) phthalate		ND	ND	Not Established	.003
4,6-Dinitro-2-methylphenol		--	ND	Not Established	PQL
Fluorene		.004	ND	.950	.28
Naphthalene		ND	ND	15.5	.021
Phenanthrene		.005	ND	.41	.21
Pyrene		--	ND	.210	.21
Total EPA Method 625		.012	--	N/A	N/A
EPA METHOD 625, TENTATIVELY IDENTIFIED COMPOUNDS – TICs (mg/L)					
Known TICs [Concentration]		11 [.061]	--	N/A	N/A
Unknown TICs [Concentration]		8 [.031]	1 [.0054]	N/A	N/A

Shaded cells = Concentrations exceed the NC Groundwater Quality Standard, but are below the Gross Contamination Levels.

* = VOCs determined by EPA method 602. Data from LAW Risk Characterization Report, November 1999; Delivery Order 0062

MDL = Method Detection Limit (see Lab Report)

ND = Not Detected above the laboratory practical quantitation limit (PQL). See laboratory report.

TABLE 3 (PAGE 4 OF 5)
SUMMARY OF LABORATORY ANALYTICAL RESULTS (GROUNDWATER SAMPLES)
VOLATILE AND SEMI-VOLATILE ORGANIC COMPOUNDS
FORMER USTs M233-MW21 MARINE CORPS BASE
CAMP LEJEUNE, NORTH CAROLINA

PARAMETER	GROUNDWATER SAMPLE ID	UST M232 GW21-99C*	UST M233 GW21-00D	GROSS CONTAMINATION LEVELS	NC GROUNDWATER QUALITY STANDARD
	WELL SCREEN DEPTH (ft)	5 to 15	5 to 15		
	SAMPLE DATE	8/18/99	10/18/00		
STANDARD METHOD 6210D (including historical results by Method 602) – VOLATILE ORGANIC COMPOUNDS (mg/L)					
Benzene		ND	ND	5.0	.001
n-Butylbenzene		--	.004	6.9	.070
sec-Butylbenzene		--	.006	8.5	.070
Ethylbenzene		ND	.0007	29.0	.029
Isopropylbenzene		--	.002	25.0	.070
4-Isopropyltoluene		--	.002		
Naphthalene		--	.008	15.5	.021
n-Propyl benzene		--	.005	30.0	.070
1,2,4-Trimethylbenzene		--	.011	28.5	.350
1,3,5-Trimethylbenzene		--	.003	25.0	.350
Toluene		ND	ND	257.5	1.000
Xylenes (Total)		ND	ND	87.5	.530
Total EPA Method 602		--	--	N/A	N/A
Total Standard Method 6210D		--	.0417	N/A	N/A
EPA METHOD 625 – BASE, NEUTRAL AND ACID EXTRACTABLE SEMIVOLATILE ORGANIC COMPOUNDS (mg/L)					
Acenaphthene		.001	ND	2.12	.08
Anthracene		--	ND	.645	2.10
Bis (2-ethylhexyl) phthalate		.006	ND	Not Established	.003
4,6-Dinitro-2-methylphenol		--	ND	Not Established	PQL
Fluorene		.002	ND	.950	.28
Naphthalene		ND	ND	15.5	.021
Phenanthrene		.002	ND	.41	.21
Pyrene		--	ND	.210	.21
Total EPA Method 625		.011	--	N/A	N/A
EPA METHOD 625, TENTATIVELY IDENTIFIED COMPOUNDS – TICs (mg/L)					
Known TICs [Concentration]		15 [.062]	5 [2.350]	N/A	N/A
Unknown TICs [Concentration]		5 [.022]	5 [2.820]	N/A	N/A

Shaded cells = Concentrations exceed the NC Groundwater Quality Standard, but are below the Gross Contamination Levels.

* = VOCs determined by EPA method 602. Data from LAW Risk Characterization Report, November 1999; Delivery Order 0062

MDL = Method Detection Limit (see Lab Report)

ND = Not Detected above the laboratory practical quantitation limit (PQL). See laboratory report.

TABLE 3 (PAGE 5 OF 5)
SUMMARY OF LABORATORY ANALYTICAL RESULTS (GROUNDWATER SAMPLES)
VOLATILE AND SEMI-VOLATILE ORGANIC COMPOUNDS
FORMER UST M232-MW22 MARINE CORPS BASE
CAMP LEJEUNE, NORTH CAROLINA

PARAMETER	GROUNDWATER		UST M232	UST M232	GROSS CONTAMINATION LEVELS	NC GROUNDWATER QUALITY STANDARD
	SAMPLE ID	WELL/SCREEN DEPTH (ft)	GW22-99G+	GW22-00D		
			5 to 15	5 to 15		
SAMPLE DATE		8/19/99		10/18/00		
STANDARD METHOD 6210D (including historical results by Method 602) – VOLATILE ORGANIC COMPOUNDS (mg/L)						
Benzene		ND	ND	5.0		.001
sec-Butylbenzene		--	.003	8.5		.070
tert-Butylbenzene		--	.0008	15.0		.070
Ethylbenzene		ND	.001	29.0		.029
Isopropylbenzene		--	.003	25.0		.070
4-Isopropyltoluene		--	.002			
Naphthalene		--	.024	15.5		.021
n-Propyl benzene		--	.005	30.0		.070
1,2,4-Trimethylbenzene		--	.022	28.5		.350
1,3,5-Trimethylbenzene		--	.004	25.0		.350
Toluene		ND	ND	257.5		1.000
Xylenes (Total)		ND	ND	87.5		.530
Total EPA Method 602		--	--	N/A		N/A
Total Standard Method 6210D		--	.0648	N/A		N/A
EPA METHOD 625 – BASE, NEUTRAL AND ACID EXTRACTABLE SEMIVOLATILE ORGANIC COMPOUNDS (mg/L)						
Acenaphthene		.002	ND	2.12		.08
Anthracene		--	ND	.645		2.10
Bis (2-ethylhexyl) phthalate		.283	ND	Not Established		.003
4,6-Dinitro-2-methylphenol		--	ND	Not Established		PQL
Fluorene		.003	ND	.950		.28
Naphthalene		.008	.014	15.5		.021
Phenanthrene		.001	ND	.41		.21
Pyrene		--	ND	.210		.21
Total EPA Method 625		.297	.014	N/A		N/A
EPA METHOD 625, TENTATIVELY IDENTIFIED COMPOUNDS – TICs (mg/L)						
Known TICs [Concentration]		16 [.100]	6 [.281]	N/A		N/A
Unknown TICs [Concentration]		4 [.018]	4 [.099]	N/A		N/A

Shaded cells = Concentrations exceed the NC Groundwater Quality Standard, but are below the Gross Contamination Levels.

* = VOCs determined by EPA method 602. Data from LAW Risk Characterization Report, November 1999; Delivery Order 0062
 MDL = Method Detection Limit (see Lab Report)
 ND = Not Detected above the laboratory practical quantitation limit (PQL). See laboratory report.

TABLE 4 (PAGE 1 OF 5)
SUMMARY OF MADEP VPH AND EPH LABORATORY RESULTS (GROUNDWATER SAMPLES)
FORMER USTs M232-MW05 & M232-MW07 MARINE CORPS BASE
CAMP LEJUENE, NORTH CAROLINA

PARAMETER	GROUNDWATER SAMPLE ID	UST M232- GW05-00D	UST M232- GW07-00D	INTERIM GROUNDWATER STANDARD * (VPH and EPH Class Ranges)
	WELL SCREEN DEPTHS (ft)	5 to 15	5 to 15	
	SAMPLE DATES	10/17/00	10/17/00	
MADEP, Total Volatile Petroleum Hydrocarbon Compounds (VPH), mg/L				
	C5 to C8 Aliphatics	ND	ND	
	C9 to C12 Aliphatics	ND	ND	
	C9 to C10 Aromatics	ND	ND	
MADEP, Total Extractable Petroleum Hydrocarbon Compounds (EPH), mg/L				
	C9 to C18 Aliphatics	ND	.760	
	C19 to C36 Aliphatics	ND	.200	
	C11 to C22 Aromatics	ND	.440	
MADEP, CARBON CLASS RANGE TOTALS, mg/L (if concentration identified)				
	C5 to C8 Aliphatics (VPH)	--	--	0.42
	C9 to C12 Aliphatics	--	--	Not Established: Note 1
	C9 to C10 Aromatics	--	--	Not Established: Note 2
	C9 to C18 Aliphatics (VPH + EPH)	--	.760	4.2
	C19 to C36 Aliphatics (EPH)	--	.200	42.0
	C11 to C22 Aromatics (VPH + EPH)	--	.440	0.21

ND = No compounds detected above the laboratory practical quantitation limit (PQL). See laboratory reports

Shaded Cells = Groundwater Contaminant Concentration exceeds the N.C. Groundwater Standard

MADEP = Massachusetts Department of Environmental Protection.

* Gross Contamination levels have not been established for these parameters

Notes:

1. The DWQ has not established a groundwater standard for the C9 to C12 aliphatic compound class of VPH. Instead, the DWQ established a groundwater standard for the C9 to C18 aliphatic compound class, which includes both VPH and EPH.
2. The DWQ has not established a groundwater standard for the C9 to C10 aromatic compound class of VPH. Instead, the DWQ established a groundwater standard for the C11 to C32 aromatic compound class which includes both VPH and EPH.

TABLE 4 (PAGE 2 OF 5)
SUMMARY OF MADEP VPH AND EPH LABORATORY RESULTS (GROUNDWATER SAMPLES)
FORMER USTs M232-MW18 MARINE CORPS BASE
CAMP LEJUENE, NORTH CAROLINA

PARAMETER	GROUNDWATER SAMPLE ID	UST M232- GW18-99C Note 5	UST M232- GW18-00D	INTERIM GROUNDWATER STANDARD* (VPH and EPH Class Ranges)
	WELL SCREEN DEPTHS (ft)	5 to 15	5 to 15	
	SAMPLE DATES	8/19/99	10/19/00	
MADEP, Total Volatile Petroleum Hydrocarbon Compounds (VPH), mg/L				
C5 to C8 Aliphatics		ND	ND	
C9 to C12 Aliphatics		.021	.430	
C9 to C10 Aromatics		.015	.110	
MADEP, Total Extractable Petroleum Hydrocarbon Compounds (EPH), mg/L				
C9 to C18 Aliphatics		ND	.200	
C19 to C36 Aliphatics		ND	ND	
C11 to C22 Aromatics		ND	.170	
MADEP, CARBON CLASS RANGE TOTALS, mg/L (if concentration identified)				
C5 to C8 Aliphatics (VPH)		--	ND	0.42
C9 to C12 Aliphatics		.021	.430	Not Established: Note 3
C9 to C10 Aromatics		.015	.110	Not Established: Note 4
C9 to C18 Aliphatics (VPH + EPH)		.021	.630	4.2
C19 to C36 Aliphatics (EPH)		--	ND	42.0
C11 to C22 Aromatics (VPH + EPH)		.015	.280	0.21

ND = No compounds detected above the laboratory practical quantitation limit (PQL). See laboratory reports

Shaded Cells = Groundwater Contaminant Concentration exceeds the N.C. Groundwater Standard

MADEP = Massachusetts Department of Environmental Protection.

* Gross Contamination levels have not been established for these parameters

Notes:

- The DWQ has not established a groundwater standard for the C9 to C12 aliphatic compound class of VPH. Instead, the DWQ established a groundwater standard for the C9 to C18 aliphatic compound class, which includes both VPH and EPH.
- The DWQ has not established a groundwater standard for the C9 to C10 aromatic compound class of VPH. Instead, the DWQ established a groundwater standard for the C9 to C32 aromatic compound class which includes both VPH and EPH.
- Data from LAW Risk Characterization Report, November 1999; Delivery Order 0062

TABLE 4 (PAGE 3 OF 5)
SUMMARY OF MADEP VPH AND EPH LABORATORY RESULTS (GROUNDWATER SAMPLES)
FORMER USTs M234-MW20 MARINE CORPS BASE
CAMP LEJUENE, NORTH CAROLINA

PARAMETER	GROUNDWATER SAMPLE ID	UST M232- GW20-99C Note 8	UST M232- GW20-00D	INTERIM GROUNDWATER STANDARD* (VPH and EPH Class Ranges)
	WELL SCREEN DEPTHS (ft)	5 to 15	5 to 15	
	SAMPLE DATES	8/18/99	10/19/00	
MADEP, Total Volatile Petroleum Hydrocarbon Compounds (VPH), mg/L				
C5 to C8 Aliphatics		ND	ND	
C9 to C12 Aliphatics		.260	.120	
C9 to C10 Aromatics		.170	ND	
MADEP, Total Extractable Petroleum Hydrocarbon Compounds (EPH), mg/L				
C9 to C18 Aliphatics		ND	ND	
C19 to C36 Aliphatics		ND	ND	
C11 to C22 Aromatics		ND	ND	
MADEP, CARBON CLASS RANGE TOTALS, mg/L (if concentration identified)				
C5 to C8 Aliphatics (VPH)		--	--	
C9 to C12 Aliphatics		.260	.120	
C9 to C10 Aromatics		.170	--	
C9 to C18 Aliphatics (VPH + EPH)		.260	.120	
C19 to C36 Aliphatics (EPH)		--	--	
C11 to C22 Aromatics (VPH + EPH)		.170	--	

ND = No compounds detected above the laboratory practical quantitation limit (PQL). See laboratory reports

Shaded Cells = Groundwater Contaminant Concentration exceeds the N.C. Groundwater Standard

MADEP = Massachusetts Department of Environmental Protection.

* Gross Contamination levels have not been established for these parameters

Notes:

- The DWQ has not established a ground water standard for the C9 to C12 aliphatic compound class of VPH. Instead, the DWQ established a ground water standard for the C9 to C18 aliphatic compound class, which includes both VPH and EPH.
- The DWQ has not established a ground water standard for the C9 to C10 aromatic compound class of VPH. Instead, the DWQ established^a ground water standard for the C9 to C32 aromatic compound class which includes both VPH and EPH.
- Data from LAW Risk Characterization Report, November 1999; Delivery Order 0062

TABLE 4 (PAGE 4 OF 5)
SUMMARY OF MADEP VPH AND EPH LABORATORY RESULTS (GROUNDWATER SAMPLES)
FORMER USTs M233-MW21 MARINE CORPS BASE
CAMP LEJUENE, NORTH CAROLINA

PARAMETER	GROUNDWATER SAMPLE ID	UST M232- GW21-99C Note 11	UST M232- GW21-00D	INTERIM GROUNDWATER STANDARD* (VPH and EPH Class Ranges)
	WELL SCREEN DEPTHS (ft)	5 to 15	5 to 15	
	SAMPLE DATES	8/18/99	10/18/00	
MADEP, Total Volatile Petroleum Hydrocarbon Compounds (VPH), mg/L				
C5 to C8 Aliphatics		ND	ND	
C9 to C12 Aliphatics		.110	.300	
C9 to C10 Aromatics		.072	ND	
MADEP, Total Extractable Petroleum Hydrocarbon Compounds (EPH), mg/L				
C9 to C18 Aliphatics		ND	.160	
C19 to C36 Aliphatics		ND	ND	
C11 to C22 Aromatics		ND	.250	
MADEP, CARBON CLASS RANGE TOTALS, mg/L (if concentration identified)				
C5 to C8 Aliphatics (VPH)		--	--	0.42
C9 to C12 Aliphatics		.110	.300	Not Established: Note 9
C9 to C10 Aromatics		.072	--	Not Established: Note 10
C9 to C18 Aliphatics (VPH + EPH)		.110	.460	4.2
C19 to C36 Aliphatics (EPH)		--	--	42.0
C11 to C22 Aromatics (VPH + EPH)		.072	.250	0.21

ND = No compounds detected above the laboratory practical quantitation limit (PQL). See laboratory reports

Shaded Cells = Groundwater Contaminant Concentration exceeds the N.C. Groundwater Standard

MADEP = Massachusetts Department of Environmental Protection.

* Gross Contamination levels have not been established for these parameters

Notes:

9. The DWQ has not established a groundwater standard for the C9 to C12 aliphatic compound class of VPH. Instead, the DWQ established a groundwater standard for the C9 to C18 aliphatic compound class, which includes both VPH and EPH.

10. The DWQ has not established a groundwater standard for the C9 to C10 aromatic compound class of VPH. Instead, the DWQ established a

groundwater standard for the C9 to C32 aromatic compound class which includes both VPH and EPH.

11. Data from LAW Risk Characterization Report, November 1999; Delivery Order 0062

TABLE 4 (PAGE 5 OF 5)
SUMMARY OF MADEP VPH AND EPH LABORATORY RESULTS (GROUNDWATER SAMPLES)
FORMER USTs M232-MW22 MARINE CORPS BASE
CAMP LEJUENE, NORTH CAROLINA

PARAMETER	GROUNDWATER SAMPLE ID	UST M232- GW22-99C Note 14	UST M232- GW22-00D	INTERIM GROUNDWATER STANDARD* (VPH and EPH Class Ranges)
	WELL SCREEN DEPTHS (ft)	5 to 15	5 to 15	
	SAMPLE DATES	8/19/99	10/18/00	
MADEP, Total Volatile Petroleum Hydrocarbon Compounds (VPH), mg/L				
C5 to C8 Aliphatics		ND	ND	
C9 to C12 Aliphatics		.150	.210	
C9 to C10 Aromatics		.096	ND	
MADEP, Total Extractable Petroleum Hydrocarbon Compounds (EPH), mg/L				
C9 to C18 Aliphatics		ND	.210	
C19 to C36 Aliphatics		ND	ND	
C11 to C22 Aromatics		ND	.340	
MADEP, CARBON CLASS RANGE TOTALS, mg/L (if concentration identified)				
C5 to C8 Aliphatics (VPH)		--	--	0.42
C9 to C12 Aliphatics		.150	.210	Not Established: Note 12
C9 to C10 Aromatics		.096	--	Not Established: Note 13
C9 to C18 Aliphatics (VPH + EPH)		.150	.210	4.2
C19 to C36 Aliphatics (EPH)		--	--	42.0
C11 to C22 Aromatics (VPH + EPH)		.096	.340	0.21

ND = No compounds detected above the laboratory practical quantitation limit (PQL). See laboratory reports

Shaded Cells = Groundwater Contaminant Concentration exceeds the N.C. Groundwater Standard

MADEP = Massachusetts Department of Environmental Protection.

* Gross Contamination levels have not been established for these parameters

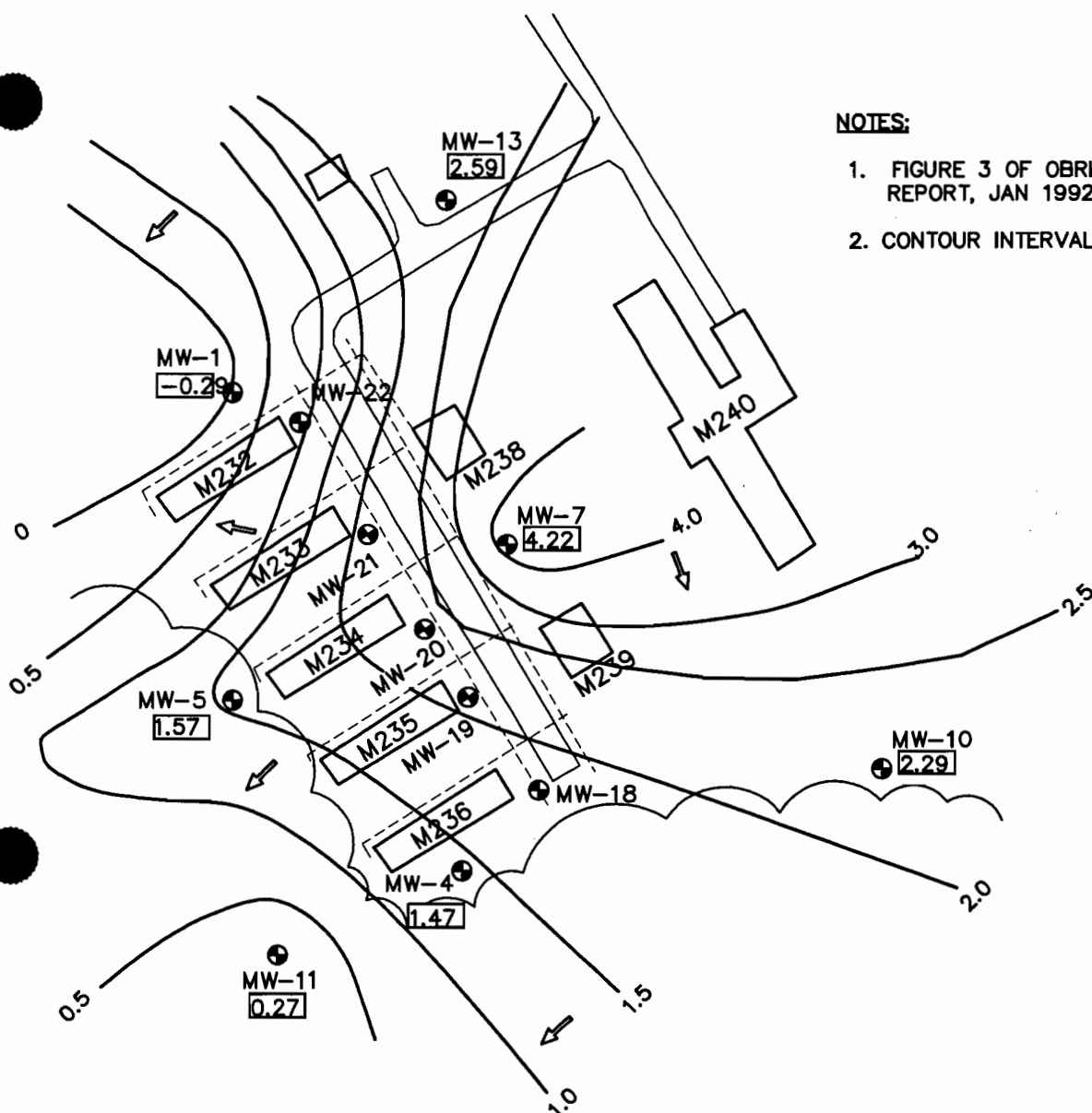
Notes:

12. The DWQ has not established a groundwater standard for the C9 to C12 aliphatic compound class of VPH. Instead, the DWQ established a groundwater standard for the C9 to C18 aliphatic compound class, which includes both VPH and EPH.
13. The DWQ has not established a groundwater standard for the C9 to C10 aromatic compound class of VPH. Instead, the DWQ established^a a groundwater standard for the C9 to C32 aromatic compound class which includes both VPH and EPH.
14. Data from LAW Risk Characterization Report, November 1999; Delivery Order 0062

NORTH

NOTES:

1. FIGURE 3 OF OBRIEN & GERE REPORT, JAN 1992
2. CONTOUR INTERVAL=0.5ft.



KEY

- 5.6 GROUNDWATER ELEVATION (FT. MSL), JULY 19, 2000.
- 3.00 --- GROUNDWATER ELEVATION CONTOUR LINES (FT. MSL)
- ⇒ GROUNDWATER FLOW DIRECTION BASED ON GROUNDWATER ELEVATION DATA.
- ⊕ MW-10 MONITORING WELLS INSTALLED BY ATEC ENVIRONMENTAL INC., NOVEMBER 1991
- ~~~~~ WOODLINE

GRAPHIC SCALE - IN FEET



G:\CADD\PROJECTS\40-60600\W232-M232-236_PLAN(1)

LAW

LAWGIBB Group Member
LAW ENGINEERING & ENVIRONMENTAL
SERVICES, INC. RALEIGH NC

PROJECT
1ST SEMI-ANNUAL GROUNDWATER
MONITORING REPORT
BUILDING M232-M236
CAMP LEJEUNE, N.C.

JOB NO:
30740-6-0600/0088

DATE: DEC. 2000

TITLE

**WATER TABLE ELEVATION
CONTOUR MAP
JULY 19, 2000**

SCALE: 1"=150'

DRAWN BY: LGL

CHECKED BY: *wsb*

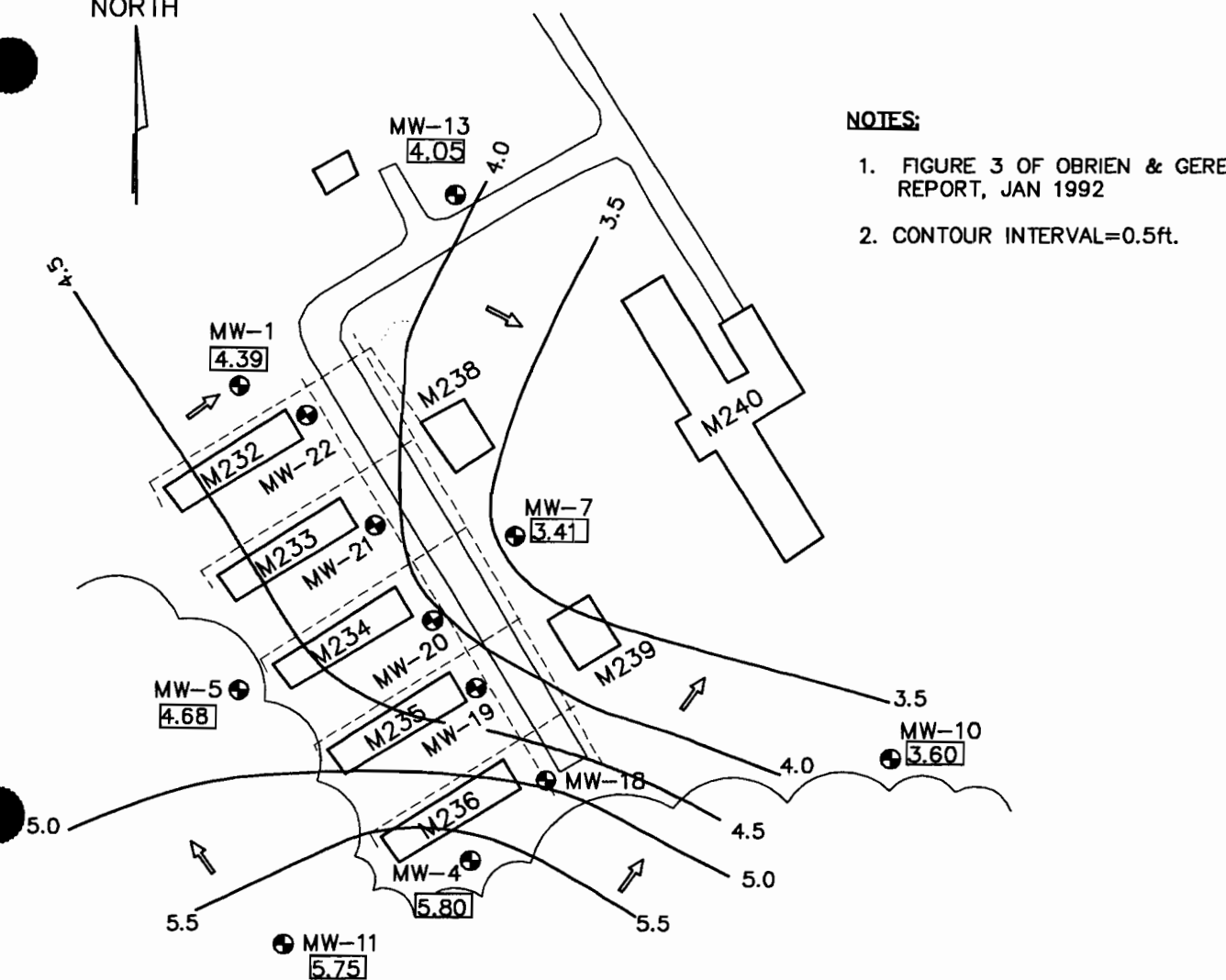
FIGURE

1

NORTH

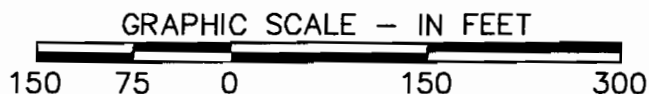
NOTES:

1. FIGURE 3 OF OBRIEN & GERE REPORT, JAN 1992
2. CONTOUR INTERVAL=0.5ft.



KEY

- 5.6 GROUNDWATER ELEVATION (FT. MSL), OCTOBER 17, 2000.
- 3.00 --- GROUNDWATER ELEVATION CONTOUR LINES (FT. MSL)
- ⇒ GROUNDWATER FLOW DIRECTION BASED ON GROUNDWATER ELEVATION DATA.
- ⊕ MW-10 MONITORING WELLS INSTALLED BY ATEC ENVIRONMENTAL INC., NOVEMBER 1991
- ~~~~~ WOODLINE



G:\CADD\PROJECTS\40-60600\M232-M236_PLAN(2)

Laboratory Report and Chain of Custody Records

PARADIGM ANALYTICAL LABORATORIES, INC.

2627 Northchase Parkway S.E.
Wilmington, North Carolina 28405
(910) 350-1903
Fax (910) 350-1557

Mr. Bill Deobald
Law Engineering
3301 Atlantic Ave.
Raleigh, NC 27604

November 7, 2000

Report Number: G132-736

Client Project ID: M232-M236

Dear Mr. Deobald,

Enclosed are the results of the analytical services performed under the referenced project. Copies of this report and supporting data will be retained in our files for a period of five years in the event they are required for future reference. Any samples submitted to our laboratory will be retained for a maximum of thirty (30) days from the date of this report unless other arrangements are requested.

If there are any questions about the report or the services performed during this project, please call for assistance. We will be happy to answer any questions or concerns which you may have.

Thank you for using Paradigm Analytical Labs for your analytical services. We look forward to working with you again on any additional analytical needs which you may have.

Sincerely,

Paradigm Analytical Laboratories, Inc.



Laboratory Director
Mark Randall

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Volatiles

by GCMS 6210D

Client Sample ID: USTM232-GW05-00D

Client Project ID: M232-M236

Lab Sample ID: 97482

Lab Project ID: G132-736

Matrix: Water

Date Analyzed: 10/29/00

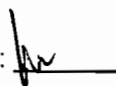
Analyzed By: EKR

Date Collected: 10/17/00

Date Received: 10/19/00

Dilution: 1.0

Compound	Quantitation Limit (ug/L)	Result (ug/L)
Benzene	0.5	BQL
Bromobenzene	0.5	BQL
Bromochloromethane	0.5	BQL
Bromodichloromethane	0.5	BQL
Bromoform	0.5	BQL
Bromomethane	0.5	BQL
n-Butylbenzene	0.5	BQL
sec-Butylbenzene	0.5	BQL
tert-Butylbenzene	0.5	BQL
Carbon tetrachloride	0.5	BQL
Chlorobenzene	0.5	BQL
Chloroethane	0.5	BQL
Chloroform	0.5	BQL
Chloromethane	0.5	BQL
2-Chlorotoluene	0.5	BQL
4-Chlorotoluene	0.5	BQL
Dibromochloromethane	0.5	BQL
1,2-Dibromo-3-chloropropane	5	BQL
Dibromomethane	0.5	BQL
1,2-Dibromoethane (EDB)	0.5	BQL
1,2-Dichlorobenzene	0.5	BQL
1,3-Dichlorobenzene	0.5	BQL
1,4-Dichlorobenzene	0.5	BQL
1,1-Dichloroethane	0.5	BQL
1,1-Dichloroethene	0.5	BQL
1,2-Dichloroethane	0.5	BQL
cis-1,2-Dichloroethene	0.5	BQL
trans-1,2-dichloroethene	0.5	BQL
1,2-Dichloropropane	0.5	BQL
1,3-Dichloropropane	0.5	BQL
2,2-Dichloropropane	0.5	BQL
1,1-Dichloropropene	0.5	BQL
Dichlorodifluoromethane	5	BQL
Diisopropyl ether (DIPE)	0.5	BQL
Ethylbenzene	0.5	BQL
Hexachlorobutadiene	0.5	BQL
Isopropylbenzene	0.5	BQL
4-Isopropyltoluene	0.5	BQL
Methylene chloride	5	BQL
Methyl-tert-butyl ether (MTBE)	0.5	BQL

Reviewed by: 

Flags: BQL = Below Quantitation Limit

N.C. Certification #481 S.C. Certification #99029

Page 1

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Volatiles

by GCMS 6210D

Client Sample ID: USTM232-GW05-00D

Client Project ID: M232-M236

Lab Sample ID: 97482

Lab Project ID: G132-736

Matrix: Water

Date Analyzed: 10/29/00

Analyzed By: EKR

Date Collected: 10/17/00

Date Received: 10/19/00

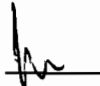
Dilution: 1.0

Compound	Quantitation Limit (ug/L)	Result (ug/L)
Naphthalene	0.5	BQL
n-Propyl benzene	0.5	BQL
Styrene	0.5	BQL
1,1,1,2-Tetrachloroethane	0.5	BQL
1,1,2,2-Tetrachloroethane	0.5	BQL
Tetrachloroethene	0.5	BQL
Toluene	0.5	BQL
1,2,3-Trichlorobenzene	0.5	BQL
1,2,4-Trichlorobenzene	0.5	BQL
Trichloroethene	0.5	BQL
1,1,1-Trichloroethane	0.5	BQL
1,1,2-Trichloroethane	0.5	BQL
Trichlorofluoromethane	0.5	BQL
1,2,3-Trichloropropane	0.5	BQL
1,2,4-Trimethylbenzene	0.5	BQL
1,3,5-Trimethylbenzene	0.5	BQL
Vinyl chloride	0.5	BQL
m-,p-Xylene	1	BQL
o-Xylene	0.5	BQL

Surrogate Spike Recoveries	Spike Added (ug/L)	Surrogate Result (ug/L)	%Rec
Compound			
Bromofluorobenzene	10.0	9.6	96
1,2-Dichloroethane-d4	10.0	11.0	110
Toluene-d8	10.0	9.9	99

Comments:

All results are corrected for dilution.

Reviewed by: 

Flags: BQL = Below Quantitation Limit

N.C. Certification #481 S.C. Certification #99029

Page 2

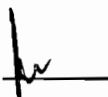
PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Volatiles by GCMS 6210D

Client Sample ID: USTM232-GW07-00D
Client Project ID: M232-M236
Lab Sample ID: 97483
Lab Project ID: G132-736
Matrix: Water

Date Analyzed: 10/29/00
Analyzed By: EKR
Date Collected: 10/17/00
Date Received: 10/19/00
Dilution: 1.0

Compound	Quantitation Limit (ug/L)	Result (ug/L)
Benzene	0.5	BQL
Bromobenzene	0.5	BQL
Bromochloromethane	0.5	BQL
Bromodichloromethane	0.5	BQL
Bromoform	0.5	BQL
Bromomethane	0.5	BQL
n-Butylbenzene	0.5	BQL
sec-Butylbenzene	0.5	BQL
tert-Butylbenzene	0.5	BQL
Carbon tetrachloride	0.5	BQL
Chlorobenzene	0.5	BQL
Chloroethane	0.5	BQL
Chloroform	0.5	BQL
Chloromethane	0.5	BQL
2-Chlorotoluene	0.5	BQL
4-Chlorotoluene	0.5	BQL
Dibromochloromethane	0.5	BQL
1,2-Dibromo-3-chloropropane	5	BQL
Dibromomethane	0.5	BQL
1,2-Dibromoethane (EDB)	0.5	BQL
1,2-Dichlorobenzene	0.5	BQL
1,3-Dichlorobenzene	0.5	BQL
1,4-Dichlorobenzene	0.5	BQL
1,1-Dichloroethane	0.5	BQL
1,1-Dichloroethene	0.5	BQL
1,2-Dichloroethane	0.5	BQL
cis-1,2-Dichloroethene	0.5	BQL
trans-1,2-dichloroethene	0.5	BQL
1,2-Dichloropropane	0.5	BQL
1,3-Dichloropropane	0.5	BQL
2,2-Dichloropropane	0.5	BQL
1,1-Dichloropropene	0.5	BQL
Dichlorodifluoromethane	5	BQL
Diisopropyl ether (DIPE)	0.5	BQL
Ethylbenzene	0.5	BQL
Hexachlorobutadiene	0.5	BQL
Isopropylbenzene	0.5	BQL
4-Isopropyltoluene	0.5	BQL
Methylene chloride	5	BQL
Methyl-tert-butyl ether (MTBE)	0.5	BQL

Reviewed by: 

Flags: BQL = Below Quantitation Limit

N.C. Certification #481 S.C. Certification #99029

Page 1

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Volatiles

by GCMS 6210D

Client Sample ID: USTM232-GW07-00D

Client Project ID: M232-M236

Lab Sample ID: 97483

Lab Project ID: G132-736

Matrix: Water

Date Analyzed: 10/29/00

Analyzed By: EKR

Date Collected: 10/17/00

Date Received: 10/19/00

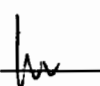
Dilution: 1.0

Compound	Quantitation Limit (ug/L)	Result (ug/L)
Naphthalene	0.5	BQL
n-Propyl benzene	0.5	BQL
Styrene	0.5	BQL
1,1,1,2-Tetrachloroethane	0.5	BQL
1,1,2,2-Tetrachloroethane	0.5	BQL
Tetrachloroethene	0.5	BQL
Toluene	0.5	BQL
1,2,3-Trichlorobenzene	0.5	BQL
1,2,4-Trichlorobenzene	0.5	BQL
Trichloroethene	0.5	BQL
1,1,1-Trichloroethane	0.5	BQL
1,1,2-Trichloroethane	0.5	BQL
Trichlorofluoromethane	0.5	BQL
1,2,3-Trichloropropane	0.5	BQL
1,2,4-Trimethylbenzene	0.5	BQL
1,3,5-Trimethylbenzene	0.5	BQL
Vinyl chloride	0.5	BQL
m-,p-Xylene	1	BQL
o-Xylene	0.5	BQL

Surrogate Spike Recoveries	Spike Added (ug/L)	Surrogate Result (ug/L)	%Rec
Compound			
Bromofluorobenzene	10.0	9.8	98
1,2-Dichloroethane-d4	10.0	11.0	110
Toluene-d8	10.0	10.0	100

Comments:

All results are corrected for dilution.

Reviewed by: 

Flags: BQL = Below Quantitation Limit

N.C. Certification #481 S.C. Certification #99029

Page 2

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Volatiles

by GCMS 6210D

Client Sample ID: USTM236-GW18-00D

Client Project ID: M232-M236

Lab Sample ID: 97486

Lab Project ID: G132-736

Matrix: Water

Date Analyzed: 11/2/00

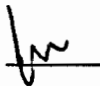
Analyzed By: EKR

Date Collected: 10/19/00

Date Received: 10/19/00

Dilution: 1.0

Compound	Quantitation Limit (ug/L)	Result (ug/L)
Benzene	0.5	BQL
Bromobenzene	0.5	BQL
Bromochloromethane	0.5	BQL
Bromodichloromethane	0.5	BQL
Bromoform	0.5	BQL
Bromomethane	0.5	BQL
n-Butylbenzene	0.5	BQL
sec-Butylbenzene	0.5	4
tert-Butylbenzene	0.5	0.7
Carbon tetrachloride	0.5	BQL
Chlorobenzene	0.5	BQL
Chloroethane	0.5	BQL
Chloroform	0.5	BQL
Chloromethane	0.5	BQL
2-Chlorotoluene	0.5	BQL
4-Chlorotoluene	0.5	BQL
Dibromochloromethane	0.5	BQL
1,2-Dibromo-3-chloropropane	5	BQL
Dibromomethane	0.5	BQL
1,2-Dibromoethane (EDB)	0.5	BQL
1,2-Dichlorobenzene	0.5	BQL
1,3-Dichlorobenzene	0.5	BQL
1,4-Dichlorobenzene	0.5	BQL
1,1-Dichloroethane	0.5	BQL
1,1-Dichloroethene	0.5	BQL
1,2-Dichloroethane	0.5	BQL
cis-1,2-Dichloroethene	0.5	BQL
trans-1,2-dichloroethene	0.5	BQL
1,2-Dichloropropane	0.5	BQL
1,3-Dichloropropane	0.5	BQL
2,2-Dichloropropane	0.5	BQL
1,1-Dichloropropene	0.5	BQL
Dichlorodifluoromethane	5	BQL
Diisopropyl ether (DIPE)	0.5	BQL
Ethylbenzene	0.5	BQL
Hexachlorobutadiene	0.5	BQL
Isopropylbenzene	0.5	BQL
4-Isopropyltoluene	0.5	BQL
Methylene chloride	5	BQL
Methyl-tert-butyl ether (MTBE)	0.5	BQL

Reviewed by: 

Flags: BQL = Below Quantitation Limit

N.C. Certification #481 S.C. Certification #99029

Page 1

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Volatiles

by GCMS 6210D

Client Sample ID: USTM236-GW18-00D

Client Project ID: M232-M236

Lab Sample ID: 97486

Lab Project ID: G132-736

Matrix: Water

Date Analyzed: 11/2/00

Analyzed By: EKR

Date Collected: 10/19/00

Date Received: 10/19/00

Dilution: 1.0

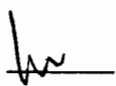
Compound	Quantitation Limit (ug/L)	Result (ug/L)
Naphthalene	0.5	3
n-Propyl benzene	0.5	BQL
Styrene	0.5	BQL
1,1,1,2-Tetrachloroethane	0.5	BQL
1,1,2,2-Tetrachloroethane	0.5	BQL
Tetrachloroethene	0.5	BQL
Toluene	0.5	BQL
1,2,3-Trichlorobenzene	0.5	BQL
1,2,4-Trichlorobenzene	0.5	BQL
Trichloroethene	0.5	BQL
1,1,1-Trichloroethane	0.5	BQL
1,1,2-Trichloroethane	0.5	BQL
Trichlorofluoromethane	0.5	BQL
1,2,3-Trichloropropane	0.5	BQL
1,2,4-Trimethylbenzene	0.5	BQL
1,3,5-Trimethylbenzene	0.5	0.5
Vinyl chloride	0.5	BQL
m-,p-Xylene	1	BQL
o-Xylene	0.5	BQL

Surrogate Spike Recoveries

Compound	Spike Added (ug/L)	Surrogate Result (ug/L)	%Rec
Bromofluorobenzene	10.0	9.7	97
1,2-Dichloroethane-d4	10.0	10.4	104
Toluene-d8	10.0	10.1	101

Comments:

All results are corrected for dilution.

Reviewed by: 

Flags: BQL = Below Quantitation Limit

N.C. Certification #481 S.C. Certification #99029

Page 2

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Volatiles

by GCMS 6210D

Client Sample ID: USTM234-GW20-00D

Client Project ID: M232-M236

Lab Sample ID: 97487

Lab Project ID: G132-736

Matrix: Water

Date Analyzed: 11/2/00

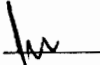
Analyzed By: EKR

Date Collected: 10/19/00

Date Received: 10/19/00

Dilution: 1.0

Compound	Quantitation Limit (ug/L)	Result (ug/L)
Benzene	0.5	BQL
Bromobenzene	0.5	BQL
Bromochloromethane	0.5	BQL
Bromodichloromethane	0.5	BQL
Bromoform	0.5	BQL
Bromomethane	0.5	BQL
n-Butylbenzene	0.5	BQL
sec-Butylbenzene	0.5	2
tert-Butylbenzene	0.5	BQL
Carbon tetrachloride	0.5	BQL
Chlorobenzene	0.5	BQL
Chloroethane	0.5	BQL
Chloroform	0.5	BQL
Chloromethane	0.5	BQL
2-Chlorotoluene	0.5	BQL
4-Chlorotoluene	0.5	BQL
Dibromochloromethane	0.5	BQL
1,2-Dibromo-3-chloropropane	5	BQL
Dibromomethane	0.5	BQL
1,2-Dibromoethane (EDB)	0.5	BQL
1,2-Dichlorobenzene	0.5	BQL
1,3-Dichlorobenzene	0.5	BQL
1,4-Dichlorobenzene	0.5	BQL
1,1-Dichloroethane	0.5	BQL
1,1-Dichloroethene	0.5	BQL
1,2-Dichloroethane	0.5	BQL
cis-1,2-Dichloroethene	0.5	BQL
trans-1,2-dichloroethene	0.5	BQL
1,2-Dichloropropane	0.5	BQL
1,3-Dichloropropane	0.5	BQL
2,2-Dichloropropane	0.5	BQL
1,1-Dichloropropene	0.5	BQL
Dichlorodifluoromethane	5	BQL
Diisopropyl ether (DIPE)	0.5	BQL
Ethylbenzene	0.5	BQL
Hexachlorobutadiene	0.5	BQL
Isopropylbenzene	0.5	BQL
4-Isopropyltoluene	0.5	BQL
Methylene chloride	5	BQL
Methyl-tert-butyl ether (MTBE)	0.5	BQL

Reviewed by: 

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Volatiles

by GCMS 6210D

Client Sample ID: USTM234-GW20-00D

Client Project ID: M232-M236

Lab Sample ID: 97487

Lab Project ID: G132-736

Matrix: Water

Date Analyzed: 11/2/00

Analyzed By: EKR

Date Collected: 10/19/00

Date Received: 10/19/00

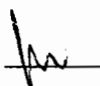
Dilution: 1.0

Compound	Quantitation Limit (ug/L)	Result (ug/L)
Naphthalene	0.5	1
n-Propyl benzene	0.5	0.7
Styrene	0.5	BQL
1,1,1,2-Tetrachloroethane	0.5	BQL
1,1,2,2-Tetrachloroethane	0.5	BQL
Tetrachloroethene	0.5	BQL
Toluene	0.5	BQL
1,2,3-Trichlorobenzene	0.5	BQL
1,2,4-Trichlorobenzene	0.5	BQL
Trichloroethene	0.5	BQL
1,1,1-Trichloroethane	0.5	BQL
1,1,2-Trichloroethane	0.5	BQL
Trichlorofluoromethane	0.5	BQL
1,2,3-Trichloropropane	0.5	BQL
1,2,4-Trimethylbenzene	0.5	BQL
1,3,5-Trimethylbenzene	0.5	BQL
Vinyl chloride	0.5	BQL
m,p-Xylene	1	BQL
o-Xylene	0.5	BQL

Surrogate Spike Recoveries	Spike Added (ug/L)	Surrogate Result (ug/L)	%Rec
Compound			
Bromofluorobenzene	10.0	10.4	104
1,2-Dichloroethane-d4	10.0	10.6	106
Toluene-d8	10.0	10.0	100

Comments:

All results are corrected for dilution.

Reviewed by: 

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Volatiles

by GCMS 6210D

Client Sample ID: USTM233-GW21-00D

Client Project ID: M232-M236

Lab Sample ID: 97484

Lab Project ID: G132-736

Matrix: Water

Date Analyzed: 10/31/00

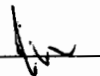
Analyzed By: EKR

Date Collected: 10/18/00

Date Received: 10/19/00

Dilution: 1.0

Compound	Quantitation Limit (ug/L)	Result (ug/L)
Benzene	0.5	BQL
Bromobenzene	0.5	BQL
Bromochloromethane	0.5	BQL
Bromodichloromethane	0.5	BQL
Bromoform	0.5	BQL
Bromomethane	0.5	BQL
n-Butylbenzene	0.5	4
sec-Butylbenzene	0.5	6
tert-Butylbenzene	0.5	BQL
Carbon tetrachloride	0.5	BQL
Chlorobenzene	0.5	BQL
Chloroethane	0.5	BQL
Chloroform	0.5	BQL
Chloromethane	0.5	BQL
2-Chlorotoluene	0.5	BQL
4-Chlorotoluene	0.5	BQL
Dibromochloromethane	0.5	BQL
1,2-Dibromo-3-chloropropane	5	BQL
Dibromomethane	0.5	BQL
1,2-Dibromoethane (EDB)	0.5	BQL
1,2-Dichlorobenzene	0.5	BQL
1,3-Dichlorobenzene	0.5	BQL
1,4-Dichlorobenzene	0.5	BQL
1,1-Dichloroethane	0.5	BQL
1,1-Dichloroethene	0.5	BQL
1,2-Dichloroethane	0.5	BQL
cis-1,2-Dichloroethene	0.5	BQL
trans-1,2-dichloroethene	0.5	BQL
1,2-Dichloropropane	0.5	BQL
1,3-Dichloropropane	0.5	BQL
2,2-Dichloropropane	0.5	BQL
1,1-Dichloropropene	0.5	BQL
Dichlorodifluoromethane	5	BQL
Diisopropyl ether (DIPE)	0.5	BQL
Ethylbenzene	0.5	0.7
Hexachlorobutadiene	0.5	BQL
Isopropylbenzene	0.5	2
4-Isopropyltoluene	0.5	2
Methylene chloride	5	BQL
Methyl-tert-butyl ether (MTBE)	0.5	BQL

Reviewed by: 

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Volatiles

by GCMS 6210D

Client Sample ID: USTM233-GW21-00D

Client Project ID: M232-M236

Lab Sample ID: 97484

Lab Project ID: G132-736

Matrix: Water

Date Analyzed: 10/31/00

Analyzed By: EKR

Date Collected: 10/18/00

Date Received: 10/19/00

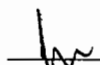
Dilution: 1.0

Compound	Quantitation Limit (ug/L)	Result (ug/L)
Naphthalene	0.5	8
n-Propyl benzene	0.5	5
Styrene	0.5	BQL
1,1,1,2-Tetrachloroethane	0.5	BQL
1,1,2,2-Tetrachloroethane	0.5	BQL
Tetrachloroethene	0.5	BQL
Toluene	0.5	BQL
1,2,3-Trichlorobenzene	0.5	BQL
1,2,4-Trichlorobenzene	0.5	BQL
Trichloroethene	0.5	BQL
1,1,1-Trichloroethane	0.5	BQL
1,1,2-Trichloroethane	0.5	BQL
Trichlorofluoromethane	0.5	BQL
1,2,3-Trichloropropane	0.5	BQL
1,2,4-Trimethylbenzene	0.5	11
1,3,5-Trimethylbenzene	0.5	3
Vinyl chloride	0.5	BQL
m-,p-Xylene	1	BQL
o-Xylene	0.5	BQL

Surrogate Spike Recoveries	Spike Added (ug/L)	Surrogate Result (ug/L)	%Rec
Compound			
Bromofluorobenzene	10.0	10.1	101
1,2-Dichloroethane-d4	10.0	11.4	114
Toluene-d8	10.0	10.2	102

Comments:

All results are corrected for dilution.

Reviewed by: 

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Volatiles

by GCMS 6210D

Client Sample ID: USTM232-GW22-00D
 Client Project ID: M232-M236
 Lab Sample ID: 97485
 Lab Project ID: G132-736
 Matrix: Water

Date Analyzed: 10/31/00
 Analyzed By: EKR
 Date Collected: 10/18/00
 Date Received: 10/19/00
 Dilution: 1.0

Compound	Quantitation Limit (ug/L)	Result (ug/L)
Benzene	0.5	BQL
Bromobenzene	0.5	BQL
Bromochloromethane	0.5	BQL
Bromodichloromethane	0.5	BQL
Bromoform	0.5	BQL
Bromomethane	0.5	BQL
n-Butylbenzene	0.5	BQL
sec-Butylbenzene	0.5	3
tert-Butylbenzene	0.5	0.8
Carbon tetrachloride	0.5	BQL
Chlorobenzene	0.5	BQL
Chloroethane	0.5	BQL
Chloroform	0.5	BQL
Chloromethane	0.5	BQL
2-Chlorotoluene	0.5	BQL
4-Chlorotoluene	0.5	BQL
Dibromochloromethane	0.5	BQL
1,2-Dibromo-3-chloropropane	5	BQL
Dibromomethane	0.5	BQL
1,2-Dibromoethane (EDB)	0.5	BQL
1,2-Dichlorobenzene	0.5	BQL
1,3-Dichlorobenzene	0.5	BQL
1,4-Dichlorobenzene	0.5	BQL
1,1-Dichloroethane	0.5	BQL
1,1-Dichloroethene	0.5	BQL
1,2-Dichloroethane	0.5	BQL
cis-1,2-Dichloroethene	0.5	BQL
trans-1,2-dichloroethene	0.5	BQL
1,2-Dichloropropane	0.5	BQL
1,3-Dichloropropane	0.5	BQL
2,2-Dichloropropane	0.5	BQL
1,1-Dichloropropene	0.5	BQL
Dichlorodifluoromethane	5	BQL
Diisopropyl ether (DIPE)	0.5	BQL
Ethylbenzene	0.5	1
Hexachlorobutadiene	0.5	BQL
Isopropylbenzene	0.5	3
4-Isopropyltoluene	0.5	2
Methylene chloride	5	BQL
Methyl-tert-butyl ether (MTBE)	0.5	BQL

Reviewed by: 

Flags: BQL = Below Quantitation Limit

N.C. Certification #481 S.C. Certification #99029

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Volatiles

by GCMS 6210D

Client Sample ID: USTM232-GW22-00D

Client Project ID: M232-M236

Lab Sample ID: 97485

Lab Project ID: G132-736

Matrix: Water

Date Analyzed: 10/31/00

Analyzed By: EKR

Date Collected: 10/18/00

Date Received: 10/19/00

Dilution: 1.0

Compound	Quantitation Limit (ug/L)	Result (ug/L)
Naphthalene	0.5	24
n-Propyl benzene	0.5	5
Styrene	0.5	BQL
1,1,1,2-Tetrachloroethane	0.5	BQL
1,1,2,2-Tetrachloroethane	0.5	BQL
Tetrachloroethene	0.5	BQL
Toluene	0.5	BQL
1,2,3-Trichlorobenzene	0.5	BQL
1,2,4-Trichlorobenzene	0.5	BQL
Trichloroethene	0.5	BQL
1,1,1-Trichloroethane	0.5	BQL
1,1,2-Trichloroethane	0.5	BQL
Trichlorofluoromethane	0.5	BQL
1,2,3-Trichloropropane	0.5	BQL
1,2,4-Trimethylbenzene	0.5	22
1,3,5-Trimethylbenzene	0.5	4
Vinyl chloride	0.5	BQL
m-,p-Xylene	1	BQL
o-Xylene	0.5	BQL

Surrogate Spike Recoveries

Compound	Spike Added (ug/L)	Surrogate Result (ug/L)	%Rec
Bromofluorobenzene	10.0	9.7	97
1,2-Dichloroethane-d4	10.0	11.0	110
Toluene-d8	10.0	10.2	102

Comments:

All results are corrected for dilution.

Reviewed by: 

Flags: BQL = Below Quantitation Limit

N.C. Certification #481 S.C. Certification #99029

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PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Volatiles

by GCMS 6210D

Client Sample ID: USTM232-GW99-00D

Client Project ID: M232-M236

Lab Sample ID: 97488

Lab Project ID: G132-736

Matrix: Water

Date Analyzed: 10/29/00

Analyzed By: EKR

Date Collected: 10/17/00

Date Received: 10/19/00

Dilution: 1.0

Compound	Quantitation Limit (ug/L)	Result (ug/L)
Benzene	0.5	BQL
Bromobenzene	0.5	BQL
Bromochloromethane	0.5	BQL
Bromodichloromethane	0.5	BQL
Bromoform	0.5	BQL
Bromomethane	0.5	BQL
n-Butylbenzene	0.5	BQL
sec-Butylbenzene	0.5	BQL
tert-Butylbenzene	0.5	BQL
Carbon tetrachloride	0.5	BQL
Chlorobenzene	0.5	BQL
Chloroethane	0.5	BQL
Chloroform	0.5	BQL
Chloromethane	0.5	BQL
2-Chlorotoluene	0.5	BQL
4-Chlorotoluene	0.5	BQL
Dibromochloromethane	0.5	BQL
1,2-Dibromo-3-chloropropane	5	BQL
Dibromomethane	0.5	BQL
1,2-Dibromoethane (EDB)	0.5	BQL
1,2-Dichlorobenzene	0.5	BQL
1,3-Dichlorobenzene	0.5	BQL
1,4-Dichlorobenzene	0.5	BQL
1,1-Dichloroethane	0.5	BQL
1,1-Dichloroethene	0.5	BQL
1,2-Dichloroethane	0.5	BQL
cis-1,2-Dichloroethene	0.5	BQL
trans-1,2-dichloroethene	0.5	BQL
1,2-Dichloropropane	0.5	BQL
1,3-Dichloropropane	0.5	BQL
2,2-Dichloropropane	0.5	BQL
1,1-Dichloropropene	0.5	BQL
Dichlorodifluoromethane	5	BQL
Diisopropyl ether (DIPE)	0.5	BQL
Ethylbenzene	0.5	BQL
Hexachlorobutadiene	0.5	BQL
Isopropylbenzene	0.5	BQL
4-Isopropyltoluene	0.5	BQL
Methylene chloride	5	BQL
Methyl-tert-butyl ether (MTBE)	0.5	BQL

Reviewed by: 

Flags: BQL = Below Quantitation Limit

N.C. Certification #481 S.C. Certification #99029

Page 1

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Volatiles

by GCMS 6210D

Client Sample ID: USTM232-GW99-00D

Client Project ID: M232-M236

Lab Sample ID: 97488

Lab Project ID: G132-736

Matrix: Water

Date Analyzed: 10/29/00

Analyzed By: EKR

Date Collected: 10/17/00

Date Received: 10/19/00

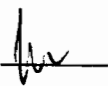
Dilution: 1.0

Compound	Quantitation Limit (ug/L)	Result (ug/L)
Naphthalene	0.5	BQL
n-Propyl benzene	0.5	BQL
Styrene	0.5	BQL
1,1,1,2-Tetrachloroethane	0.5	BQL
1,1,2,2-Tetrachloroethane	0.5	BQL
Tetrachloroethene	0.5	BQL
Toluene	0.5	BQL
1,2,3-Trichlorobenzene	0.5	BQL
1,2,4-Trichlorobenzene	0.5	BQL
Trichloroethene	0.5	BQL
1,1,1-Trichloroethane	0.5	BQL
1,1,2-Trichloroethane	0.5	BQL
Trichlorofluoromethane	0.5	BQL
1,2,3-Trichloropropane	0.5	BQL
1,2,4-Trimethylbenzene	0.5	BQL
1,3,5-Trimethylbenzene	0.5	BQL
Vinyl chloride	0.5	BQL
m-,p-Xylene	1	BQL
o-Xylene	0.5	BQL

Surrogate Spike Recoveries	Spike Added (ug/L)	Surrogate Result (ug/L)	%Rec
Compound			
Bromofluorobenzene	10.0	9.9	99
1,2-Dichloroethane-d4	10.0	11.3	113
Toluene-d8	10.0	10.3	103

Comments:

All results are corrected for dilution.

Reviewed by: 

Flags: BQL = Below Quantitation Limit

N.C. Certification #481 S.C. Certification #99029

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VPH (Aliphatics/Aromatics) Laboratory Reporting Form

Client Name: LAW ENGINEERING

Project Name: M232-M236

Sample Information and Analytical Results	
Sample Identification	USTM232-GW05-00D
Sample Matrix	Water
Collection Option (for Soil)*	
Date Collected	10/17/00
Date Received	10/19/00
Date Extracted	10/24/00
Date Analyzed	10/24/00
Dry Weight	
Dilution Factor	1
C ₅ -C ₈ Aliphatics**	< 100 (µg/L)
C ₉ -C ₁₂ Aliphatics**	< 100 (µg/L)
C ₉ -C ₁₀ Aromatics**	< 100 (µg/L)
Surrogate % Recovery - PID	85
Surrogate % Recovery - FID	98

* = Option 1 = Established fill line on vial, Option 2 = Sampling Device/Brand, or Option 3 = Field weight of soil.

** = Excludes any surrogates or internal standards.

Lab Info: G132-736-97482

Reviewed By: W

VPH (Aliphatics/Aromatics) Laboratory Reporting Form

Client Name: LAW ENGINEERING

Project Name: M232-M236

Sample Information and Analytical Results	
Sample Identification	USTM232-GW07-00D
Sample Matrix	Water
Collection Option (for Soil)*	
Date Collected	10/17/00
Date Received	10/19/00
Date Extracted	10/24/00
Date Analyzed	10/24/00
Dry Weight	
Dilution Factor	1
C ₅ -C ₈ Aliphatics**	< 100 (µg/L)
C ₉ -C ₁₂ Aliphatics**	< 100 (µg/L)
C ₉ -C ₁₀ Aromatics**	< 100 (µg/L)
Surrogate % Recovery - PID	85
Surrogate % Recovery - FID	110

* = Option 1 = Established fill line on vial, Option 2 = Sampling Device/Brand, or Option 3 = Field weight of soil.

** = Excludes any surrogates or internal standards.

Lab Info: G132-736-97483

Reviewed By: LN

VPH (Aliphatics/Aromatics) Laboratory Reporting Form

Client Name: LAW ENGINEERING

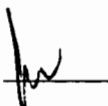
Project Name: M232-M236

Sample Information and Analytical Results	
Sample Identification	USTM236-GW18-00D
Sample Matrix	Water
Collection Option (for Soil)*	
Date Collected	10/19/00
Date Received	10/19/00
Date Extracted	10/24/00
Date Analyzed	10/24/00
Dry Weight	
Dilution Factor	1
C ₅ -C ₈ Aliphatics**	< 100 (µg/L)
C ₉ -C ₁₂ Aliphatics**	430 (µg/L)
C ₉ -C ₁₀ Aromatics**	110 (µg/L)
Surrogate % Recovery - PID	90
Surrogate % Recovery - FID	110

* = Option 1 = Established fill line on vial, Option 2 = Sampling Device/Brand, or Option 3 = Field weight of soil.

** = Excludes any surrogates or internal standards.

Lab Info: G132-736-97486

Reviewed By: 

VPH (Aliphatics/Aromatics) Laboratory Reporting Form

Client Name: LAW ENGINEERING

Project Name: M232-M236

Sample Information and Analytical Results	
Sample Identification	USTM234-GW20-00D
Sample Matrix	Water
Collection Option (for Soil)*	
Date Collected	10/19/00
Date Received	10/19/00
Date Extracted	10/24/00
Date Analyzed	10/24/00
Dry Weight	
Dilution Factor	1
C ₅ -C ₈ Aliphatics**	< 100 (µg/L)
C ₉ -C ₁₂ Aliphatics**	120 (µg/L)
C ₉ -C ₁₀ Aromatics**	< 100 (µg/L)
Surrogate % Recovery - PID	92
Surrogate % Recovery - FID	110

* = Option 1 = Established fill line on vial, Option 2 = Sampling Device/Brand, or Option 3 = Field weight of soil.

** = Excludes any surrogates or internal standards.

Lab Info: G132-736-97487

Reviewed By: 

VPH (Aliphatics/Aromatics) Laboratory Reporting Form

Client Name: LAW ENGINEERING

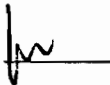
Project Name: M232-M236

Sample Information and Analytical Results	
Sample Identification	USTM233-GW21-00D
Sample Matrix	Water
Collection Option (for Soil)*	
Date Collected	10/18/00
Date Received	10/19/00
Date Extracted	10/27/00
Date Analyzed	10/27/00
Dry Weight	
Dilution Factor	1
C ₅ -C ₈ Aliphatics**	< 100 (µg/L)
C ₉ -C ₁₂ Aliphatics**	300 (µg/L)
C ₉ -C ₁₀ Aromatics**	< 100 (µg/L)
Surrogate % Recovery - PID	82
Surrogate % Recovery - FID	100

* = Option 1 = Established fill line on vial, Option 2 = Sampling Device/Brand, or Option 3 = Field weight of soil.

** = Excludes any surrogates or internal standards.

Lab Info: G132-736-97484

Reviewed By: 

VPH (Aliphatics/Aromatics) Laboratory Reporting Form

Client Name: LAW ENGINEERING

Project Name: M232-M236

Sample Information and Analytical Results	
Sample Identification	USTM232-GW22-00D
Sample Matrix	Water
Collection Option (for Soil)*	
Date Collected	10/18/00
Date Received	10/19/00
Date Extracted	10/27/00
Date Analyzed	10/27/00
Dry Weight	
Dilution Factor	1
C ₅ -C ₈ Aliphatics**	< 100 (µg/L)
C ₉ -C ₁₂ Aliphatics**	210 (µg/L)
C ₉ -C ₁₀ Aromatics**	< 100 (µg/L)
Surrogate % Recovery - PID	84
Surrogate % Recovery - FID	100

* = Option 1 = Established fill line on vial, Option 2 = Sampling Device/Brand, or Option 3 = Field weight of soil.

** = Excludes any surrogates or internal standards.

Lab Info: G132-736-97485

Reviewed By: 

VPH (Aliphatics/Aromatics) Laboratory Reporting Form

Client Name: LAW ENGINEERING

Project Name: M232-M236

Sample Information and Analytical Results	
Sample Identification	Trip Blank
Sample Matrix	Water
Collection Option (for Soil)*	
Date Collected	10/19/00
Date Received	10/19/00
Date Extracted	10/26/00
Date Analyzed	10/26/00
Dry Weight	
Dilution Factor	1
C ₅ -C ₈ Aliphatics**	< 100 (µg/L)
C ₉ -C ₁₂ Aliphatics**	< 100 (µg/L)
C ₉ -C ₁₀ Aromatics**	< 100 (µg/L)
Surrogate % Recovery - PID	88
Surrogate % Recovery - FID	100

* = Option 1 = Established fill line on vial, Option 2 = Sampling Device/Brand, or Option 3 = Field weight of soil.

** = Excludes any surrogates or internal standards.

Lab Info: G132-736-97489

Reviewed By: 

Attachment 2

VPH Laboratory Reporting Form

Calibration and QA/QC Information

FID Initial Calibration Date: 10/12/00PID Initial Calibration Date: 10/12/00

Calibration Ranges and Limits

Range	MDL		ML		RL	
	(µg/L)	(mg/Kg)	(µg/L)	(mg/Kg)	(µg/L)	(mg/Kg)
C ₅ -C ₈ Aliphatics	2.4	0.12	7.5	0.38	100	10
C ₉ -C ₁₂ Aliphatics	1.3	0.065	4.0	0.21	100	10
C ₉ -C ₁₀ Aromatics	0.5	0.025	1.6	0.08	100	10

Calibration Concentration Levels

Range	Levels		%RSD or CCC	Method of Quantitation
	(µg/L)	(mg/Kg)		
C ₅ -C ₈ Aliphatics	40	2	1.7	Calibration Factor
	160	8		
	400	20		
	1600	80		
	4000	200		
C ₉ -C ₁₂ Aliphatics	30	1.5	10.9	Calibration Factor
	120	6		
	300	15		
	1200	60		
	3000	150		
C ₉ -C ₁₀ Aromatics	65	3.25	21.2	Calibration Factor
	260	13		
	650	32.5		
	2600	130		
	6500	325		

Calibration Check Date: 10/24/00

Calibration Check

Range	Levels		RPD
	(µg/L)	(mg/Kg)	
C ₅ -C ₈ Aliphatics	400	20	9.5
C ₉ -C ₁₂ Aliphatics	300	15	2.7
C ₉ -C ₁₀ Aromatics	650	32.5	-11.3

MDL = Method Detection Limit

ML = Minimum Limit

RL = Reportable Limit

RPD = Relative Percent Difference

%RSD = Percent Relative Standard Deviation

CCC = Correlation Coefficient of Curve

Reviewed By: *h*

Attachment 2

VPH Laboratory Reporting Form

Calibration and QA/QC Information

FID Initial Calibration Date: 10/12/00PID Initial Calibration Date: 10/12/00

Calibration Ranges and Limits

Range	MDL		ML		RL	
	($\mu\text{g/L}$)	(mg/Kg)	($\mu\text{g/L}$)	(mg/Kg)	($\mu\text{g/L}$)	(mg/Kg)
C ₅ -C ₈ Aliphatics	2.4	0.12	7.5	0.38	100	10
C ₉ -C ₁₂ Aliphatics	1.3	0.065	4.0	0.21	100	10
C ₉ -C ₁₀ Aromatics	0.5	0.025	1.6	0.08	100	10

Calibration Concentration Levels

Range	Levels		%RSD or CCC	Method of Quantitation
	($\mu\text{g/L}$)	(mg/Kg)		
C ₅ -C ₈ Aliphatics	40	2	1.7	Calibration Factor
	160	8		
	400	20		
	1600	80		
	4000	200		
C ₉ -C ₁₂ Aliphatics	30	1.5	10.9	Calibration Factor
	120	6		
	300	15		
	1200	60		
	3000	150		
C ₉ -C ₁₀ Aromatics	65	3.25	21.2	Calibration Factor
	260	13		
	650	32.5		
	2600	130		
	6500	325		

Calibration Check Date: 10/26/00

Calibration Check

Range	Levels		RPD
	($\mu\text{g/L}$)	(mg/Kg)	
C ₅ -C ₈ Aliphatics	400	20	10.7
C ₉ -C ₁₂ Aliphatics	300	15	12.1
C ₉ -C ₁₀ Aromatics	650	32.5	-0.9

MDL = Method Detection Limit

ML = Minimum Limit

RL = Reportable Limit

RPD = Relative Percent Difference

%RSD = Percent Relative Standard Deviation

CCC = Correlation Coefficient of Curve

Reviewed By: 

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Semivolatiles by GCMS 625

Client Sample ID: USTM232-GW05-00D

Client Project ID: M232-M236

Lab Sample ID: 97482

Lab Project ID: G132-736

Matrix: Water

Date Collected: 10/17/00

Date Received: 10/19/00

Date Analyzed: 10/27/00

Analyzed By: MRC

Dilution: 1

Compound	Quantitation Limit (ug/L)	Result (ug/L)
Acenaphthene	10	BQL
Acenaphthylene	10	BQL
Anthracene	10	BQL
Benzo[a]anthracene	10	BQL
Benzo[a]pyrene	10	BQL
Benzo[b]fluoranthene	10	BQL
Benzo[g,h,i]perylene	10	BQL
Benzo[k]fluoranthene	10	BQL
Bis(2-chloroethoxy)methane	10	BQL
Bis(2-chloroethyl)ether	10	BQL
Bis(2-chloroisopropyl)ether	10	BQL
Bis(2-ethylhexyl)phthalate	10	BQL
4-bromophenyl phenyl ether	10	BQL
Butylbenzylphthalate	10	BQL
4-Chloro-3-methylphenol	10	BQL
2-Chloronaphthalene	10	BQL
2-Chlorophenol	10	BQL
4-Chlorophenyl phenyl ether	10	BQL
Chrysene	10	BQL
Di-n-Butylphthalate	10	BQL
Di-n-octylphthalate	10	BQL
Dibenzo[a,h]anthracene	10	BQL
1,2-Dichlorobenzene	10	BQL
1,3-Dichlorobenzene	10	BQL
1,4-Dichlorobenzene	10	BQL
3,3'-Dichlorobenzidine	20	BQL
2,4-Dichlorophenol	10	BQL
Diethylphthalate	10	BQL
2,4-Dimethylphenol	10	BQL
Dimethylphthalate	10	BQL
4,6-Dinitro-2-methylphenol	50	BQL
2,4-Dinitrophenol	50	BQL
2,4-Dinitrotoluene	10	BQL
2,6-Dinitrotoluene	10	BQL
Fluoranthene	10	BQL
Fluorene	10	BQL
Hexachlorobenzene	10	BQL
Hexachlorobutadiene	10	BQL
Hexachlorocyclopentadiene	20	BQL
Hexachloroethane	10	BQL

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Semivolatiles by GCMS 625

Client Sample ID: USTM232-GW05-00D
 Client Project ID: M232-M236
 Lab Sample ID: 97482
 Lab Project ID: G132-736
 Matrix: Water

Date Collected: 10/17/00
 Date Received: 10/19/00
 Date Analyzed: 10/27/00
 Analyzed By: MRC
 Dilution: 1

Compound	Quantitation Limit (ug/L)	Result (ug/L)
Indeno(1,2,3-c,d)pyrene	10	BQL
Isophorone	10	BQL
N-Nitrosodi-n-propylamine	10	BQL
N-Nitrosodiphenylamine	10	BQL
Naphthalene	10	BQL
Nitrobenzene	10	BQL
2-Nitrophenol	10	BQL
4-Nitrophenol	50	BQL
Pentachlorophenol	50	BQL
Phenanthrene	10	BQL
Phenol	10	BQL
Pyrene	10	BQL
1,2,4-Trichlorobenzene	10	BQL
2,4,6-Trichlorophenol	10	BQL

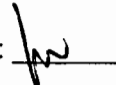
Surrogate Spike Recoveries	Spike Added	Spike Result	Percent Recovered
2-Fluorobiphenyl	10	7.4	74
2-Fluorophenol	10	5.8	58
Nitrobenzene-d5	10	6.5	65
Phenol-d6	10	6.2	62
2,4,6-Tribromophenol	10	6.8	68
4-Terphenyl-d14	10	6.1	61

Comments:

Results are corrected for %solids and dilution where applicable.

Flags:

BQL = Below Quantitation Limit.

Reviewed By: 

Results of Library Search for Semivolatile Compounds

by GCMS

Client Sample ID: USTM232-GW05-00D
Client Project ID: M232-M236
Lab Sample ID: 97482
Lab Project ID: G132-736
Matrix: Water

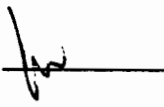
Date Collected: 10/17/00
Date Received: 10/19/00
Date Analyzed: 10/27/00
Analyzed By: MRC
Dilution: 1

Num.	Compound	CAS#	Match Probability	Result (ug/L)
1	No library search compounds detected.			
2				
3				
4				
5				
6				
7				
8				
9				
10				

Comment:

Tentatively Identified Compound (TIC) refers to substances which are not present in the list of target compounds. Therefore, not all TICs are identified and quantitated using individual standards. TIC listings are prepared utilizing a computerized library search of electron impact mass spectral data and evaluation of the relevant data by a mass spectral data specialist.

Quantitation is accomplished by relative peak height of the compound compared to that of the nearest internal standard from the total ion chromatogram. TICs are identified and quantitated only if the peak height is equal to or greater than 10% of that of the nearest internal standard. Quantitation provided is an estimate.

Reviewed by: 

Results for Semivolatiles
by GCMS 625

Client Sample ID: USTM232-GW07-00D
Client Project ID: M232-M236
Lab Sample ID: 97483
Lab Project ID: G132-736
Matrix: Water

Date Collected: 10/17/00
Date Received: 10/19/00
Date Analyzed: 10/26/00
Analyzed By: MRC
Dilution: 1

Compound	Quantitation Limit (ug/L)	Result (ug/L)
Acenaphthene	10	BQL
Acenaphthylene	10	BQL
Anthracene	10	BQL
Benzo[a]anthracene	10	BQL
Benzo[a]pyrene	10	BQL
Benzo[b]fluoranthene	10	BQL
Benzo[g,h,i]perylene	10	BQL
Benzo[k]fluoranthene	10	BQL
Bis(2-chloroethoxy)methane	10	BQL
Bis(2-chloroethyl)ether	10	BQL
Bis(2-chloroisopropyl)ether	10	BQL
Bis(2-ethylhexyl)phthalate	10	BQL
4-bromophenyl phenyl ether	10	BQL
Butylbenzylphthalate	10	BQL
4-Chloro-3-methylphenol	10	BQL
2-Chloronaphthalene	10	BQL
2-Chlorophenol	10	BQL
4-Chlorophenyl phenyl ether	10	BQL
Chrysene	10	BQL
Di-n-Butylphthalate	10	BQL
Di-n-octylphthalate	10	BQL
Dibenzo[a,h]anthracene	10	BQL
1,2-Dichlorobenzene	10	BQL
1,3-Dichlorobenzene	10	BQL
1,4-Dichlorobenzene	10	BQL
3,3'-Dichlorobenzidine	20	BQL
2,4-Dichlorophenol	10	BQL
Diethylphthalate	10	BQL
2,4-Dimethylphenol	10	BQL
Dimethylphthalate	10	BQL
4,6-Dinitro-2-methylphenol	50	BQL
2,4-Dinitrophenol	50	BQL
2,4-Dinitrotoluene	10	BQL
2,6-Dinitrotoluene	10	BQL
Fluoranthene	10	BQL
Fluorene	10	BQL
Hexachlorobenzene	10	BQL
Hexachlorobutadiene	10	BQL
Hexachlorocyclopentadiene	20	BQL
Hexachloroethane	10	BQL

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Semivolatiles by GCMS 625

Client Sample ID: USTM232-GW07-00D
 Client Project ID: M232-M236
 Lab Sample ID: 97483
 Lab Project ID: G132-736
 Matrix: Water

Date Collected: 10/17/00
 Date Received: 10/19/00
 Date Analyzed: 10/26/00
 Analyzed By: MRC
 Dilution: 1

Compound	Quantitation Limit (ug/L)	Result (ug/L)
Indeno(1,2,3-c,d)pyrene	10	BQL
Isophorone	10	BQL
N-Nitrosodi-n-propylamine	10	BQL
N-Nitrosodiphenylamine	10	BQL
Naphthalene	10	BQL
Nitrobenzene	10	BQL
2-Nitrophenol	10	BQL
4-Nitrophenol	50	BQL
Pentachlorophenol	50	BQL
Phenanthrene	10	BQL
Phenol	10	BQL
Pyrene	10	BQL
1,2,4-Trichlorobenzene	10	BQL
2,4,6-Trichlorophenol	10	BQL

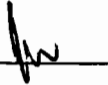
Surrogate Spike Recoveries	Spike Added	Spike Result	Percent Recovered
2-Fluorobiphenyl	10	8.3	83
2-Fluorophenol	10	8.1	81
Nitrobenzene-d5	10	8.3	83
Phenol-d6	10	8.2	82
2,4,6-Tribromophenol	10	9.1	91
4-Terphenyl-d14	10	10.9	109

Comments:

Results are corrected for %solids and dilution where applicable.

Flags:

BQL = Below Quantitation Limit.

Reviewed By: 

Results of Library Search for Semivolatile Compounds
by GCMS

Client Sample ID: USTM232-GW07-00D

Client Project ID: M232-M236

Lab Sample ID: 97483

Lab Project ID: G132-736

Matrix: Water

Date Collected: 10/17/00

Date Received: 10/19/00

Date Analyzed: 10/26/00

Analyzed By: MRC

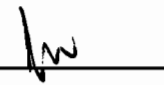
Dilution: 1

Num.	Compound	CAS#	Match Probability	Result (ug/L)
1	Alkane, Unknown			250
2	Alkane, Unknown			130
3	Unknown			120
4	Alkane, Unknown			120
5	Alkane, Unknown			110
6	Alkane, Unknown			96
7	Alkane, Unknown			57
8	Unknown			53
9	Unknown			46
10	Alkane, Unknown			42

Comment:

Tentatively Identified Compound (TIC) refers to substances which are not present in the list of target compounds. Therefore, not all TICs are identified and quantitated using individual standards. TIC listings are prepared utilizing a computerized library search of electron impact mass spectral data and evaluation of the relevant data by a mass spectral data specialist.

Quantitation is accomplished by relative peak height of the compound compared to that of the nearest internal standard from the total ion chromatogram. TICs are identified and quantitated only if the peak height is equal to or greater than 10% of that of the nearest internal standard. Quantitation provided is an estimate.

Reviewed by: 

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Semivolatiles by GCMS 625

Client Sample ID: USTM236-GW18-00D
 Client Project ID: M232-M236
 Lab Sample ID: 97486
 Lab Project ID: G132-736
 Matrix: Water

Date Collected: 10/19/00
 Date Received: 10/19/00
 Date Analyzed: 10/26/00
 Analyzed By: MRC
 Dilution: 1

Compound	Quantitation Limit (ug/L)	Result (ug/L)
Acenaphthene	10	BQL
Acenaphthylene	10	BQL
Anthracene	10	BQL
Benzo[a]anthracene	10	BQL
Benzo[a]pyrene	10	BQL
Benzo[b]fluoranthene	10	BQL
Benzo[g,h,i]perylene	10	BQL
Benzo[k]fluoranthene	10	BQL
Bis(2-chloroethoxy)methane	10	BQL
Bis(2-chloroethyl)ether	10	BQL
Bis(2-chloroisopropyl)ether	10	BQL
Bis(2-ethylhexyl)phthalate	10	BQL
4-bromophenyl phenyl ether	10	BQL
Butylbenzylphthalate	10	BQL
4-Chloro-3-methylphenol	10	BQL
2-Chloronaphthalene	10	BQL
2-Chlorophenol	10	BQL
4-Chlorophenyl phenyl ether	10	BQL
Chrysene	10	BQL
Di-n-Butylphthalate	10	BQL
Di-n-octylphthalate	10	BQL
Dibenzo[a,h]anthracene	10	BQL
1,2-Dichlorobenzene	10	BQL
1,3-Dichlorobenzene	10	BQL
1,4-Dichlorobenzene	10	BQL
3,3'-Dichlorobenzidine	20	BQL
2,4-Dichlorophenol	10	BQL
Diethylphthalate	10	BQL
2,4-Dimethylphenol	10	BQL
Dimethylphthalate	10	BQL
4,6-Dinitro-2-methylphenol	50	BQL
2,4-Dinitrophenol	50	BQL
2,4-Dinitrotoluene	10	BQL
2,6-Dinitrotoluene	10	BQL
Fluoranthene	10	BQL
Fluorene	10	12
Hexachlorobenzene	10	BQL
Hexachlorobutadiene	10	BQL
Hexachlorocyclopentadiene	20	BQL
Hexachloroethane	10	BQL

Results for Semivolatiles
by GCMS 625

Client Sample ID: USTM236-GW18-00D
Client Project ID: M232-M236
Lab Sample ID: 97486
Lab Project ID: G132-736
Matrix: Water

Date Collected: 10/19/00
Date Received: 10/19/00
Date Analyzed: 10/26/00
Analyzed By: MRC
Dilution: 1

Compound	Quantitation Limit (ug/L)	Result (ug/L)
Indeno(1,2,3-c,d)pyrene	10	BQL
Isophorone	10	BQL
N-Nitrosodi-n-propylamine	10	BQL
N-Nitrosodiphenylamine	10	BQL
Naphthalene	10	BQL
Nitrobenzene	10	BQL
2-Nitrophenol	10	BQL
4-Nitrophenol	50	BQL
Pentachlorophenol	50	BQL
Phenanthrene	10	11
Phenol	10	BQL
Pyrene	10	BQL
1,2,4-Trichlorobenzene	10	BQL
2,4,6-Trichlorophenol	10	BQL

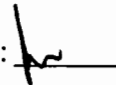
Surrogate Spike Recoveries	Spike Added	Spike Result	Percent Recovered
2-Fluorobiphenyl	10	8.4	85
2-Fluorophenol	10	7.9	79
Nitrobenzene-d5	10	8.5	85
Phenol-d6	10	8.2	82
2,4,6-Tribromophenol	10	9.5	95
4-Terphenyl-d14	10	10.1	101

Comments:

Results are corrected for %solids and dilution where applicable.

Flags:

BQL = Below Quantitation Limit.

Reviewed By: 

Results of Library Search for Semivolatile Compounds
by GCMS

Client Sample ID: USTM236-GW18-00D

Client Project ID: M232-M236

Lab Sample ID: 97486

Lab Project ID: G132-736

Matrix: Water

Date Collected: 10/19/00

Date Received: 10/19/00

Date Analyzed: 10/26/00

Analyzed By: MRC

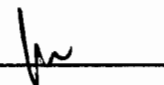
Dilution: 1

Num.	Compound	CAS#	Match Probability	Result (ug/L)
1	Aromatic, Unknown			47
2	Unknown			45
3	Tetrahydromethylnaphahalene, Isomer of			27
4	Aromatic, Unknown			19
5	Biphenyl	000092-52-4	95	19
6	Aromatic, Unknown			15
7	Tetrahydronaphahalene, Isomer of			14
8	Tetrahydromethylnaphahalene, Isomer of			12
9	Aromatic, Unknown			12
10	Aromatic, Unknown			12

Comment:

Tentatively Identified Compound (TIC) refers to substances which are not present in the list of target compounds. Therefore, not all TICs are identified and quantitated using individual standards. TIC listings are prepared utilizing a computerized library search of electron impact mass spectral data and evaluation of the relevant data by a mass spectral data specialist.

Quantitation is accomplished by relative peak height of the compound compared to that of the nearest internal standard from the total ion chromatogram. TICs are identified and quantitated only if the peak height is equal to or greater than 10% of that of the nearest internal standard. Quantitation provided is an estimate.

Reviewed by: 

Results for Semivolatiles
by GCMS 625

Client Sample ID: USTM234-GW20-00D
Client Project ID: M232-M236
Lab Sample ID: 97487
Lab Project ID: G132-736
Matrix: Water

Date Collected: 10/19/00
Date Received: 10/19/00
Date Analyzed: 10/26/00
Analyzed By: MRC
Dilution: 1

Compound	Quantitation Limit (ug/L)	Result (ug/L)
Acenaphthene	10	BQL
Acenaphthylene	10	BQL
Anthracene	10	BQL
Benzo[a]anthracene	10	BQL
Benzo[a]pyrene	10	BQL
Benzo[b]fluoranthene	10	BQL
Benzo[g,h,i]perylene	10	BQL
Benzo[k]fluoranthene	10	BQL
Bis(2-chloroethoxy)methane	10	BQL
Bis(2-chloroethyl)ether	10	BQL
Bis(2-chloroisopropyl)ether	10	BQL
Bis(2-ethylhexyl)phthalate	10	BQL
4-bromophenyl phenyl ether	10	BQL
Butylbenzylphthalate	10	BQL
4-Chloro-3-methylphenol	10	BQL
2-Chloronaphthalene	10	BQL
2-Chlorophenol	10	BQL
4-Chlorophenyl phenyl ether	10	BQL
Chrysene	10	BQL
Di-n-Butylphthalate	10	BQL
Di-n-octylphthalate	10	BQL
Dibenzo[a,h]anthracene	10	BQL
1,2-Dichlorobenzene	10	BQL
1,3-Dichlorobenzene	10	BQL
1,4-Dichlorobenzene	10	BQL
3,3'-Dichlorobenzidine	20	BQL
2,4-Dichlorophenol	10	BQL
Diethylphthalate	10	BQL
2,4-Dimethylphenol	10	BQL
Dimethylphthalate	10	BQL
4,6-Dinitro-2-methylphenol	50	BQL
2,4-Dinitrophenol	50	BQL
2,4-Dinitrotoluene	10	BQL
2,6-Dinitrotoluene	10	BQL
Fluoranthene	10	BQL
Fluorene	10	BQL
Hexachlorobenzene	10	BQL
Hexachlorobutadiene	10	BQL
Hexachlorocyclopentadiene	20	BQL
Hexachloroethane	10	BQL

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Semivolatiles by GCMS 625

Client Sample ID: USTM234-GW20-00D
 Client Project ID: M232-M236
 Lab Sample ID: 97487
 Lab Project ID: G132-736
 Matrix: Water

Date Collected: 10/19/00
 Date Received: 10/19/00
 Date Analyzed: 10/26/00
 Analyzed By: MRC
 Dilution: 1

Compound	Quantitation Limit (ug/L)	Result (ug/L)
Indeno(1,2,3-c,d)pyrene	10	BQL
Isophorone	10	BQL
N-Nitrosodi-n-propylamine	10	BQL
N-Nitrosodiphenylamine	10	BQL
Naphthalene	10	BQL
Nitrobenzene	10	BQL
2-Nitrophenol	10	BQL
4-Nitrophenol	50	BQL
Pentachlorophenol	50	BQL
Phenanthrene	10	BQL
Phenol	10	BQL
Pyrene	10	BQL
1,2,4-Trichlorobenzene	10	BQL
2,4,6-Trichlorophenol	10	BQL

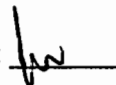
Surrogate Spike Recoveries	Spike Added	Spike Result	Percent Recovered
2-Fluorobiphenyl	10	7.4	74
2-Fluorophenol	10	6.3	63
Nitrobenzene-d5	10	7.4	74
Phenol-d6	10	7.3	73
2,4,6-Tribromophenol	10	8.2	82
4-Terphenyl-d14	10	6.5	65

Comments:

Results are corrected for %solids and dilution where applicable.

Flags:

BQL = Below Quantitation Limit.

Reviewed By: 

Results of Library Search for Semivolatile Compounds
by GCMS

Client Sample ID: USTM234-GW20-00D

Client Project ID: M232-M236

Lab Sample ID: 97487

Lab Project ID: G132-736

Matrix: Water

Date Collected: 10/19/00

Date Received: 10/19/00

Date Analyzed: 10/26/00

Analyzed By: MRC

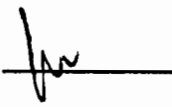
Dilution: 1

Num.	Compound	CAS#	Match Probability	Result (ug/L)
1	Unknown			5.4
2				
3				
4				
5				
6				
7				
8				
9				
10				

Comment:

Tentatively Identified Compound (TIC) refers to substances which are not present in the list of target compounds. Therefore, not all TICs are identified and quantitated using individual standards. TIC listings are prepared utilizing a computerized library search of electron impact mass spectral data and evaluation of the relevant data by a mass spectral data specialist.

Quantitation is accomplished by relative peak height of the compound compared to that of the nearest internal standard from the total ion chromatogram. TICs are identified and quantitated only if the peak height is equal to or greater than 10% of that of the nearest internal standard. Quantitation provided is an estimate.

Reviewed by: 

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Semivolatiles by GCMS 625

Client Sample ID: USTM233-GW21-00D

Client Project ID: M232-M236

Lab Sample ID: 97484

Lab Project ID: G132-736

Matrix: Water

Date Collected: 10/18/00

Date Received: 10/19/00

Date Analyzed: 10/26/00

Analyzed By: MRC

Dilution: 1

Compound	Quantitation Limit (ug/L)	Result (ug/L)
Acenaphthene	10	BQL
Acenaphthylene	10	BQL
Anthracene	10	BQL
Benzo[a]anthracene	10	BQL
Benzo[a]pyrene	10	BQL
Benzo[b]fluoranthene	10	BQL
Benzo[g,h,i]perylene	10	BQL
Benzo[k]fluoranthene	10	BQL
Bis(2-chloroethoxy)methane	10	BQL
Bis(2-chloroethyl)ether	10	BQL
Bis(2-chloroisopropyl)ether	10	BQL
Bis(2-ethylhexyl)phthalate	10	BQL
4-bromophenyl phenyl ether	10	BQL
Butylbenzylphthalate	10	BQL
4-Chloro-3-methylphenol	10	BQL
2-Chloronaphthalene	10	BQL
2-Chlorophenol	10	BQL
4-Chlorophenyl phenyl ether	10	BQL
Chrysene	10	BQL
Di-n-Butylphthalate	10	BQL
Di-n-octylphthalate	10	BQL
Dibenzo[a,h]anthracene	10	BQL
1,2-Dichlorobenzene	10	BQL
1,3-Dichlorobenzene	10	BQL
1,4-Dichlorobenzene	10	BQL
3,3'-Dichlorobenzidine	20	BQL
2,4-Dichlorophenol	10	BQL
Diethylphthalate	10	BQL
2,4-Dimethylphenol	10	BQL
Dimethylphthalate	10	BQL
4,6-Dinitro-2-methylphenol	50	BQL
2,4-Dinitrophenol	50	BQL
2,4-Dinitrotoluene	10	BQL
2,6-Dinitrotoluene	10	BQL
Fluoranthene	10	BQL
Fluorene	10	BQL
Hexachlorobenzene	10	BQL
Hexachlorobutadiene	10	BQL
Hexachlorocyclopentadiene	20	BQL
Hexachloroethane	10	BQL

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Semivolatiles by GCMS 625

Client Sample ID: USTM233-GW21-00D
 Client Project ID: M232-M236
 Lab Sample ID: 97484
 Lab Project ID: G132-736
 Matrix: Water

Date Collected: 10/18/00
 Date Received: 10/19/00
 Date Analyzed: 10/26/00
 Analyzed By: MRC
 Dilution: 1

Compound	Quantitation Limit (ug/L)	Result (ug/L)
Indeno(1,2,3-c,d)pyrene	10	BQL
Isophorone	10	BQL
N-Nitrosodi-n-propylamine	10	BQL
N-Nitrosodiphenylamine	10	BQL
Naphthalene	10	BQL
Nitrobenzene	10	BQL
2-Nitrophenol	10	BQL
4-Nitrophenol	50	BQL
Pentachlorophenol	50	BQL
Phenanthrene	10	BQL
Phenol	10	BQL
Pyrene	10	BQL
1,2,4-Trichlorobenzene	10	BQL
2,4,6-Trichlorophenol	10	BQL

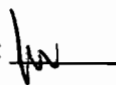
Surrogate Spike Recoveries	Spike Added	Spike Result	Percent Recovered
2-Fluorobiphenyl	10	7.5	75
2-Fluorophenol	10	7.9	79
Nitrobenzene-d5	10	8.3	83
Phenol-d6	10	7.8	78
2,4,6-Tribromophenol	10	8.7	87
4-Terphenyl-d14	10	4.8	49

Comments:

Results are corrected for %solids and dilution where applicable.

Flags:

BQL = Below Quantitation Limit.

Reviewed By: 

Results of Library Search for Semivolatile Compounds
by GCMS

Client Sample ID: USTM233-GW21-00D

Client Project ID: M232-M236

Lab Sample ID: 97484

Lab Project ID: G132-736

Matrix: Water

Date Collected: 10/18/00

Date Received: 10/19/00

Date Analyzed: 10/26/00

Analyzed By: MRC

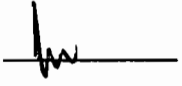
Dilution: 1

Num.	Compound	CAS#	Match Probability	Result (ug/L)
1	Alkane, Unknown			1100
2	Naphthalene, 2-methyl-	000091-57-6	95	730
3	Dimethylnaphthalene, Isomer of			520
4	Alkane, Unknown			510
5	Alkane, Unknown			480
6	Alkane, Unknown			470
7	Naphthalene, 1-methyl-	000090-12-0	94	460
8	Dimethylnaphthalene, Isomer of			380
9	Dimethylnaphthalene, Isomer of			260
10	Alkane, Unknown			260

Comment:

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Quantitation is accomplished by relative peak height of the compound compared to that of the nearest internal standard from the total ion chromatogram. TICs are identified and quantitated only if the peak height is equal to or greater than 10% of that of the nearest internal standard. Quantitation provided is an estimate.

Reviewed by: 

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Semivolatiles by GCMS 625

Client Sample ID: USTM232-GW22-00D

Client Project ID: M232-M236

Lab Sample ID: 97485

Lab Project ID: G132-736

Matrix: Water

Date Collected: 10/18/00

Date Received: 10/19/00

Date Analyzed: 10/26/00

Analyzed By: MRC

Dilution: 1

Compound	Quantitation Limit (ug/L)	Result (ug/L)
Acenaphthene	10	BQL
Acenaphthylene	10	BQL
Anthracene	10	BQL
Benzo[a]anthracene	10	BQL
Benzo[a]pyrene	10	BQL
Benzo[b]fluoranthene	10	BQL
Benzo[g,h,i]perylene	10	BQL
Benzo[k]fluoranthene	10	BQL
Bis(2-chloroethoxy)methane	10	BQL
Bis(2-chloroethyl)ether	10	BQL
Bis(2-chloroisopropyl)ether	10	BQL
Bis(2-ethylhexyl)phthalate	10	BQL
4-bromophenyl phenyl ether	10	BQL
Butylbenzylphthalate	10	BQL
4-Chloro-3-methylphenol	10	BQL
2-Chloronaphthalene	10	BQL
2-Chlorophenol	10	BQL
4-Chlorophenyl phenyl ether	10	BQL
Chrysene	10	BQL
Di-n-Butylphthalate	10	BQL
Di-n-octylphthalate	10	BQL
Dibenzo[a,h]anthracene	10	BQL
1,2-Dichlorobenzene	10	BQL
1,3-Dichlorobenzene	10	BQL
1,4-Dichlorobenzene	10	BQL
3,3'-Dichlorobenzidine	20	BQL
2,4-Dichlorophenol	10	BQL
Diethylphthalate	10	BQL
2,4-Dimethylphenol	10	BQL
Dimethylphthalate	10	BQL
4,6-Dinitro-2-methylphenol	50	BQL
2,4-Dinitrophenol	50	BQL
2,4-Dinitrotoluene	10	BQL
2,6-Dinitrotoluene	10	BQL
Fluoranthene	10	BQL
Fluorene	10	BQL
Hexachlorobenzene	10	BQL
Hexachlorobutadiene	10	BQL
Hexachlorocyclopentadiene	20	BQL
Hexachloroethane	10	BQL

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Semivolatiles by GCMS 625

Client Sample ID: USTM232-GW22-00D
 Client Project ID: M232-M236
 Lab Sample ID: 97485
 Lab Project ID: G132-736
 Matrix: Water

Date Collected: 10/18/00
 Date Received: 10/19/00
 Date Analyzed: 10/26/00
 Analyzed By: MRC
 Dilution: 1

Compound	Quantitation Limit (ug/L)	Result (ug/L)
Indeno(1,2,3-c,d)pyrene	10	BQL
Isophorone	10	BQL
N-Nitrosodi-n-propylamine	10	BQL
N-Nitrosodiphenylamine	10	BQL
Naphthalene	10	14
Nitrobenzene	10	BQL
2-Nitrophenol	10	BQL
4-Nitrophenol	50	BQL
Pentachlorophenol	50	BQL
Phenanthrene	10	BQL
Phenol	10	BQL
Pyrene	10	BQL
1,2,4-Trichlorobenzene	10	BQL
2,4,6-Trichlorophenol	10	BQL

Surrogate Spike Recoveries	Spike Added	Spike Result	Percent Recovered
2-Fluorobiphenyl	10	7.8	78
2-Fluorophenol	10	7.1	71
Nitrobenzene-d5	10	7.4	74
Phenol-d6	10	7.4	74
2,4,6-Tribromophenol	10	8.9	89
4-Terphenyl-d14	10	9.8	98

Comments:

Results are corrected for %solids and dilution where applicable.

Flags:

BQL = Below Quantitation Limit.

Reviewed By: W

Results of Library Search for Semivolatile Compounds
by GCMS

Client Sample ID: USTM232-GW22-00D

Client Project ID: M232-M236

Lab Sample ID: 97485

Lab Project ID: G132-736

Matrix: Water

Date Collected: 10/18/00

Date Received: 10/19/00

Date Analyzed: 10/26/00

Analyzed By: MRC

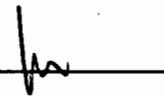
Dilution: 1

Num.	Compound	CAS#	Match Probability	Result (ug/L)
1	Naphthalene, 2-methyl-	000091-57-6	94	72
2	Naphthalene, 1-methyl-	000090-12-0	94	68
3	Dimethylnaphthalene, Isomer of			48
4	Dimethylnaphthalene, Isomer of			38
5	Dimethylnaphthalene, Isomer of			33
6	Alkane, Unknown			31
7	Unknown			30
8	Ethyl dimethylbenzene, Isomer of			22
9	Alkane, Unknown			20
10	Alkane, Unknown			18

Comment:

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Quantitation is accomplished by relative peak height of the compound compared to that of the nearest internal standard from the total ion chromatogram. TICs are identified and quantitated only if the peak height is equal to or greater than 10% of that of the nearest internal standard. Quantitation provided is an estimate.

Reviewed by: 

EPH (Aliphatics/Aromatics) Results

by MDEP-EPH

Client Name: LAW ENGINEERING

Project Name: M232-M236

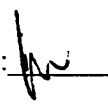
Sample Information and Analytical Results	
Sample Identification	USTM232-GW05-00D
Sample Matrix	Water
Date Collected	10/17/00
Date Received	10/19/00
Date Extracted	10/24/00
Date Analyzed	10/25/00
Dry Weight	
Dilution Factor	1
C ₉ -C ₁₈ Aliphatics*	< 100 (µg/L)
C ₁₉ -C ₃₆ Aliphatics*	< 100 (µg/L)
C ₁₁ -C ₂₂ Aromatics*	< 100 (µg/L)
Aliphatic Surrogate % Recovery	41
Aromatic Surrogate % Recovery	79

Comments:

* = Excludes any surrogates or internal standards.

Sample did not require fractionation.

Lab info: G132-736-97482

Reviewed By: 

EPH (Aliphatics/Aromatics) Results

by MDEP-EPH

Client Name: LAW ENGINEERING

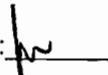
Project Name: M232-M236

Sample Information and Analytical Results	
Sample Identification	USTM232-GW07-00D
Sample Matrix	Water
Date Collected	10/17/00
Date Received	10/19/00
Date Extracted	10/24/00
Date Analyzed	11/02/00
Dry Weight	
Dilution Factor	1
C ₉ -C ₁₈ Aliphatics*	760 (µg/L)
C ₁₉ -C ₃₆ Aliphatics*	200 (µg/L)
C ₁₁ -C ₂₂ Aromatics*	440 (µg/L)
Aliphatic Surrogate % Recovery	72
Aromatic Surrogate % Recovery	91
Fractionation Surrogate 1 % Recovery	94

Comments:

* = Excludes any surrogates or internal standards.

Lab info: G132-736-97483

Reviewed By: 

EPH (Aliphatics/Aromatics) Results

by MDEP-EPH

Client Name: LAW ENGINEERING

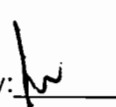
Project Name: M232-M236

Sample Information and Analytical Results	
Sample Identification	USTM236-GW18-00D
Sample Matrix	Water
Date Collected	10/19/00
Date Received	10/19/00
Date Extracted	10/26/00
Date Analyzed	11/02/00
Dry Weight	
Dilution Factor	1
C ₉ -C ₁₈ Aliphatics*	200 (µg/L)
C ₁₉ -C ₃₆ Aliphatics*	< 100 (µg/L)
C ₁₁ -C ₂₂ Aromatics*	170 (µg/L)
Aliphatic Surrogate % Recovery	29
Aromatic Surrogate % Recovery	67
Fractionation Surrogate 1 % Recovery	24

Comments:

* = Excludes any surrogates or internal standards.
Low surrogate confirmed by duplicate analysis.

Lab info: G132-736-97486

Reviewed By: 

EPH (Aliphatics/Aromatics) Results

by MDEP-EPH

Client Name: LAW ENGINEERING

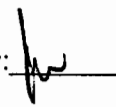
Project Name: M232-M236

Sample Information and Analytical Results	
Sample Identification	USTM234-GW20-00D
Sample Matrix	Water
Date Collected	10/19/00
Date Received	10/19/00
Date Extracted	10/24/00
Date Analyzed	10/24/00
Dry Weight	
Dilution Factor	1
C ₉ -C ₁₈ Aliphatics*	< 100 (µg/L)
C ₁₉ -C ₃₆ Aliphatics*	< 100 (µg/L)
C ₁₁ -C ₂₂ Aromatics*	< 100 (µg/L)
Aliphatic Surrogate % Recovery	34
Aromatic Surrogate % Recovery	77

Comments:

- * = Excludes any surrogates or internal standards.
Sample did not require fractionation.

Lab info: G132-736-97487

Reviewed By: 

PARADIGM ANALYTICAL LABORATORIES, INC.

EPH (Aliphatics/Aromatics) Results

by MDEP-EPH

Client Name: LAW ENGINEERING

Project Name: M232-M236

Sample Information and Analytical Results	
Sample Identification	USTM233-GW21-00D
Sample Matrix	Water
Date Collected	10/18/00
Date Received	10/19/00
Date Extracted	10/25/00
Date Analyzed	11/02/00
Dry Weight	
Dilution Factor	1
C ₉ -C ₁₈ Aliphatics*	160 (µg/L)
C ₁₉ -C ₃₆ Aliphatics*	< 100 (µg/L)
C ₁₁ -C ₂₂ Aromatics*	250 (µg/L)
Aliphatic Surrogate % Recovery	71
Aromatic Surrogate % Recovery	79
Fractionation Surrogate 1 % Recovery	85

Comments:

* = Excludes any surrogates or internal standards.

Lab info: G132-736-97484

Reviewed By: 

EPH (Aliphatics/Aromatics) Results

by MDEP-EPH

Client Name: LAW ENGINEERING

Project Name: M232-M236

Sample Information and Analytical Results	
Sample Identification	USTM232-GW22-00D
Sample Matrix	Water
Date Collected	10/18/00
Date Received	10/19/00
Date Extracted	10/25/00
Date Analyzed	11/02/00
Dry Weight	
Dilution Factor	1
C ₉ -C ₁₈ Aliphatics*	210 (µg/L)
C ₁₉ -C ₃₆ Aliphatics*	< 100 (µg/L)
C ₁₁ -C ₂₂ Aromatics*	340 (µg/L)
Aliphatic Surrogate % Recovery	36
Aromatic Surrogate % Recovery	79
Fractionation Surrogate 1 % Recovery	98

Comments:

* = Excludes any surrogates or internal standards.

Lab info: G132-736-97485

Reviewed By: 

PARADIGM ANALYTICAL LABORATORIES, INC.

Attachment 3

EPH Laboratory Reporting Form

Calibration and QA/QC Information

Initial Calibration Date: 10/16/00

Calibration Ranges and Limits

Range	MDL (mg/Kg)	(µg/L)	ML (mg/Kg)	(µg/L)	RL (mg/Kg)	(µg/L)
C ₉ -C ₁₈ Aliphatics	0.1	2	0.3	6.5	100	10
C ₁₉ -C ₃₆ Aliphatics	0.1	1	0.3	3.1	100	10
C ₁₁ -C ₂₂ Aromatics	0.2	2.5	0.6	8	100	10

Calibration Concentration Levels

Range	Levels (µg/L) (mg/Kg)	%RSD or CCC	Method of Quantitation
C ₉ -C ₁₈ Aliphatics	0.06 1	3.60	Calibration Factor
	0.15 2.5		
	0.3 5		
	0.6 10		
	1.2 20		
C ₁₉ -C ₃₆ Aliphatics	0.08 1.33	2.3	Calibration Factor
	0.2 3.33		
	0.4 6.67		
	0.8 13.3		
	1.6 26.7		
C ₁₁ -C ₂₂ Aromatics	0.12 2	3.7	Calibration Factor
	0.3 5		
	0.6 10		
	1.2 20		
	2.4 40		

Calibration Check Date: 10/24/00

Calibration Check

Range	Levels (µg/mL) (mg/Kg)	RPD
C ₉ -C ₁₈ Aliphatics	0.6 10	-5.9
C ₁₉ -C ₃₆ Aliphatics	0.8 13.3	-13.8
C ₁₁ -C ₂₂ Aromatics	1.2 20	-6.0

MDL = Method Detection Limit

ML = Minimum Limit

RL = Reportable Limit

RPD = Relative Percent Difference

%RSD = Percent Relative Standard Deviation

CCC = Correlation Coefficient of Curve

PARADIGM ANALYTICAL LABORATORIES, INC.

Attachment 3

EPH Laboratory Reporting Form

Calibration and QA/QC Information

Initial Calibration Date: 10/16/00

Calibration Ranges and Limits

Range	MDL (mg/Kg)	(µg/L)	ML (mg/Kg)	(µg/L)	RL (mg/Kg)	(µg/L)
C ₉ -C ₁₈ Aliphatics	0.1	2	0.3	6.5	100	10
C ₁₉ -C ₃₆ Aliphatics	0.1	1	0.3	3.1	100	10
C ₁₁ -C ₂₂ Aromatics	0.2	2.5	0.6	8	100	10

Calibration Concentration Levels

Range	Levels (µg/L) (mg/Kg)	%RSD or CCC	Method of Quantitation
C ₉ -C ₁₈ Aliphatics	0.06 1	3.60	Calibration Factor
	0.15 2.5		
	0.3 5		
	0.6 10		
	1.2 20		
C ₁₉ -C ₃₆ Aliphatics	0.08 1.33	2.3	Calibration Factor
	0.2 3.33		
	0.4 6.67		
	0.8 13.3		
	1.6 26.7		
C ₁₁ -C ₂₂ Aromatics	0.12 2	3.7	Calibration Factor
	0.3 5		
	0.6 10		
	1.2 20		
	2.4 40		

Calibration Check Date: 10/25/00

Calibration Check

Range	Levels (µg/mL) (mg/Kg)	RPD
C ₉ -C ₁₈ Aliphatics	0.6 10	-5.5
C ₁₉ -C ₃₆ Aliphatics	0.8 13.3	-7.6
C ₁₁ -C ₂₂ Aromatics	1.2 20	-3.8

MDL = Method Detection Limit

ML = Minimum Limit

RL = Reportable Limit

RPD = Relative Percent Difference

%RSD = Percent Relative Standard Deviation

CCC = Correlation Coefficient of Curve

PARADIGM ANALYTICAL LABORATORIES, INC.

Attachment 3

EPH Laboratory Reporting Form

Calibration and QA/QC Information

Initial Calibration Date: 10/16/00

Calibration Ranges and Limits

Range	MDL (mg/Kg)	(µg/L)	ML (mg/Kg)	(µg/L)	RL (mg/Kg)	(µg/L)
C ₉ -C ₁₈ Aliphatics	0.1	2	0.3	6.5	100	10
C ₁₉ -C ₃₆ Aliphatics	0.1	1	0.3	3.1	100	10
C ₁₁ -C ₂₂ Aromatics	0.2	2.5	0.6	8	100	10

Calibration Concentration Levels

Range	Levels (µg/L) (mg/Kg)	%RSD or CCC	Method of Quantitation
C ₉ -C ₁₈ Aliphatics	0.06 1	3.60	Calibration Factor
	0.15 2.5		
	0.3 5		
	0.6 10		
	1.2 20		
C ₁₉ -C ₃₆ Aliphatics	0.08 1.33	2.3	Calibration Factor
	0.2 3.33		
	0.4 6.67		
	0.8 13.3		
	1.6 26.7		
C ₁₁ -C ₂₂ Aromatics	0.12 2	3.7	Calibration Factor
	0.3 5		
	0.6 10		
	1.2 20		
	2.4 40		

Calibration Check Date: 11/01/00

Calibration Check

Range	Levels (µg/mL) (mg/Kg)	RPD
C ₉ -C ₁₈ Aliphatics	0.6 10	-4.7
C ₁₉ -C ₃₆ Aliphatics	0.8 13.3	-5.2
C ₁₁ -C ₂₂ Aromatics	1.2 20	-2.3

MDL = Method Detection Limit

ML = Minimum Limit

RL = Reportable Limit

RPD = Relative Percent Difference

%RSD = Percent Relative Standard Deviation

CCC = Correlation Coefficient of Curve

Client: Law Engineering Project ID: M232 → M236 Date: 10-17-18 Report To: Bill Deebald
Address: 3301 Atlantic Avenue Contact: Bill Deebald Turnaround: Standard
Address: Raleigh, NC 27606 Phone: (919) 631-8051 Job Number: 30740-6-0600-88-72
Note #: 1489 Fax: (919) 631-6136 P.O. Number: 307-00607-00 Invoice To: Law Corporate in Alpharetta

Sample ID	Date	Time	Matrix	Preservatives			Analyses				Comments: Please specify any special reporting requirements
							6200 w/Hcl	VRH w/Hcl	625+hrs	EPH w/Hcl	
TM232-GW05-00D	10-17-00	1115	W				3	2	1	1	report in EDD format
TM232-GW07-00D	10-17-00	1015	W				3	2	1	1	G132-136
TM233-GW21-00D	10-18-00	1700	W				3	2	1	1	
TM232-GW22-00D	10-18-00	1645	W				3	2	1	1	
TM236-GW18-00D	10-19-00	0930	W				3	2	1	1	
TM234-GW20-00D	10-19-00	1000	W				3	2	1	1	
TM232-GW19-00D	10-17-00	0800	W				3				
RIP BLANK	-	-	W					2			

Relinquished By: <u>Bill Deebald</u>	Date: <u>10/19/18</u>	Time: <u>1230</u>	Received By: <u>John Stigler</u>	Date: <u>10/19/18</u>	Time: <u>1230</u>	Temperature: <u>Ice - Walker</u>	State Certification Requested: NC ☐ SC ☐ Other ☐
SEE REVERSE FOR TERMS AND CONDITIONS							



L A W

C A T L I N

ENVIRONMENTAL AND
ENGINEERING CONSULTANTS

RALEIGH, N.C.
WILMINGTON, N.C.

**SECOND SEMI-ANNUAL GROUNDWATER
MONITORING REPORT**

**BUILDINGS M232-1 TO M236-1
MARINE CORPS BASE
CAMP LEJEUNE, NORTH CAROLINA**

Issued: June 7, 2001

**Navy Contract No. N62470-95-D-6009
Delivery Order No. 0088
LAW Job No. 30740-6-0600-0088**

**Law Engineering and Environmental Services, Inc.
3301 Atlantic Avenue
Raleigh, North Carolina 27604**

CATLIN

ENVIRONMENTAL AND
ENGINEERING CONSULTANTS

LAW

WILMINGTON, N.C.
RALEIGH, N.C.

June 7, 2001

Commander
LANTNAVFACENGCOM
1510 Gilbert Street
Norfolk, Virginia 23511-2699

Attention: Ms. Lori P. Reuther, Code: EV21LR

**Subject: Second Semi-Annual Groundwater Monitoring Report
Former USTs M232-1 to M236-1
Marine Corps Base
Camp Lejeune, North Carolina
Navy Contract Number N62470-95-D-6009
Delivery Order Number: 0088
Law Job Number: 30740-6-0600-0088**

Dear Ms. Reuther:

In accordance with Naval Facilities Engineering Command Order for Supplies and Services Contract No. N62470-95-D-6009, Delivery Order Number 0088, Law Engineering and Environmental Services, Inc. (LAW) is pleased to provide this Semi-Annual Groundwater Monitoring Report for the above referenced site. Our services included groundwater level gauging, and collection and analysis of groundwater samples from selected, existing monitoring wells at the subject site. The purpose of our services was to document the presence or absence of free product, determine groundwater flow conditions across the site, and evaluate groundwater quality at selected locations.

Background Information

LAW has completed the second two rounds of quarterly water-table monitoring, and the second of two semi-annual groundwater sampling events at the Building M232 to M236 site, located at the Marine Corps Base (MCB) Camp Lejeune, North Carolina. Four 550-gallon capacity heating oil underground storage tanks (UST) and one 530-gallon capacity heating oil UST were formerly operated adjacent to Buildings M232, M233, M234, M235 and M236. The USTs were reportedly installed in 1942, supplied No. 2 fuel oil to furnaces located within the five buildings, and were taken out of service in the late 1980's. The USTs were removed in April or early May of 1990.

RICHARD CATLIN & ASSOC.
220 OLD DAIRY ROAD
P.O. BOX 10279
WILMINGTON, NC 28405-3755
(910) 452-5861

LAW ENVIRONMENTAL
3301 ATLANTIC AVENUE
P.O. BOX 18288
RALEIGH, NC 27619
(919) 876-0416

Free product was identified within monitoring well UST M232-MW19 during LAW's August, 1999 Risk Characterization Assessment fieldwork, during LAW's July 2000 gauging event and the October 2000 groundwater sampling event. Free product was again identified during LAW's January 2001 gauging event and during the April 2001 sampling event. LAW informed RAC Contractor IT Group of the measured free product thickness following the January and April gauging events to arrange the removal and proper disposal of the free product. A petroleum-typical sheen was observed in the purge water removed from existing monitoring well UST M232-MW07 (formerly designated as well UST M232-MW3) in the August 1999, October 2000, and April 2001 sampling events.

The table below lists known environmental assessment or remediation reports prepared for the subject site. Please reference the reports listed for additional background information and study findings associated with the Building M232 to M236 site.

Previous Environmental Reports for Buildings M232-M236

NO.	REPORT TITLE	DATE	AUTHOR
1	Report of Underground Storage Tank Abandonment, Buildings M232 - M236 and Building H-28	5/90	UTTS Environmental
2	Site Assessment, Tanks M232-M236, Camp Johnson, Marine Corps Base	1/92	O'Brien & Gere
3	Addendum Site Assessment, Tanks M232 to M236, Marine Corps Base	7/93	O'Brien & Gere
4	Report of Natural Attenuation Monitoring, Buildings M232 to M236	5/98	Law Engineering and Environmental Services, Inc.
5	Risk Characterization Assessment, former USTs M232-1 through M236-1	11/99	Law Engineering and Environmental Services, Inc.
6	First Semi-Annual Groundwater Monitoring Report, former USTs M232-1 through M236-1	12/00	Law Engineering and Environmental Services, Inc.

Current Groundwater Sampling and Gauging Event

LAW gauged 22 existing monitoring wells in January and April 2001, and collected groundwater samples from six selected wells in April 2001. The presence of free product in well UST M232-MW19 was documented on both occasions. A 0.61 foot thickness of free product was measured on January 16, 2001 in monitoring well MW19. Free product identified in January was removed during an AFVR event conducted by the IT Group on January 25, 2001. A 0.12 foot thickness of free product was measured on April 10, 2001. Free product identified in April was removed by LAW using a dedicated disposable bailer on April 12, 2001, and was disposed of by the IT Group at one of their on-base disposal facilities.

The depth to groundwater was measured in monitoring wells UST M232-MW01 through UST M232-MW22 using an electronic interface probe or water gauging meter on January 16, 2001 and April 10, 2001. Groundwater elevations were calculated by subtracting the water-table depth from surveyed top-of-casing elevations where available (see Tables 1 & 2). Figures 1 and 2 are water-table elevation contour maps, as prepared from water-table measurements obtained during January and April 2001. The groundwater flow direction determined for the January 2001 and April 2001 gauging events (Figures 1 and 2, respectively) is similar to that depicted on the water-table contour map prepared by LAW for October 2000 (Report No. 6: Figure 2) and May 1998 (Report No. 4: Figure 1) and is generally towards the northeast.

Groundwater samples were collected from selected monitoring wells (UST M232-MW05, UST M232-MW07, UST M232-MW18, UST M232-MW20, UST M232-MW21 and UST M232-MW22) on April 10, 2001. The six monitoring wells were purged prior to sample collection. The stagnant water from the well casing and sand pack was removed in an effort to collect samples representative of the water quality in the aquifer surrounding the screened interval. Each well was purged and sampled using a new, dedicated disposable bailer. LAW personnel donned a new pair of laboratory grade gloves prior to purging, sampling and collecting water-level measurements at each well to minimize the potential for cross contamination. Specific conductance, pH, groundwater temperature, turbidity and dissolved oxygen were measured and recorded throughout the purging process. Well purging continued until three standing well volumes were removed and indicator parameters had stabilized. Groundwater samples were then collected and decanted from the bailer into pre-labeled sample containers. These containers were sealed, and stored in a chilled cooler. Custody of the samples was maintained by LAW personnel, from the time of collection through delivery to the analytical laboratory.

The groundwater samples from the six wells, one duplicate sample, and a trip blank, were submitted to Paradigm Analytical Laboratory. The samples were analyzed for volatile organic compounds (VOCs) by Standard Method 6210D, for semi-volatile organic compounds (SVOCs) plus Tentatively Identified Compounds (TICs) by EPA Method 625, and volatile petroleum hydrocarbons (VPH) and extractable petroleum hydrocarbons (EPH) by the Massachusetts Department of Environmental Protection (MADEP) method.

Comments

The attached tables (Tables 3 and 4) summarize the laboratory results from the August 1999, October 2000, and April 2001 and sampling events. Laboratory reports for the April 2001 sampling event are attached.

No VOCs, SVOCs, or any TICs were identified in the groundwater sample from monitoring well UST M232-MW05. Additionally, no MADEP hydrocarbon compounds were identified in this sample (Table 3).

A total of ten unknown SVOC TICs, were detected in the groundwater sample from well UST M232-MW07, however no VOCs or SVOCs were detected in the sample (Table 3). VPH hydrocarbon chains were not detected in the sample, however detectable concentrations of EPH hydrocarbon chains C9 to C18 aliphatics, C19 to C36 aliphatics, and C11 to C22 aromatics were identified. The detected concentration of C11 to C22 aromatics in the sample from well UST M232-MW07 exceeds its Interim Groundwater Standard (Table 4). The State of North Carolina has not established Gross Contamination Levels (GCLs) for MADEP VPH and EPH hydrocarbon chains.

Low concentrations of seven VOCs, one SVOCs, eight known and two unknown SVOC TICs were identified in the groundwater sample from well UST M232-MW18. With the exception of the TICs, none of the concentrations of compounds identified exceeded their respective Groundwater Standards (Table 3). Detectable concentrations of VPH hydrocarbon chain C9 to C12 aliphatics and EPH hydrocarbon concentrations for C11 to C22 aromatics were identified. The concentration of C11 to C22 aromatics exceeds its Interim Groundwater Standard.

Low concentrations of three VOCs and one SVOC TIC were detected in the sample from well UST M232-MW20. The concentrations of VOCs detected did not exceed their respective Groundwater Standards. No detectable concentrations of MADEP hydrocarbon compounds were identified in the groundwater sample from M232-MW20.

Low concentrations of 11 VOCs, seven known and three unknown SVOC TICs were identified in the groundwater sample from well UST M232-MW21. The detected concentration of 4-Isopropyltoluene exceeds its calculated GCL. Detectable concentrations of VPH hydrocarbon chain C9 to C12 aliphatics, C9 to C10 aromatics, as well as EPH concentrations of C11 to C22 aromatics were identified in the sample. The combined concentration of VPH and EPH C11 to C22 aromatics exceeds its Interim Groundwater Standard.

Low concentrations of eight VOCs, one SVOC, and eight known and two unknown SVOC TICs were identified in the groundwater sample from well UST M232-MW22. The naphthalene concentration identified in the sample from UST M232-MW22 has decreased to below the State Groundwater Standard since the October 2000 sampling event. The detected concentration of 4-Isopropyltoluene exceeds its calculated Groundwater Standard, a slight increase since the October 2000 sampling event but remains below its calculated GCL. Detectable concentrations of VPH hydrocarbon chain C9 to C12 aliphatics and EPH C9 to C18 aliphatics and C11 to C22 aromatics were identified in the sample. The combined concentration of VPH and EPH C11 to C22 aromatics exceeds its Interim Groundwater Standard, but has decreased since the October 2000 sampling event.

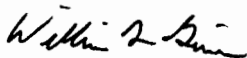
Results of groundwater analysis for this sampling event generally indicate the presence of low and decreasing concentrations of petroleum hydrocarbons, all of which are below established GCLs. The presence of free product within well UST M232-MW19 will continue to cause the Risk Classification for this site to remain Intermediate. LAW recommends that you continue free product recovery efforts at this well location.

This report is intended for the exclusive use of Naval Facilities Engineering Command, Atlantic Division. The contents of this report should not be relied upon by any other parties without the expressed written consent of LAW. The findings are relevant to the dates of our site work and should not be relied upon to represent site conditions on other dates.

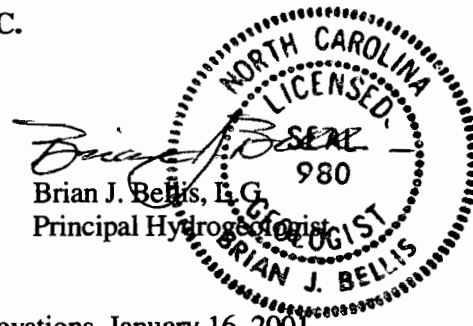
We appreciate the opportunity to provide environmental services on this project. If any questions arise, please contact us at (919) 876-0416.

Sincerely,

LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.



William S. Grimes
Staff Geologist



Attachments: Table 1 – Monitoring Well Casing and Groundwater Elevations, January 16, 2001
Table 2 – Monitoring Well Casing and Groundwater Elevations, April 10, 2001
Table 3 – Summary of Laboratory Analytical Results, Volatile and Semi-Volatile Organic Compounds (5 pages)
Table 4 – Summary of MADEP VPH and EPH Laboratory Analytical Results (5 pages)
Figure 1 – Water Table Elevation Contour Map for January 2001
Figure 2 – Water Table Elevation Contour Map for April 2001
Laboratory Report and Chain of Custody Record

cc: Mr. Neal Paul, Marine Corps Base Camp Lejeune
Ms. Christine Foskey, LANTNAVFACENGOM – Contracts, Correspondence Only
Mr. Michael E. Mason, Program Manager, Catlin Engineers and Scientists, Inc., Correspondence Only

TABLES

TABLE 1
BUILDINGS M-232 to M-236
MONITORING WELL CASING
AND GROUNDWATER ELEVATIONS
JANUARY 16, 2001

DATA POINT	TOP OF CASING ELEVATION (feet)	DEPTH TO WATER (feet)	FREE PRODUCT THICKNESS (feet)	WATER TABLE ELEVATION (feet)
UST M232-MW01 Shallow well	14.20	10.38	NMT	3.82
UST M232-MW02 Deep well	NA	11.53	NMT	NA
UST M232-MW03 Deep well	12.91	10.41	NMT	2.50
UST M232-MW04 Shallow well	12.90	7.73	NMT	5.17
UST M232-MW05 Shallow well	12.80	8.46	NMT	4.43
UST M232-MW06 Deep well	NA	10.71	NMT	NA
UST M232-MW07 Shallow well	16.33	13.81	NMT	2.52
UST M232-MW08 Deep well	16.48	14.04	NMT	2.44
UST M232-MW09 Deep well	13.88	12.34	NMT	1.54
UST M232-MW10 Shallow well	14.43	11.59	NMT	2.84
UST M232-MW11 Shallow well	10.87	5.55	NMT	5.32
UST M232-MW12 Deep well	NA	8.85	NMT	NA
UST M232-MW13 Shallow well	16.10	12.98	NMT	3.12
UST M232-MW14 Shallow well	15.97	13.27	NMT	2.70
UST M232-MW15 Shallow well	NA	12.41	NMT	NA
UST M232-MW16 Shallow well	NA	12.70	NMT	NA
UST M232-MW17 Shallow well	NA	9.56	NMT	NA
UST M232-MW18 Shallow well	NA	8.86	NMT	NA
UST M232-MW19 Shallow well	NA	9.43	0.61	NA
UST M232-MW20 Shallow well	NA	8.71	NMT	NA
UST M232-MW21 Shallow well	NA	8.78	NMT	NA
UST M232-MW22 Shallow well	NA	8.76	NMT	NA

NMT = No Measurable Thickness

NA= Not Available

Top of casing elevations provided to LAW by O'Brien and Gere (Report No. 2)

TABLE 2
BUILDINGS M-232 to M-236
MONITORING WELL CASING
AND GROUNDWATER ELEVATIONS
APRIL 10, 2001

DATA POINT	TOP OF CASING ELEVATION (feet)	DEPTH TO WATER (feet)	FREE PRODUCT THICKNESS (feet)	WATER TABLE ELEVATION (feet)
UST M232-MW01 Shallow well	14.20	9.55	NMT	4.65
UST M232-MW02 Deep Well	NA	11.11	NMT	NA
UST M232-MW03 Deep Well	12.91	10.30	NMT	2.61
UST M232-MW04 Shallow well	12.90	7.14	NMT	5.76
UST M232-MW05 Shallow well	12.80	7.89	NMT	4.91
UST M232-MW06 Deep Well	NA	10.30	NMT	NA
UST M232-MW07 Shallow well	16.33	13.29	NMT	3.04
UST M232-MW08 Deep Well	16.48	13.61	NMT	2.87
UST M232-MW09 Deep Well	13.88	11.94	NMT	1.94
UST M232-MW10 Shallow well	14.43	11.05	NMT	3.38
UST M232-MW11 Shallow well	10.87	5.08	NMT	5.79
UST M232-MW12 Deep Well	NA	8.63	NMT	NA
UST M232-MW13 Shallow well	16.10	12.82	NMT	3.28
UST M232-MW14 Shallow well	15.97	12.33	NMT	3.64
UST M232-MW15 Shallow well	NA	11.87	NMT	NA
UST M232-MW16 Shallow well	NA	12.19	NMT	NA
UST M232-MW17 Shallow well	NA	9.77	NMT	NA
UST M232-MW18 Shallow well	NA	8.43	NMT	NA
UST M232-MW19 Shallow well	NA	8.57	0.12	NA
UST M232-MW20 Shallow well	NA	8.14	NMT	NA
UST M232-MW21 Shallow well	NA	8.09	NMT	NA
UST M232-MW22 Shallow well	NA	8.10	NMT	NA

NMT = No Measurable Thickness

NA= Not Available

Top of casing elevations provided to LAW by O'Brien and Gere (Report No. 2)

TABLE 3 (PAGE 1 OF 5)
SUMMARY OF LABORATORY ANALYTICAL RESULTS (GROUNDWATER SAMPLES)
VOLATILE AND SEMI-VOLATILE ORGANIC COMPOUNDS
FORMER USTs M232-MW05 & M232-MW07 MARINE CORPS BASE
CAMP LEJEUNE, NORTH CAROLINA

PARAMETER	GROUNDWATER SAMPLE ID	USTM232- GW05-00D*	USTM232- GW05-01B	USTM232- GW07-00D*	USTM232- GW07-01B	GROSS CONTAMINATION LEVELS	NC GROUNDWATER QUALITY STANDARD
	WELL SCREEN DEPTH (ft)	5 to 15	5 to 15	5 to 15	5 to 15		
	SAMPLE DATE	10/17/00	4/10/01	10/17/00	4/10/01		
STANDARD METHOD 6210D – VOLATILE ORGANIC COMPOUNDS (mg/L)							
Benzene		ND	ND	ND	ND	5.0	.001
sec-Butylbenzene		ND	ND	ND	ND	8.5	.070
Ethylbenzene		ND	ND	ND	ND	29.0	.029
Isopropylbenzene		ND	ND	ND	ND	25.0	.070
Naphthalene		ND	ND	ND	ND	15.5	.021
n-Propyl benzene		ND	ND	ND	ND	30.0	.070
1,2,4-Trimethylbenzene		ND	ND	ND	ND	28.5	.350
1,3,5-Trimethylbenzene		ND	ND	ND	ND	25.0	.350
Toluene		ND	ND	ND	ND	257.5	1.000
Xylenes (Total)		ND	ND	ND	ND	87.5	.530
Total Standard Method 6210D		ND	ND	ND	ND	N/A	N/A
EPA METHOD 625 – BASE, NEUTRAL AND ACID EXTRACTABLE SEMI-VOLATILE ORGANIC COMPOUNDS (mg/L)							
Acenaphthene		ND	ND	ND	ND	2.12	.08
Anthracene		ND	ND	ND	ND	.645	2.10
Bis (2-ethylhexyl) phthalate		ND	ND	ND	ND	Not Established	.003
4,6-Dinitro-2-methylphenol		ND	ND	ND	ND	Not Established	PQL
Fluorene		ND	ND	ND	ND	.950	.28
Naphthalene		ND	ND	ND	ND	15.5	.021
Phenanthrene		ND	ND	ND	ND	.41	.21
Pyrene		ND	ND	ND	ND	.210	.21
Total EPA Method 625		ND	ND	ND	ND	N/A	N/A
EPA METHOD 625, TENTATIVELY IDENTIFIED COMPOUNDS – TICs (mg/L)							
Known TICs [Concentration]		ND	ND	ND	ND	N/A	N/A
Unknown TICs [Concentration]		ND	ND	10[1.024]	10[0.585]	N/A	N/A

Shaded cells = Concentrations exceed the NC Groundwater Quality Standard, but are below the Gross Contamination Levels.

MDL = Method Detection Limit (see Lab Report)

ND = Not Detected above the laboratory practical quantitation limit (PQL). See laboratory report.

* = Data from LAW First Semi-Annual Groundwater Monitoring Report, December 2000; Delivery Order 0088

TABLE 3 (PAGE 2 OF 5)
SUMMARY OF LABORATORY ANALYTICAL RESULTS (GROUNDWATER SAMPLES)
VOLATILE AND SEMI-VOLATILE ORGANIC COMPOUNDS
FORMER UST M236-MW18, MARINE CORPS BASE
CAMP LEJEUNE, NORTH CAROLINA

PARAMETER	GROUNDWATER	UST M232-	UST M232-	UST M232-	GROSS	NC GROUNDWATER QUALITY	
	SAMPLE ID	GW18-99C*	GW18-00D**	GW18-001B			CONTAMINATION
	WELL SCREEN	5 to 15	5 to 15	5 to 15			LEVELS
	DEPTH (ft)						
	SAMPLE DATE	8/18/99	10/19/00	4/10/01			
STANDARD METHOD 6210D (including historical results by Method 602) – VOLATILE ORGANIC COMPOUNDS (mg/L)							
Benzene		ND	ND	ND	5.0	.001	
n-Butylbenzene		ND	ND	.01	6.9	.070	
sec-Butylbenzene		--	.004	.006	8.5	.070	
tert-Butylbenzene		--	.0007	.0007	15.0	.070	
Ethylbenzene		ND	ND	.0008	29.0	.029	
Isopropylbenzene		--	ND	.002	25.0	.070	
4-Isopropyltoluene		ND	ND	.0005	0.5****	.0005***	
Naphthalene		--	.003	.005	15.5	.021	
n-Propyl benzene		--	ND	.001	30.0	.070	
1,3,5-Trimethylbenzene		--	.0005	ND	25.0	.350	
Toluene		ND	ND	ND	257.5	1.000	
Xylenes (Total)		ND	ND	ND	87.5	.530	
Total EPA Method 602		ND	--	--	N/A	N/A	
Total Standard Method 6210D		--	.0052	.026	N/A	N/A	
EPA METHOD 625 – BASE, NEUTRAL AND ACID EXTRACTABLE SEMI-VOLATILE ORGANIC COMPOUNDS (mg/L)							
Bis (2-ethylhexyl) phthalate		.159	ND	ND	Not Established	.003	
4,6-Dinitro-2-methylphenol		--	ND	ND	Not Established	PQL	
Fluorene		ND	.012	.012	.950	.28	
Naphthalene		.006	ND	ND	15.5	.021	
Phenanthrene		ND	.011	ND	.41	.21	
Total EPA Method 625		.165	.023	.012	N/A	N/A	
EPA METHOD 625, TENTATIVELY IDENTIFIED COMPOUNDS – TICs (mg/L)							
Known TICs [Concentration]		3 [.013]	4 [.072]	8[.128]	N/A	N/A	
Unknown TICs [Concentration]		2 [.006]	6 [.150]	2[.075]	N/A	N/A	

Shaded cells = Concentrations exceed the NC Groundwater Quality Standard, but are below the Gross Contamination Levels.

* = VOCs determined by EPA method 602. Data from LAW Risk Characterization Report, November 1999; Delivery Order 0062

** = Data from LAW First Semi-Annual Groundwater Monitoring Report, December 2000; Delivery Order 0088

*** = Laboratory detection limit is the default standard because a numerical standard has not been established

**** = GCL = 1000 times the groundwater standard for this compound because water solubility data is not available

-- = Constituent not analyzed for in historical method

MDL = Method Detection Limit (see Lab Report)

ND = Not Detected above the laboratory practical quantitation limit (PQL). See laboratory report.

TABLE 3 (PAGE 3 OF 5)
SUMMARY OF LABORATORY ANALYTICAL RESULTS (GROUNDWATER SAMPLES)
VOLATILE AND SEMI-VOLATILE ORGANIC COMPOUNDS
FORMER UST M234-MW20 MARINE CORPS BASE
CAMP LEJEUNE, NORTH CAROLINA

PARAMETER	GROUNDWATER SAMPLE ID	UST M232- GW20-99C*	UST M232- GW20-00D**	UST M232- GW20-01B	GROSS CONTAMINATION LEVELS	NC GROUNDWATER QUALITY STANDARD
	WELL SCREEN DEPTH (ft)	5 to 15	5 to 15	5 to 15		
	SAMPLE DATE	8/18/99	10/19/00	4/10/01		
STANDARD METHOD 6210D (including historical results by Method 602) – VOLATILE ORGANIC COMPOUNDS (mg/L)						
Benzene		ND	ND	ND	5.0	.001
sec-Butylbenzene		--	.002	.002	8.5	.070
Ethylbenzene		.007	ND	ND	29.0	.029
Isopropylbenzene		--	ND	ND	25.0	.070
Naphthalene		--	.001	.001	15.5	.021
n-Propyl benzene		--	.0007	.0006	30.0	.070
1,2,4-Trimethylbenzene		--	ND	ND	28.5	.350
1,3,5-Trimethylbenzene		--	ND	ND	25.0	.350
Toluene		ND	ND	ND	257.5	1.000
Xylenes (Total)		ND	ND	ND	87.5	.530
Total EPA Method 602		.007	ND	ND	N/A	N/A
Total Standard Method 6210D		--	.0037	.0036	N/A	N/A
EPA METHOD 625 – BASE, NEUTRAL AND ACID EXTRACTABLE SEMI-VOLATILE ORGANIC COMPOUNDS (mg/L)						
Acenaphthene		.003	ND	ND	2.12	.08
Anthracene		--	ND	ND	.645	2.10
Bis (2-ethylhexyl) phthalate		ND	ND	ND	Not Established	.003
Fluorene		.004	ND	ND	.950	.28
Naphthalene		ND	ND	ND	15.5	.021
Phenanthrene		.005	ND	ND	.41	.21
Pyrene		ND	ND	ND	.210	.21
Total EPA Method 625		.012	ND	ND	N/A	N/A
EPA METHOD 625, TENTATIVELY IDENTIFIED COMPOUNDS – TICs (mg/L)						
Known TICs [Concentration]		11 [.061]	ND	ND	N/A	N/A
Unknown TICs [Concentration]		8 [.031]	1 [.0054]	1[.0038]	N/A	N/A

Shaded cells = Concentrations exceed the NC Groundwater Quality Standard, but are below the Gross Contamination Levels.

* = VOCs determined by EPA method 602. Data from LAW Risk Characterization Report, November 1999; Delivery Order 0062

** = Data from LAW First Semi-Annual Groundwater Monitoring Report, December 2000; Delivery Order 0088

-- = Constituent not analyzed for in historical method

MDL = Method Detection Limit (see Lab Report)

ND = Not Detected above the laboratory practical quantitation limit (PQL). See laboratory report.

TABLE 3 (PAGE 4 OF 5)
SUMMARY OF LABORATORY ANALYTICAL RESULTS (GROUNDWATER SAMPLES)
VOLATILE AND SEMI-VOLATILE ORGANIC COMPOUNDS
FORMER USTs M233-MW21 MARINE CORPS BASE
CAMP LEJEUNE, NORTH CAROLINA

PARAMETER	GROUNDWATER	UST M232-	UST M233-	UST M233-	GROSS	NC GROUNDWATER		
	SAMPLE ID	GW21-99C*	GW21-00D**	GW21-01B			CONTAMINATION	QUALITY STANDARD
	WELL SCREEN	5 to 15	5 to 15	5 to 15			LEVELS	
	DEPTH (ft)							
	SAMPLE DATE	8/18/99	10/18/00	4/10/01				
STANDARD METHOD 6210D (including historical results by Method 602) – VOLATILE ORGANIC COMPOUNDS (mg/L)								
Benzene		ND	ND	ND	5.0	.001		
n-Butylbenzene		--	.004	.004	6.9	.070		
sec-Butylbenzene		--	.006	.006	8.5	.070		
tert-Butylbenzene		--	ND	.0006	15.0	.070		
Ethylbenzene		ND	.0007	.001	29.0	.029		
Isopropylbenzene		--	.002	.003	25.0	.070		
4-Isopropyltoluene		--	.002	.003	0.5****	.0005***		
Naphthalene		--	.008	.007	15.5	.021		
n-Propyl benzene		--	.005	.006	30.0	.070		
Tetrachloroethene		--	ND	.0006	0.7	.0007		
1,2,4-Trimethylbenzene		--	.011	.014	28.5	.350		
1,3,5-Trimethylbenzene		--	.003	.005	25.0	.350		
Toluene		ND	ND	ND	257.5	1.000		
Xylenes (Total)		ND	ND	ND	87.5	.530		
Total Standard Method 6210D		ND	.0417	.0502	N/A	N/A		
EPA METHOD 625 – BASE, NEUTRAL AND ACID EXTRACTABLE SEMI-VOLATILE ORGANIC COMPOUNDS (mg/L)								
Acenaphthene		.001	ND	ND	2.12	.08		
Bis (2-ethylhexyl) phthalate		.006	ND	ND	Not Established	.003		
Fluorene		.002	ND	ND	.950	.28		
Phenanthrene		.002	ND	ND	.41	.21		
Total EPA Method 625		.011	ND	ND	N/A	N/A		
EPA METHOD 625, TENTATIVELY IDENTIFIED COMPOUNDS – TICs (mg/L)								
Known TICs [Concentration]		15 [.062]	5 [2.350]	7[.328]	N/A	N/A		
Unknown TICs [Concentration]		5 [.022]	5 [2.820]	3[.102]	N/A	N/A		

Shaded cells = Concentrations exceed the NC Groundwater Quality Standard, but are below the Gross Contamination Levels.

* = VOCs determined by EPA method 602. Data from LAW Risk Characterization Report, November 1999; Delivery Order 0062

** = Data from LAW First Semi-Annual Groundwater Monitoring Report, December 2000; Delivery Order 0088

*** = Laboratory detection limit is the default standard because a numerical standard has not been established

**** = GCL = 1000 times the groundwater standard for this compound because water solubility data is not available

-- = Constituent not analyzed for in historical method

MDL = Method Detection Limit (see Lab Report)

ND = Not Detected above the laboratory practical quantitation limit (PQL). See laboratory report.

TABLE 3 (PAGE 5 OF 5)
SUMMARY OF LABORATORY ANALYTICAL RESULTS (GROUNDWATER SAMPLES)
VOLATILE AND SEMI-VOLATILE ORGANIC COMPOUNDS
FORMER UST M232-MW22 MARINE CORPS BASE
CAMP LEJEUNE, NORTH CAROLINA

PARAMETER	GROUNDWATER SAMPLE ID	UST M232- GW22-99C*	UST M232- GW22-00D**	UST M232- GW22-01B	GROSS CONTAMINATION LEVELS	NC GROUNDWATER QUALITY STANDARD
	WELL SCREEN DEPTH (ft)	5 to 15	5 to 15	5 to 15		
	SAMPLE DATE	8/19/99	10/18/00	4/10/01		
STANDARD METHOD 6210D (including historical results by Method 602) – VOLATILE ORGANIC COMPOUNDS (mg/L)						
Benzene		ND	ND	ND	5.0	.001
n-Butylbenzene		--	ND	.001	6.9	.070
sec-Butylbenzene		--	.003	.001	8.5	.070
tert-Butylbenzene		--	.0008	ND	15.0	.070
Ethylbenzene		ND	.001	ND	29.0	.029
Isopropylbenzene		--	.003	.001	25.0	.070
4-Isopropyltoluene		--	.002	.0008	0.5****	.0005***
Naphthalene		--	.024	.011	15.5	.021
n-Propyl benzene		--	.005	.002	30.0	.070
1,2,4-Trimethylbenzene		--	.022	.009	28.5	.350
1,3,5-Trimethylbenzene		--	.004	.001	25.0	.350
Toluene		ND	ND	ND	257.5	1.000
Xylenes (Total)		ND	ND	ND	87.5	.530
Total Standard Method 6210D		ND	.0648	.0268	N/A	N/A
EPA METHOD 625 – BASE, NEUTRAL AND ACID EXTRACTABLE SEMI-VOLATILE ORGANIC COMPOUNDS (mg/L)						
Acenaphthene		.002	ND	ND	2.12	.08
Bis (2-ethylhexyl) phthalate		.283	ND	ND	Not Established	.003
Fluorene		.003	ND	ND	.950	.28
Naphthalene		.008	.014	.013	15.5	.021
Phenanthrene		.001	ND	ND	.41	.21
Total EPA Method 625		.297	.014	.013	N/A	N/A
EPA METHOD 625, TENTATIVELY IDENTIFIED COMPOUNDS – TICs (mg/L)						
Known TICs [Concentration]		16 [.100]	6 [.281]	8 [.337]	N/A	N/A
Unknown TICs [Concentration]		4 [.018]	4 [.099]	2 [.032]	N/A	N/A

Shaded cells = Concentrations exceed the NC Groundwater Quality Standard, but are below the Gross Contamination Levels.

* = VOCs determined by EPA method 602. Data from LAW Risk Characterization Report, November 1999; Delivery Order 0062

** = Data from LAW First Semi-Annual Groundwater Monitoring Report, December 2000; Delivery Order 0088

*** = Laboratory detection limit is the default standard because a numerical standard has not been established

**** = GCL = 1000 times the groundwater standard for this compound because water solubility data is not available

-- = Constituent not analyzed for in historical method

MDL = Method Detection Limit (see Lab Report)

ND = Not Detected above the laboratory practical quantitation limit (PQL). See laboratory report.

TABLE 4 (PAGE 1 OF 5)
SUMMARY OF MADEP VPH AND EPH LABORATORY RESULTS (GROUNDWATER SAMPLES)
FORMER USTs M232-MW05 & M232-MW07 MARINE CORPS BASE
CAMP LEJUENE, NORTH CAROLINA

PARAMETER	GROUNDWATER SAMPLE ID	UST M232- GW05-00D Note 3	UST M232- GW05-01B	UST M232- GW07-00D Note 3	UST M232- GW07-01B	UST M232- GW99-01B Duplicate of GW07	INTERIM GROUNDWATER STANDARD* (VPH and EPH Class Ranges)
	WELL SCREEN DEPTHS (ft)	5 to 15	5 to 15	5 to 15	5 to 15	5 to 15	
	SAMPLE DATES	10/17/00	4/10/01	10/17/00	4/10/01	4/10/01	
MADEP, Total Volatile Petroleum Hydrocarbon Compounds (VPH), mg/L							
	C5 to C8 Aliphatics	ND	ND	ND	ND	ND	
	C9 to C12 Aliphatics	ND	ND	ND	ND	0.12	
	C9 to C10 Aromatics	ND	ND	ND	ND	ND	
MADEP, Total Extractable Petroleum Hydrocarbon Compounds (EPH), mg/L							
	C9 to C18 Aliphatics	ND	ND	.760	.690	NA	
	C19 to C36 Aliphatics	ND	ND	.200	.140	NA	
	C11 to C22 Aromatics	ND	ND	.440	.430	NA	
MADEP, CARBON CLASS RANGE TOTALS, mg/L (if concentration identified)							
	C5 to C8 Aliphatics (VPH)	ND	ND	ND	ND	ND	0.42
	C9 to C12 Aliphatics	ND	ND	ND	ND	.12	Not Established: Note 1
	C9 to C10 Aromatics	ND	ND	ND	ND	ND	Not Established: Note 2
	C9 to C18 Aliphatics (VPH + EPH)	ND	ND	.760	.690	.12	4.2
	C19 to C36 Aliphatics (EPH)	ND	ND	.200	.140	ND	42.0
	C9 to C22 Aromatics (VPH + EPH)	ND	ND	.440	.430	ND	0.21

ND = No compounds detected above the laboratory practical quantitation limit (PQL). See laboratory reports

NA = No analyzed. Duplicate analysis MADEP VPH only.

Shaded Cells = Groundwater Contaminant Concentration exceeds the N.C. Groundwater Standard

MADEP = Massachusetts Department of Environmental Protection.

* Gross Contamination levels have not been established for these parameters

Notes:

1. The NCDENR has not established a groundwater standard for the C9 to C12 aliphatic compound class of VPH. Instead, the NCDENR established a groundwater standard for the C9 to C18 aliphatic compound class, which includes both VPH and EPH.
2. The NCDENR has not established a groundwater standard for the C9 to C10 aromatic compound class of VPH. Instead, the NCDENR established a groundwater standard for the C11 to C32 aromatic compound class which includes both VPH and EPH.
3. Data from LAW First Semi-Annual Groundwater Monitoring Report, December 2000; Delivery Order 0088

TABLE 4 (PAGE 2 OF 5)
SUMMARY OF MADEP VPH AND EPH LABORATORY RESULTS (GROUNDWATER SAMPLES)
FORMER USTs M232-MW18 MARINE CORPS BASE
CAMP LEJUENE, NORTH CAROLINA

PARAMETER	GROUNDWATER SAMPLE ID	UST M232- GW18-99C Note 6	UST M232- GW18-00D Note 7	UST M232- GW18-01B	INTERIM GROUNDWATER STANDARD* (VPH and EPH Class Ranges)
	WELL SCREEN DEPTHS (ft)	5 to 15	5 to 15	5 to 15	
	SAMPLE DATES	8/19/99	10/19/00	4/10/01	
MADEP, Total Volatile Petroleum Hydrocarbon Compounds (VPH), mg/L					
C5 to C8 Aliphatics		ND	ND	ND	
C9 to C12 Aliphatics		.021	.430	.430	
C9 to C10 Aromatics		.015	.110	ND	
MADEP, Total Extractable Petroleum Hydrocarbon Compounds (EPH), mg/L					
C9 to C18 Aliphatics		ND	.200	ND	
C19 to C36 Aliphatics		ND	ND	ND	
C11 to C22 Aromatics		ND	.170	.270	
MADEP, CARBON CLASS RANGE TOTALS, mg/L (if concentration identified)					
C5 to C8 Aliphatics (VPH)		ND	ND	ND	0.42
C9 to C12 Aliphatics		.021	.430	.430	Not Established: Note 4
C9 to C10 Aromatics		.015	.110	ND	Not Established: Note 5
C9 to C18 Aliphatics (VPH + EPH)		.021	.630	.430	4.2
C19 to C36 Aliphatics (EPH)		ND	ND	ND	42.0
C9 to C22 Aromatics (VPH + EPH)		.015	.280	.270	0.21

ND = No compounds detected above the laboratory practical quantitation limit (PQL). See laboratory reports

Shaded Cells = Groundwater Contaminant Concentration exceeds the N.C. Groundwater Standard

MADEP = Massachusetts Department of Environmental Protection.

* Gross Contamination levels have not been established for these parameters

Notes:

- The NCDENR has not established a groundwater standard for the C9 to C12 aliphatic compound class of VPH. Instead, the NCDENR established a groundwater standard for the C9 to C18 aliphatic compound class, which includes both VPH and EPH.
- The NCDENR has not established a groundwater standard for the C9 to C10 aromatic compound class of VPH. Instead, the NCDENR established a groundwater standard for the C9 to C32 aromatic compound class which includes both VPH and EPH.
- Data from LAW Risk Characterization Report, November 1999; Delivery Order 0062
- Data from LAW First Semi-Annual Groundwater Monitoring Report, December 2000; Delivery Order 0088

TABLE 4 (PAGE 3 OF 5)
SUMMARY OF MADEP VPH AND EPH LABORATORY RESULTS (GROUNDWATER SAMPLES)
FORMER USTs M234-MW20 MARINE CORPS BASE
CAMP LEJUENE, NORTH CAROLINA

PARAMETER	GROUNDWATER SAMPLE ID	UST M232- GW20-99C Note 10	UST M232- GW20-00D Note 11	UST M232- GW20-01B	INTERIM GROUNDWATER STANDARD* (VPH and EPH Class Ranges)
	WELL SCREEN DEPTHS (ft)	5 to 15	5 to 15	5 to 15	
	SAMPLE DATES	8/18/99	10/19/00	4/10/01	
	MADEP, Total Volatile Petroleum Hydrocarbon Compounds (VPH), mg/L				
C5 to C8 Aliphatics	ND	ND	ND		
C9 to C12 Aliphatics	.260	.120	ND		
C9 to C10 Aromatics	.170	ND	ND		
MADEP, Total Extractable Petroleum Hydrocarbon Compounds (EPH), mg/L					
C9 to C18 Aliphatics	ND	ND	ND		
C19 to C36 Aliphatics	ND	ND	ND		
C11 to C22 Aromatics	ND	ND	ND		
MADEP, CARBON CLASS RANGE TOTALS, mg/L (if concentration identified)					
C5 to C8 Aliphatics (VPH)	ND	ND	ND	0.42	
C9 to C12 Aliphatics	.260	.120	ND	Not Established: Note 8	
C9 to C10 Aromatics	.170	ND	ND	Not Established: Note 9	
C9 to C18 Aliphatics (VPH + EPH)	.260	.120	ND	4.2	
C19 to C36 Aliphatics (EPH)	ND	ND	ND	42.0	
C9 to C22 Aromatics (VPH + EPH)	.170	ND	ND	0.21	

ND = No compounds detected above the laboratory practical quantitation limit (PQL). See laboratory reports

Shaded Cells = Groundwater Contaminant Concentration exceeds the N.C. Groundwater Standard

MADEP = Massachusetts Department of Environmental Protection.

- Gross Contamination levels have not been established for these parameters

Notes:

- The NCDENR has not established a groundwater standard for the C9 to C12 aliphatic compound class of VPH. Instead, the NCDENR established a groundwater standard for the C9 to C18 aliphatic compound class, which includes both VPH and EPH.
- The NCDENR has not established a groundwater standard for the C9 to C10 aromatic compound class of VPH. Instead, the NCDENR established a groundwater standard for the C9 to C32 aromatic compound class which includes both VPH and EPH.
- Data from LAW Risk Characterization Report, November 1999; Delivery Order 0062
- Data from LAW First Semi-Annual Groundwater Monitoring Report, December 2000; Delivery Order 0088

TABLE 4 (PAGE 4 OF 5)
SUMMARY OF MADEP VPH AND EPH LABORATORY RESULTS (GROUNDWATER SAMPLES)
FORMER USTs M233-MW21 MARINE CORPS BASE
CAMP LEJUENE, NORTH CAROLINA

PARAMETER	GROUNDWATER SAMPLE ID	UST M232- GW21-99C Note 14	UST M232- GW21-00D Note 15	UST M232- GW21-01B	INTERIM GROUNDWATER STANDARD* (VPH and EPH Class Ranges)
	WELL SCREEN DEPTHS (ft)	5 to 15	5 to 15	5 to 15	
	SAMPLE DATES	8/18/99	10/18/00	4/10/01	
	MADEP, Total Volatile Petroleum Hydrocarbon Compounds (VPH), mg/L				
C5 to C8 Aliphatics	ND	ND	ND		
C9 to C12 Aliphatics	.110	.300	.520		
C9 to C10 Aromatics	.072	ND	.110		
MADEP, Total Extractable Petroleum Hydrocarbon Compounds (EPH), mg/L					
C9 to C18 Aliphatics	ND	.160	ND		
C19 to C36 Aliphatics	ND	ND	ND		
C11 to C22 Aromatics	ND	.250	.330		
MADEP, CARBON CLASS RANGE TOTALS, mg/L (if concentration identified)					
C5 to C8 Aliphatics (VPH)	ND	ND	ND	0.42	
C9 to C12 Aliphatics	.110	.300	.520	Not Established: Note 12	
C9 to C10 Aromatics	.072	ND	.110	Not Established: Note 13	
C9 to C18 Aliphatics (VPH + EPH)	.110	.460	.520	4.2	
C19 to C36 Aliphatics (EPH)	ND	ND	ND	42.0	
C9 to C22 Aromatics (VPH + EPH)	.072	.250	.440	0.21	

ND = No compounds detected above the laboratory practical quantitation limit (PQL). See laboratory reports

Shaded Cells = Groundwater Contaminant Concentration exceeds the N.C. Groundwater Standard

MADEP = Massachusetts Department of Environmental Protection.

* Gross Contamination levels have not been established for these parameters

Notes:

12. The NCDENR has not established a groundwater standard for the C9 to C12 aliphatic compound class of VPH. Instead, the NCDENR established a groundwater standard for the C9 to C18 aliphatic compound class, which includes both VPH and EPH.
13. The NCDENR has not established a groundwater standard for the C9 to C10 aromatic compound class of VPH. Instead, the NCDENR established a groundwater standard for the C9 to C32 aromatic compound class which includes both VPH and EPH.
14. Data from LAW Risk Characterization Report, November 1999; Delivery Order 0062
15. Data from LAW First Semi-Annual Groundwater Monitoring Report, December 2000; Delivery Order 0088

TABLE 4 (PAGE 5 OF 5)
SUMMARY OF MADEP VPH AND EPH LABORATORY RESULTS (GROUNDWATER SAMPLES)
FORMER USTs M232-MW22 MARINE CORPS BASE
CAMP LEJUENE, NORTH CAROLINA

PARAMETER	GROUNDWATER SAMPLE ID	UST M232- GW22-99C Note 18	UST M232- GW22-00D Note 19	UST M232- GW22-01B	INTERIM GROUNDWATER STANDARD* (VPH and EPH Class Ranges)
	WELL SCREEN DEPTHS (ft)	5 to 15	5 to 15	5 to 15	
	SAMPLE DATES	8/19/99	10/18/00	4/10/01	
MADEP, Total Volatile Petroleum Hydrocarbon Compounds (VPH), mg/L					
C5 to C8 Aliphatics	ND	ND	ND		
C9 to C12 Aliphatics	.150	.210	.200		
C9 to C10 Aromatics	.096	ND	ND		
MADEP, Total Extractable Petroleum Hydrocarbon Compounds (EPH), mg/L					
C9 to C18 Aliphatics	ND	.210	.140		
C19 to C36 Aliphatics	ND	ND	ND		
C11 to C22 Aromatics	ND	.340	.310		
MADEP, CARBON CLASS RANGE TOTALS, mg/L (if concentration identified)					
C5 to C8 Aliphatics (VPH)	ND	ND	ND	0.42	
C9 to C12 Aliphatics	.150	.210	.200	Not Established: Note 16	
C9 to C10 Aromatics	.096	ND	ND	Not Established: Note 17	
C9 to C18 Aliphatics (VPH + EPH)	.150	.210	.340	4.2	
C19 to C36 Aliphatics (EPH)	ND	ND	ND	42.0	
C9 to C22 Aromatics (VPH + EPH)	.096	.340	.310	0.21	

ND = No compounds detected above the laboratory practical quantitation limit (PQL). See laboratory reports

Shaded Cells = Groundwater Contaminant Concentration exceeds the N.C. Groundwater Standard

MADEP = Massachusetts Department of Environmental Protection.

* Gross Contamination levels have not been established for these parameters

Notes:

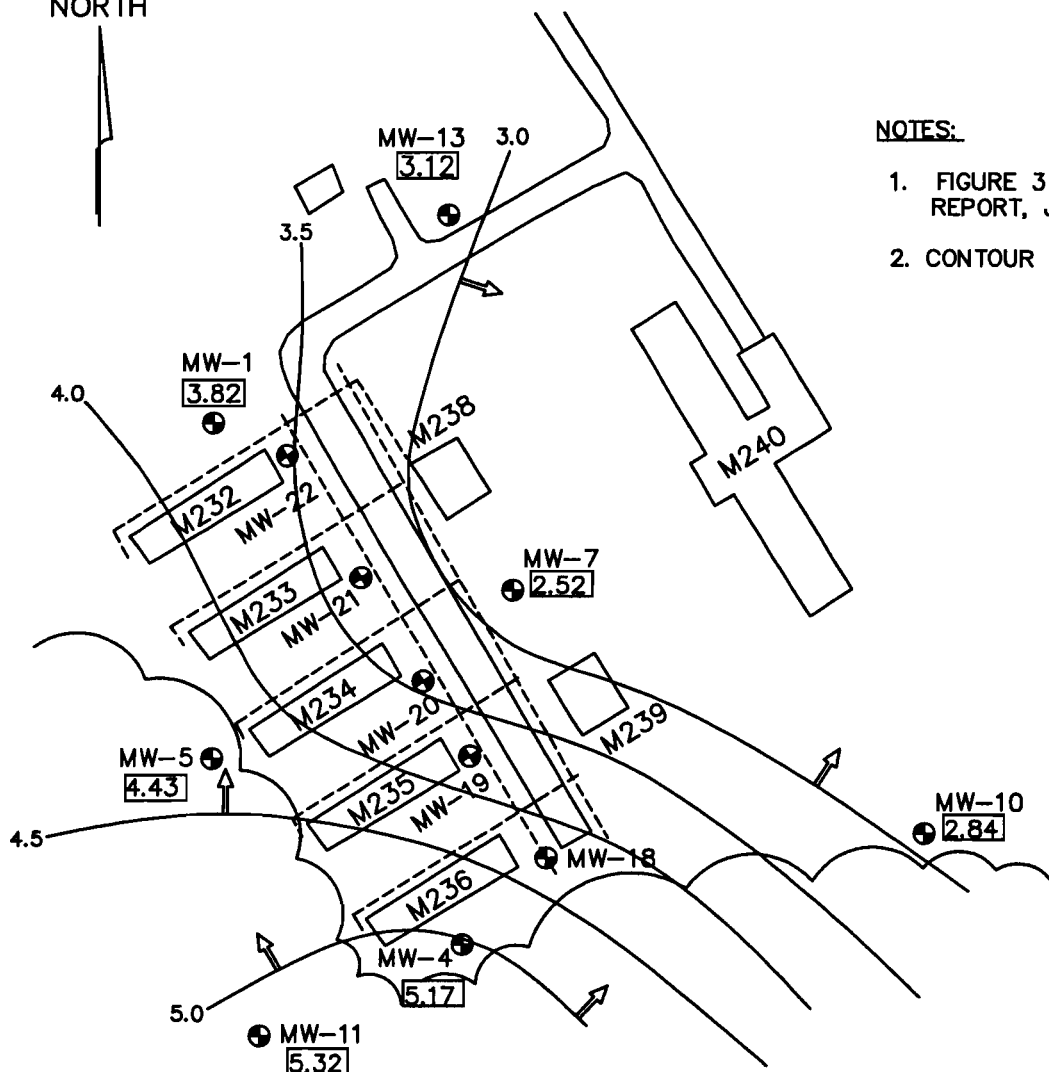
16. The NCDENR has not established a groundwater standard for the C9 to C12 aliphatic compound class of VPH. Instead, the NCDENR established a groundwater standard for the C9 to C18 aliphatic compound class, which includes both VPH and EPH.
17. The NCDENR has not established a groundwater standard for the C9 to C10 aromatic compound class of VPH. Instead, the NCDENR established a groundwater standard for the C9 to C32 aromatic compound class which includes both VPH and EPH.
18. Data from LAW Risk Characterization Report, November 1999; Delivery Order 0062
19. Data from LAW First Semi-Annual Groundwater Monitoring Report, December 2000; Delivery Order 0088

FIGURES

NORTH

NOTES:

1. FIGURE 3 OF OBRIEN & GERE REPORT, JAN 1992
2. CONTOUR INTERVAL= 0.5'

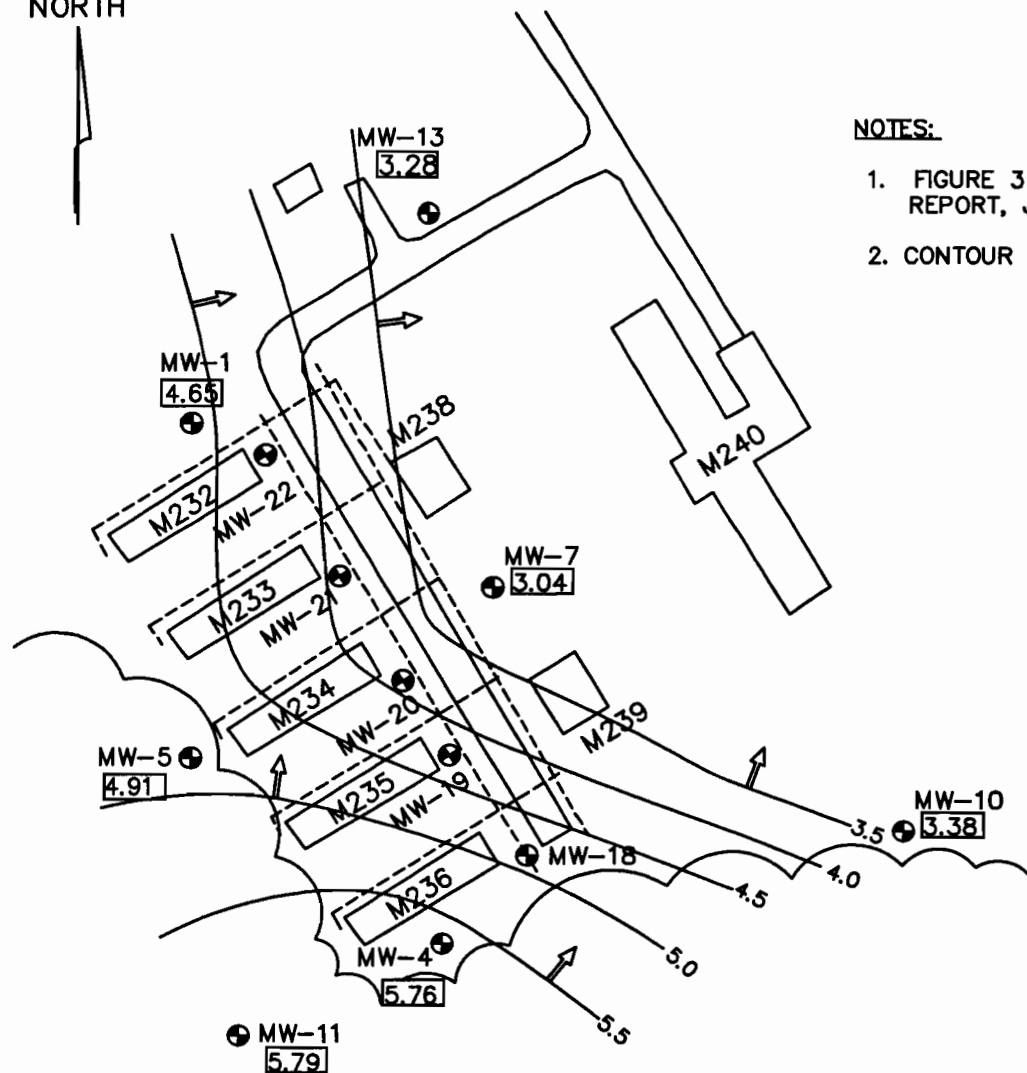


KEY

- 5.6 GROUNDWATER ELEVATION (FT. MSL), JANUARY 16, 2001.
- 3.00--- GROUNDWATER ELEVATION CONTOUR LINES (FT. MSL)
- ➔ GROUNDWATER FLOW DIRECTION BASED ON GROUNDWATER ELEVATION DATA.
- ⊕ MW-10 MONITORING WELLS INSTALLED BY ATEC ENVIRONMENTAL INC., NOVEMBER 1991
- ~~~~~ WOODLINE



NORTH



NOTES:

1. FIGURE 3 OF OBRIEN & GERE REPORT, JAN 1992
2. CONTOUR INTERVAL= 0.5'

KEY

- [5.6] GROUNDWATER ELEVATION (FT. MSL), APRIL 10, 2001.
- - - 3.00 - - - GROUNDWATER ELEVATION CONTOUR LINES (FT. MSL)
- GROUNDWATER FLOW DIRECTION BASED ON GROUNDWATER ELEVATION DATA.
- ⊙ MW-10 MONITORING WELLS INSTALLED BY ATEC ENVIRONMENTAL INC., NOVEMBER 1991
- ~~~~~ WOODLINE

GRAPHIC SCALE - IN FEET



LAW

LAWGIBB Group Member
LAW ENGINEERING & ENVIRONMENTAL
SERVICES, INC. RALEIGH NC

PROJECT
2ND SEMI-ANNUAL GROUNDWATER
MONITORING REPORT
BUILDING M232-M236
CAMP LEJEUNE, N.C.

JOB NO:
30740-6-0600/0088

DATE: APRIL 2001

TITLE

WATER TABLE ELEVATION
CONTOUR MAP
APRIL 10, 2001

SCALE: 1"=150'

DRAWN BY: LGL

CHECKED BY: *[Signature]*

FIGURE

2



Laboratory Report and Chain of Custody Records

PARADIGM ANALYTICAL LABORATORIES, INC.

2627 Northchase Parkway S.E.
Wilmington, North Carolina 28405
(910) 350-1903
Fax (910) 350-1557

Mr. Bill Deobald
Law Engineering
3301 Atlantic Ave.
Raleigh, NC 27604

May 1, 2001

Report Number: G132-857

Client Project ID: M-232

Dear Mr. Deobald,

Enclosed are the results of the analytical services performed under the referenced project. Copies of this report and supporting data will be retained in our files for a period of five years in the event they are required for future reference. Any samples submitted to our laboratory will be retained for a maximum of thirty (30) days from the date of this report unless other arrangements are requested.

If there are any questions about the report or the services performed during this project, please call for assistance. We will be happy to answer any questions or concerns which you may have.

Thank you for using Paradigm Analytical Labs for your analytical services. We look forward to working with you again on any additional analytical needs which you may have.

Sincerely,

Paradigm Analytical Laboratories, Inc.



Laboratory Director
Mark Randall

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Volatiles

by GCMS 6210D

Client Sample ID: USTM232-GW05-01B

Client Project ID: M-232

Lab Sample ID: 18469

Lab Project ID: G132-857

Matrix: Water

Date Analyzed: 4/19/01

Analyzed By: EKR

Date Collected: 4/10/01

Date Received: 4/13/01

Dilution: 1.0

Compound	Quantitation Limit (ug/L)	Result (ug/L)
Benzene	0.5	BQL
Bromobenzene	0.5	BQL
Bromochloromethane	0.5	BQL
Bromodichloromethane	0.5	BQL
Bromoform	0.5	BQL
Bromomethane	0.5	BQL
n-Butylbenzene	0.5	BQL
sec-Butylbenzene	0.5	BQL
tert-Butylbenzene	0.5	BQL
Carbon tetrachloride	0.5	BQL
Chlorobenzene	0.5	BQL
Chloroethane	0.5	BQL
Chloroform	0.5	BQL
Chloromethane	0.5	BQL
2-Chlorotoluene	0.5	BQL
4-Chlorotoluene	0.5	BQL
Dibromochloromethane	0.5	BQL
1,2-Dibromo-3-chloropropane	5	BQL
Dibromomethane	0.5	BQL
1,2-Dibromoethane (EDB)	0.5	BQL
1,2-Dichlorobenzene	0.5	BQL
1,3-Dichlorobenzene	0.5	BQL
1,4-Dichlorobenzene	0.5	BQL
1,1-Dichloroethane	0.5	BQL
1,1-Dichloroethene	0.5	BQL
1,2-Dichloroethane	0.5	BQL
cis-1,2-Dichloroethene	0.5	BQL
trans-1,2-dichloroethene	0.5	BQL
1,2-Dichloropropane	0.5	BQL
1,3-Dichloropropane	0.5	BQL
2,2-Dichloropropane	0.5	BQL
1,1-Dichloropropene	0.5	BQL
Dichlorodifluoromethane	5	BQL
Diisopropyl ether (DIPE)	0.5	BQL
Ethylbenzene	0.5	BQL
Hexachlorobutadiene	0.5	BQL
Isopropylbenzene	0.5	BQL
4-Isopropyltoluene	0.5	BQL
Methylene chloride	5	BQL
Methyl-tert-butyl ether (MTBE)	0.5	BQL

Reviewed by: 

Flags: BQL = Below Quantitation Limit

N.C. Certification #481 S.C. Certification #99029

Page 1

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Volatiles

by GCMS 6210D

Client Sample ID: USTM232-GW05-01B

Client Project ID: M-232

Lab Sample ID: 18469

Lab Project ID: G132-857

Matrix: Water

Date Analyzed: 4/19/01

Analyzed By: EKR

Date Collected: 4/10/01

Date Received: 4/13/01

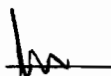
Dilution: 1.0

Compound	Quantitation Limit (ug/L)	Result (ug/L)
Naphthalene	0.5	BQL
n-Propyl benzene	0.5	BQL
Styrene	0.5	BQL
1,1,1,2-Tetrachloroethane	0.5	BQL
1,1,2,2-Tetrachloroethane	0.5	BQL
Tetrachloroethene	0.5	BQL
Toluene	0.5	BQL
1,2,3-Trichlorobenzene	0.5	BQL
1,2,4-Trichlorobenzene	0.5	BQL
Trichloroethene	0.5	BQL
1,1,1-Trichloroethane	0.5	BQL
1,1,2-Trichloroethane	0.5	BQL
Trichlorofluoromethane	0.5	BQL
1,2,3-Trichloropropane	0.5	BQL
1,2,4-Trimethylbenzene	0.5	BQL
1,3,5-Trimethylbenzene	0.5	BQL
Vinyl chloride	0.5	BQL
m-,p-Xylene	1	BQL
o-Xylene	0.5	BQL

Surrogate Spike Recoveries	Spike Added (ug/L)	Surrogate Result (ug/L)	%Rec
Compound			
Bromofluorobenzene	10.0	10.3	103
1,2-Dichloroethane-d4	10.0	11.2	112
Toluene-d8	10.0	10.2	102

Comments:

All results are corrected for dilution.

Reviewed by: 

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Semivolatiles by GCMS 625

Client Sample ID: USTM232-GW05-01B

Client Project ID: M-232

Lab Sample ID: 18469

Lab Project ID: G132-857

Matrix: Water

Date Collected: 4/10/01

Date Received: 4/13/01

Date Analyzed: 4/19/01

Analyzed By: MRC

Dilution: 1

Compound	Quantitation Limit (ug/L)	Result (ug/L)
Acenaphthene	10	BQL
Acenaphthylene	10	BQL
Anthracene	10	BQL
Benzo[a]anthracene	10	BQL
Benzo[a]pyrene	10	BQL
Benzo[b]fluoranthene	10	BQL
Benzo[g,h,i]perylene	10	BQL
Benzo[k]fluoranthene	10	BQL
Bis(2-chloroethoxy)methane	10	BQL
Bis(2-chloroethyl)ether	10	BQL
Bis(2-chloroisopropyl)ether	10	BQL
Bis(2-ethylhexyl)phthalate	10	BQL
4-bromophenyl phenyl ether	10	BQL
Butylbenzylphthalate	10	BQL
4-Chloro-3-methylphenol	10	BQL
2-Chloronaphthalene	10	BQL
2-Chlorophenol	10	BQL
4-Chlorophenyl phenyl ether	10	BQL
Chrysene	10	BQL
Di-n-Butylphthalate	10	BQL
Di-n-octylphthalate	10	BQL
Dibenzo[a,h]anthracene	10	BQL
1,2-Dichlorobenzene	10	BQL
1,3-Dichlorobenzene	10	BQL
1,4-Dichlorobenzene	10	BQL
3,3'-Dichlorobenzidine	20	BQL
2,4-Dichlorophenol	10	BQL
Diethylphthalate	10	BQL
2,4-Dimethylphenol	10	BQL
Dimethylphthalate	10	BQL
4,6-Dinitro-2-methylphenol	50	BQL
2,4-Dinitrophenol	50	BQL
2,4-Dinitrotoluene	10	BQL
2,6-Dinitrotoluene	10	BQL
Fluoranthene	10	BQL
Fluorene	10	BQL
Hexachlorobenzene	10	BQL
Hexachlorobutadiene	10	BQL
Hexachlorocyclopentadiene	20	BQL
Hexachloroethane	10	BQL

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Semivolatiles by GCMS 625

Client Sample ID: USTM232-GW05-01B

Client Project ID: M-232

Lab Sample ID: 18469

Lab Project ID: G132-857

Matrix: Water.

Date Collected: 4/10/01

Date Received: 4/13/01

Date Analyzed: 4/19/01

Analyzed By: MRC

Dilution: 1

Compound	Quantitation Limit (ug/L)	Result (ug/L)
Indeno(1,2,3-c,d)pyrene	10	BQL
Isophorone	10	BQL
N-Nitrosodi-n-propylamine	10	BQL
N-Nitrosodiphenylamine	10	BQL
Naphthalene	10	BQL
Nitrobenzene	10	BQL
2-Nitrophenol	10	BQL
4-Nitrophenol	50	BQL
Pentachlorophenol	50	BQL
Phenanthrene	10	BQL
Phenol	10	BQL
Pyrene	10	BQL
1,2,4-Trichlorobenzene	10	BQL
2,4,6-Trichlorophenol	10	BQL

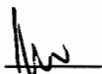
Surrogate Spike Recoveries	Spike Added	Spike Result	Percent Recovered
2-Fluorobiphenyl	10	8.7	87
2-Fluorophenol	10	9.4	94
Nitrobenzene-d5	10	8.1	81
Phenol-d6	10	8.5	85
2,4,6-Tribromophenol	10	8.0	80
4-Terphenyl-d14	10	8.1	81

Comments:

Results are corrected for %solids and dilution where applicable.

Flags:

BQL = Below Quantitation Limit.

Reviewed By: 

Results of Library Search for Semivolatile Compounds
by GCMS

Client Sample ID: USTM232-GW05-01B

Client Project ID: M-232

Lab Sample ID: 18469

Lab Project ID: G132-857

Matrix: Water

Date Collected: 4/10/01

Date Received: 4/13/01

Date Analyzed: 4/19/01

Analyzed By: MRC

Dilution: 1

Num.	Compound	CAS#	Match Probability	Result (ug/L)
1	No library search compounds detected.			
2				
3				
4				
5				
6				
7				
8				
9				
10				

Comment:

Tentatively Identified Compound (TIC) refers to substances which are not present in the list of target compounds. Therefore, not all TICs are identified and quantitated using individual standards. TIC listings are prepared utilizing a computerized library search of electron impact mass spectral data and evaluation of the relevant data by a mass spectral data specialist.

Quantitation is accomplished by relative peak height of the compound compared to that of the nearest internal standard from the total ion chromatogram. TICs are identified and quantitated only if the peak height is equal to or greater than 10% of that of the nearest internal standard. Quantitation provided is an estimate.

Reviewed by: 

VPH (Aliphatics/Aromatics) Laboratory Reporting Form

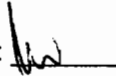
Client Name: LAW ENGINEERINGProject Name: M-232

Sample Information and Analytical Results	
Sample Identification	USTM232-GW05-01B
Sample Matrix	Water
Collection Option (for Soil)*	
Date Collected	04/10/01
Date Received	04/13/01
Date Extracted	04/19/01
Date Analyzed	04/19/01
Dry Weight	
Dilution Factor	1
C ₅ -C ₈ Aliphatics**	< 100 (µg/L)
C ₉ -C ₁₂ Aliphatics**	< 100 (µg/L)
C ₉ -C ₁₀ Aromatics**	< 100 (µg/L)
Surrogate % Recovery - PID	76
Surrogate % Recovery - FID	100

* = Option 1 = Established fill line on vial, Option 2 = Sampling Device/Brand, or Option 3 = Field weight of soil.

** = Excludes any surrogates or internal standards.

Lab Info: G132-857-18469

Reviewed By: 

EPH (Aliphatics/Aromatics) Results

by MDEP-EPH

Client Name: LAW ENGINEERING

Project Name: M-232

Sample Information and Analytical Results	
Sample Identification	USTM232-GW05-01B
Sample Matrix	Water
Date Collected	04/10/01
Date Received	04/13/01
Date Extracted	04/17/01
Date Analyzed	04/23/01
Dry Weight	
Dilution Factor	1
C ₉ -C ₁₈ Aliphatics*	< 100 (µg/L)
C ₁₉ -C ₃₆ Aliphatics*	< 100 (µg/L)
C ₁₁ -C ₂₂ Aromatics*	< 100 (µg/L)
Aliphatic Surrogate % Recovery	25
Aromatic Surrogate % Recovery	68

Comments:

* = Excludes any surrogates or internal standards.

Sample did not require fractionation.

Low surrogate confirmed by duplicate analysis.

Lab info: G132-857-18469

Reviewed By: 

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Volatiles

by GCMS 6210D

Client Sample ID: USTM232-GW07-01B

Client Project ID: M-232

Lab Sample ID: 18468

Lab Project ID: G132-857

Matrix: Water

Date Analyzed: 4/19/01

Analyzed By: EKR

Date Collected: 4/10/01

Date Received: 4/13/01

Dilution: 1.0

Compound	Quantitation Limit (ug/L)	Result (ug/L)
Benzene	0.5	BQL
Bromobenzene	0.5	BQL
Bromochloromethane	0.5	BQL
Bromodichloromethane	0.5	BQL
Bromoform	0.5	BQL
Bromomethane	0.5	BQL
n-Butylbenzene	0.5	BQL
sec-Butylbenzene	0.5	BQL
tert-Butylbenzene	0.5	BQL
Carbon tetrachloride	0.5	BQL
Chlorobenzene	0.5	BQL
Chloroethane	0.5	BQL
Chloroform	0.5	BQL
Chloromethane	0.5	BQL
2-Chlorotoluene	0.5	BQL
4-Chlorotoluene	0.5	BQL
Dibromochloromethane	0.5	BQL
1,2-Dibromo-3-chloropropane	5	BQL
Dibromomethane	0.5	BQL
1,2-Dibromoethane (EDB)	0.5	BQL
1,2-Dichlorobenzene	0.5	BQL
1,3-Dichlorobenzene	0.5	BQL
1,4-Dichlorobenzene	0.5	BQL
1,1-Dichloroethane	0.5	BQL
1,1-Dichloroethene	0.5	BQL
1,2-Dichloroethane	0.5	BQL
cis-1,2-Dichloroethene	0.5	BQL
trans-1,2-dichloroethene	0.5	BQL
1,2-Dichloropropane	0.5	BQL
1,3-Dichloropropane	0.5	BQL
2,2-Dichloropropane	0.5	BQL
1,1-Dichloropropene	0.5	BQL
Dichlorodifluoromethane	5	BQL
Diisopropyl ether (DIPE)	0.5	BQL
Ethylbenzene	0.5	BQL
Hexachlorobutadiene	0.5	BQL
Isopropylbenzene	0.5	BQL
4-Isopropyltoluene	0.5	BQL
Methylene chloride	5	BQL
Methyl-tert-butyl ether (MTBE)	0.5	BQL

Reviewed by: 

Flags: BQL = Below Quantitation Limit

N.C. Certification #481 S.C. Certification #99029

Page 1

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Volatiles by GCMS 6210D

Client Sample ID: USTM232-GW07-01B

Client Project ID: M-232

Lab Sample ID: 18468

Lab Project ID: G132-857

Matrix: Water

Date Analyzed: 4/19/01

Analyzed By: EKR

Date Collected: 4/10/01

Date Received: 4/13/01

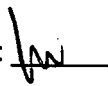
Dilution: 1.0

Compound	Quantitation Limit (ug/L)	Result (ug/L)
Naphthalene	0.5	BQL
n-Propyl benzene	0.5	BQL
Styrene	0.5	BQL
1,1,1,2-Tetrachloroethane	0.5	BQL
1,1,2,2-Tetrachloroethane	0.5	BQL
Tetrachloroethene	0.5	BQL
Toluene	0.5	BQL
1,2,3-Trichlorobenzene	0.5	BQL
1,2,4-Trichlorobenzene	0.5	BQL
Trichloroethene	0.5	BQL
1,1,1-Trichloroethane	0.5	BQL
1,1,2-Trichloroethane	0.5	BQL
Trichlorofluoromethane	0.5	BQL
1,2,3-Trichloropropane	0.5	BQL
1,2,4-Trimethylbenzene	0.5	BQL
1,3,5-Trimethylbenzene	0.5	BQL
Vinyl chloride	0.5	BQL
m-,p-Xylene	1	BQL
o-Xylene	0.5	BQL

Surrogate Spike Recoveries	Spike Added (ug/L)	Surrogate Result (ug/L)	%Rec
Compound			
Bromofluorobenzene	10.0	10.2	102
1,2-Dichloroethane-d4	10.0	11.1	111
Toluene-d8	10.0	10.2	102

Comments:

All results are corrected for dilution.

Reviewed by: 

Results for Semivolatiles
by GCMS 625

Client Sample ID: USTM232-GW07-01B

Client Project ID: M-232

Lab Sample ID: 18468

Lab Project ID: G132-857

Matrix: Water

Date Collected: 4/10/01

Date Received: 4/13/01

Date Analyzed: 4/18/01

Analyzed By: MRC

Dilution: 1

Compound	Quantitation Limit (ug/L)	Result (ug/L)
Acenaphthene	10	BQL
Acenaphthylene	10	BQL
Anthracene	10	BQL
Benzo[a]anthracene	10	BQL
Benzo[a]pyrene	10	BQL
Benzo[b]fluoranthene	10	BQL
Benzo[g,h,i]perylene	10	BQL
Benzo[k]fluoranthene	10	BQL
Bis(2-chloroethoxy)methane	10	BQL
Bis(2-chloroethyl)ether	10	BQL
Bis(2-chloroisopropyl)ether	10	BQL
Bis(2-ethylhexyl)phthalate	10	BQL
4-bromophenyl phenyl ether	10	BQL
Butylbenzylphthalate	10	BQL
4-Chloro-3-methylphenol	10	BQL
2-Chloronaphthalene	10	BQL
2-Chlorophenol	10	BQL
4-Chlorophenyl phenyl ether	10	BQL
Chrysene	10	BQL
Di-n-Butylphthalate	10	BQL
Di-n-octylphthalate	10	BQL
Dibenzo[a,h]anthracene	10	BQL
1,2-Dichlorobenzene	10	BQL
1,3-Dichlorobenzene	10	BQL
1,4-Dichlorobenzene	10	BQL
3,3'-Dichlorobenzidine	20	BQL
2,4-Dichlorophenol	10	BQL
Diethylphthalate	10	BQL
2,4-Dimethylphenol	10	BQL
Dimethylphthalate	10	BQL
4,6-Dinitro-2-methylphenol	50	BQL
2,4-Dinitrophenol	50	BQL
2,4-Dinitrotoluene	10	BQL
2,6-Dinitrotoluene	10	BQL
Fluoranthene	10	BQL
Fluorene	10	BQL
Hexachlorobenzene	10	BQL
Hexachlorobutadiene	10	BQL
Hexachlorocyclopentadiene	20	BQL
Hexachloroethane	10	BQL

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Semivolatiles

by GCMS 625

Client Sample ID: USTM232-GW07-01B

Client Project ID: M-232

Lab Sample ID: 18468

Lab Project ID: G132-857

Matrix: Water.

Date Collected: 4/10/01

Date Received: 4/13/01

Date Analyzed: 4/18/01

Analyzed By: MRC

Dilution: 1

Compound	Quantitation Limit (ug/L)	Result (ug/L)
Indeno(1,2,3-c,d)pyrene	10	BQL
Isophorone	10	BQL
N-Nitrosodi-n-propylamine	10	BQL
N-Nitrosodiphenylamine	10	BQL
Naphthalene	10	BQL
Nitrobenzene	10	BQL
2-Nitrophenol	10	BQL
4-Nitrophenol	50	BQL
Pentachlorophenol	50	BQL
Phenanthrene	10	BQL
Phenol	10	BQL
Pyrene	10	BQL
1,2,4-Trichlorobenzene	10	BQL
2,4,6-Trichlorophenol	10	BQL

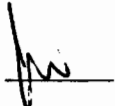
Surrogate Spike Recoveries	Spike Added	Spike Result	Percent Recovered
2-Fluorobiphenyl	10	9.4	94
2-Fluorophenol	10	10.1	101
Nitrobenzene-d5	10	8.7	87
Phenol-d6	10	8.7	87
2,4,6-Tribromophenol	10	9.6	96
4-Terphenyl-d14	10	9.0	90

Comments:

Results are corrected for %solids and dilution where applicable.

Flags:

BQL = Below Quantitation Limit.

Reviewed By: 

PARADIGM ANALYTICAL LABORATORIES, INC.

Results of Library Search for Semivolatile Compounds
by GCMS

Client Sample ID: USTM232-GW07-01B

Client Project ID: M-232

Lab Sample ID: 18468

Lab Project ID: G132-857

Matrix: Water

Date Collected: 4/10/01

Date Received: 4/13/01

Date Analyzed: 4/18/01

Analyzed By: MRC

Dilution: 1

Num.	Compound	CAS#	Match Probability	Result (ug/L)
1	Alkane, Unknown			150
2	Alkane, Unknown			79
3	Alkane, Unknown			74
4	Unknown			66
5	Alkane, Unknown			62
6	Alkane, Unknown			54
7	Aromatic, Unknown			27
8	Alkane, Unknown			26
9	Unknown			24
10	Unknown			23

Comment:

Tentatively Identified Compound (TIC) refers to substances which are not present in the list of target compounds. Therefore, not all TICs are identified and quantitated using individual standards. TIC listings are prepared utilizing a computerized library search of electron impact mass spectral data and evaluation of the relevant data by a mass spectral data specialist.

Quantitation is accomplished by relative peak height of the compound compared to that of the nearest internal standard from the total ion chromatogram. TICs are identified and quantitated only if the peak height is equal to or greater than 10% of that of the nearest internal standard. Quantitation provided is an estimate.

Reviewed by: 

VPH (Aliphatics/Aromatics) Laboratory Reporting Form

Client Name: LAW ENGINEERING

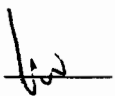
Project Name: M-232

Sample Information and Analytical Results	
Sample Identification	USTM232-GW07-01B
Sample Matrix	Water
Collection Option (for Soil)*	
Date Collected	04/10/01
Date Received	04/13/01
Date Extracted	04/20/01
Date Analyzed	04/20/01
Dry Weight	
Dilution Factor	1
C ₅ -C ₈ Aliphatics**	< 100 (µg/L)
C ₉ -C ₁₂ Aliphatics**	< 100 (µg/L)
C ₉ -C ₁₀ Aromatics**	< 100 (µg/L)
Surrogate % Recovery - PID	83
Surrogate % Recovery - FID	110

* = Option 1 = Established fill line on vial, Option 2 = Sampling Device/Brand, or Option 3 = Field weight of soil.

** = Excludes any surrogates or internal standards.

Lab Info: G132-857-18468

Reviewed By: 

EPH (Aliphatics/Aromatics) Results

by MDEP-EPH

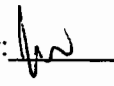
Client Name: LAW ENGINEERINGProject Name: M-232

Sample Information and Analytical Results	
Sample Identification	USTM232-GW07-01B
Sample Matrix	Water
Date Collected	04/10/01
Date Received	04/13/01
Date Extracted	04/17/01
Date Analyzed	04/25/01
Dry Weight	
Dilution Factor	1
C ₉ -C ₁₈ Aliphatics*	690 (µg/L)
C ₁₉ -C ₃₆ Aliphatics*	140 (µg/L)
C ₁₁ -C ₂₂ Aromatics*	430 (µg/L)
Aliphatic Surrogate % Recovery	66
Aromatic Surrogate % Recovery	88
Fractionation Surrogate 1 % Recovery	100

Comments:

* = Excludes any surrogates or internal standards.

Lab info: G132-857-18468

Reviewed By: 

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Volatiles

by GCMS 6210D

Client Sample ID: USTM232-GW18-01B

Client Project ID: M-232

Lab Sample ID: 18470

Lab Project ID: G132-857

Matrix: Water

Date Analyzed: 4/19/01

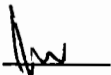
Analyzed By: EKR

Date Collected: 4/10/01

Date Received: 4/13/01

Dilution: 1.0

Compound	Quantitation Limit (ug/L)	Result (ug/L)
Benzene	0.5	BQL
Bromobenzene	0.5	BQL
Bromochloromethane	0.5	BQL
Bromodichloromethane	0.5	BQL
Bromoform	0.5	BQL
Bromomethane	0.5	BQL
n-Butylbenzene	0.5	10
sec-Butylbenzene	0.5	6
tert-Butylbenzene	0.5	0.7
Carbon tetrachloride	0.5	BQL
Chlorobenzene	0.5	BQL
Chloroethane	0.5	BQL
Chloroform	0.5	BQL
Chloromethane	0.5	BQL
2-Chlorotoluene	0.5	BQL
4-Chlorotoluene	0.5	BQL
Dibromochloromethane	0.5	BQL
1,2-Dibromo-3-chloropropane	5	BQL
Dibromomethane	0.5	BQL
1,2-Dibromoethane (EDB)	0.5	BQL
1,2-Dichlorobenzene	0.5	BQL
1,3-Dichlorobenzene	0.5	BQL
1,4-Dichlorobenzene	0.5	BQL
1,1-Dichloroethane	0.5	BQL
1,1-Dichloroethene	0.5	BQL
1,2-Dichloroethane	0.5	BQL
cis-1,2-Dichloroethene	0.5	BQL
trans-1,2-dichloroethene	0.5	BQL
1,2-Dichloropropane	0.5	BQL
1,3-Dichloropropane	0.5	BQL
2,2-Dichloropropane	0.5	BQL
1,1-Dichloropropene	0.5	BQL
Dichlorodifluoromethane	5	BQL
Diisopropyl ether (DIPE)	0.5	BQL
Ethylbenzene	0.5	0.8
Hexachlorobutadiene	0.5	BQL
Isopropylbenzene	0.5	2
4-Isopropyltoluene	0.5	0.5
Methylene chloride	5	BQL
Methyl-tert-butyl ether (MTBE)	0.5	BQL

Reviewed by: 

Flags: BQL = Below Quantitation Limit

N.C. Certification #481 S.C. Certification #99029

Page 1

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Volatiles

by GCMS 6210D

Client Sample ID: USTM232-GW18-01B

Client Project ID: M-232

Lab Sample ID: 18470

Lab Project ID: G132-857

Matrix: Water

Date Analyzed: 4/19/01

Analyzed By: EKR

Date Collected: 4/10/01

Date Received: 4/13/01

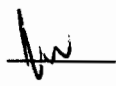
Dilution: 1.0

Compound	Quantitation Limit (ug/L)	Result (ug/L)
Naphthalene	0.5	5
n-Propyl benzene	0.5	1
Styrene	0.5	BQL
1,1,1,2-Tetrachloroethane	0.5	BQL
1,1,2,2-Tetrachloroethane	0.5	BQL
Tetrachloroethene	0.5	BQL
Toluene	0.5	BQL
1,2,3-Trichlorobenzene	0.5	BQL
1,2,4-Trichlorobenzene	0.5	BQL
Trichloroethene	0.5	BQL
1,1,1-Trichloroethane	0.5	BQL
1,1,2-Trichloroethane	0.5	BQL
Trichlorofluoromethane	0.5	BQL
1,2,3-Trichloropropane	0.5	BQL
1,2,4-Trimethylbenzene	0.5	BQL
1,3,5-Trimethylbenzene	0.5	BQL
Vinyl chloride	0.5	BQL
m-,p-Xylene	1	BQL
o-Xylene	0.5	BQL

Surrogate Spike Recoveries	Spike Added (ug/L)	Surrogate Result (ug/L)	%Rec
Compound			
Bromofluorobenzene	10.0	10.2	102
1,2-Dichloroethane-d4	10.0	11.1	111
Toluene-d8	10.0	10.2	102

Comments:

All results are corrected for dilution.

Reviewed by: 

Flags: BQL = Below Quantitation Limit

N.C. Certification #481 S.C. Certification #99029

Page 2

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Semivolatiles by GCMS 625

Client Sample ID: USTM232-GW18-01B

Client Project ID: M-232

Lab Sample ID: 18470

Lab Project ID: G132-857

Matrix: Water

Date Collected: 4/10/01

Date Received: 4/13/01

Date Analyzed: 4/19/01

Analyzed By: MRC

Dilution: 1

Compound	Quantitation Limit (ug/L)	Result (ug/L)
Acenaphthene	10	BQL
Acenaphthylene	10	BQL
Anthracene	10	BQL
Benzo[a]anthracene	10	BQL
Benzo[a]pyrene	10	BQL
Benzo[b]fluoranthene	10	BQL
Benzo[g,h,i]perylene	10	BQL
Benzo[k]fluoranthene	10	BQL
Bis(2-chloroethoxy)methane	10	BQL
Bis(2-chloroethyl)ether	10	BQL
Bis(2-chloroisopropyl)ether	10	BQL
Bis(2-ethylhexyl)phthalate	10	BQL
4-bromophenyl phenyl ether	10	BQL
Butylbenzylphthalate	10	BQL
4-Chloro-3-methylphenol	10	BQL
2-Chloronaphthalene	10	BQL
2-Chlorophenol	10	BQL
4-Chlorophenyl phenyl ether	10	BQL
Chrysene	10	BQL
Di-n-Butylphthalate	10	BQL
Di-n-octylphthalate	10	BQL
Dibenzo[a,h]anthracene	10	BQL
1,2-Dichlorobenzene	10	BQL
1,3-Dichlorobenzene	10	BQL
1,4-Dichlorobenzene	10	BQL
3,3'-Dichlorobenzidine	20	BQL
2,4-Dichlorophenol	10	BQL
Diethylphthalate	10	BQL
2,4-Dimethylphenol	10	BQL
Dimethylphthalate	10	BQL
4,6-Dinitro-2-methylphenol	50	BQL
2,4-Dinitrophenol	50	BQL
2,4-Dinitrotoluene	10	BQL
2,6-Dinitrotoluene	10	BQL
Fluoranthene	10	BQL
Fluorene	10	12
Hexachlorobenzene	10	BQL
Hexachlorobutadiene	10	BQL
Hexachlorocyclopentadiene	20	BQL
Hexachloroethane	10	BQL

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Semivolatiles

by GCMS 625

Client Sample ID: USTM232-GW18-01B

Client Project ID: M-232

Lab Sample ID: 18470

Lab Project ID: G132-857

Matrix: Water

Date Collected: 4/10/01

Date Received: 4/13/01

Date Analyzed: 4/19/01

Analyzed By: MRC

Dilution: 1

Compound	Quantitation Limit (ug/L)	Result (ug/L)
Indeno(1,2,3-c,d)pyrene	10	BQL
Isophorone	10	BQL
N-Nitrosodi-n-propylamine	10	BQL
N-Nitrosodiphenylamine	10	BQL
Naphthalene	10	BQL
Nitrobenzene	10	BQL
2-Nitrophenol	10	BQL
4-Nitrophenol	50	BQL
Pentachlorophenol	50	BQL
Phenanthrene	10	BQL
Phenol	10	BQL
Pyrene	10	BQL
1,2,4-Trichlorobenzene	10	BQL
2,4,6-Trichlorophenol	10	BQL

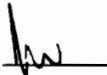
Surrogate Spike Recoveries	Spike Added	Spike Result	Percent Recovered
2-Fluorobiphenyl	10	8.5	85
2-Fluorophenol	10	8.8	88
Nitrobenzene-d5	10	8.5	85
Phenol-d6	10	7.9	79
2,4,6-Tribromophenol	10	9.7	97
4-Terphenyl-d14	10	5.2	52

Comments:

Results are corrected for %solids and dilution where applicable.

Flags:

BQL = Below Quantitation Limit.

Reviewed By: 

PARADIGM ANALYTICAL LABORATORIES, INC.

Results of Library Search for Semivolatile Compounds
by GCMS

Client Sample ID: USTM232-GW18-01B

Client Project ID: M-232

Lab Sample ID: 18470

Lab Project ID: G132-857

Matrix: Water

Date Collected: 4/10/01

Date Received: 4/13/01

Date Analyzed: 4/19/01

Analyzed By: MRC

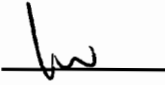
Dilution: 1

Num.	Compound	CAS#	Match Probability	Result (ug/L)
1	Aromatic, Unknown			44
2	Indane	000496-11-7	90	41
3	Tetrahydronaphthalene, Isomer of			31
4	Aromatic, Unknown			16
5	Dimethylnaphthalene, Isomer of			14
6	Ethyl dimethylbenzene, Isomer of			12
7	Naphthalene, 1-methyl-	000090-12-0	90	12
8	Tetrahydronaphthalene, Isomer of			11
9	Dimethylnaphthalene, Isomer of			11
10	Tetrahydronaphthalene, Isomer of			11

Comment:

Tentatively Identified Compound (TIC) refers to substances which are not present in the list of target compounds. Therefore, not all TICs are identified and quantitated using individual standards. TIC listings are prepared utilizing a computerized library search of electron impact mass spectral data and evaluation of the relevant data by a mass spectral data specialist.

Quantitation is accomplished by relative peak height of the compound compared to that of the nearest internal standard from the total ion chromatogram. TICs are identified and quantitated only if the peak height is equal to or greater than 10% of that of the nearest internal standard. Quantitation provided is an estimate.

Reviewed by: 

VPH (Aliphatics/Aromatics) Laboratory Reporting Form

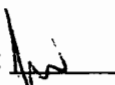
Client Name: LAW ENGINEERINGProject Name: M-232

Sample Information and Analytical Results	
Sample Identification	USTM232-GW18-01B
Sample Matrix	Water
Collection Option (for Soil)*	
Date Collected	04/10/01
Date Received	04/13/01
Date Extracted	04/19/01
Date Analyzed	04/19/01
Dry Weight	
Dilution Factor	1
C ₅ -C ₈ Aliphatics**	< 100 (µg/L)
C ₉ -C ₁₂ Aliphatics**	430 (µg/L)
C ₉ -C ₁₀ Aromatics**	< 100 (µg/L)
Surrogate % Recovery - PID	79
Surrogate % Recovery - FID	110

* = Option 1 = Established fill line on vial, Option 2 = Sampling Device/Brand, or Option 3 = Field weight of soil.

** = Excludes any surrogates or internal standards.

Lab Info: G132-857-18470

Reviewed By: 

EPH (Aliphatics/Aromatics) Results

by MDEP-EPH

Client Name: LAW ENGINEERING

Project Name: M-232

Sample Information and Analytical Results	
Sample Identification	USTM232-GW18-01B
Sample Matrix	Water
Date Collected	04/10/01
Date Received	04/13/01
Date Extracted	04/17/01
Date Analyzed	04/26/01
Dry Weight	
Dilution Factor	1
C ₉ -C ₁₈ Aliphatics*	< 100 (µg/L)
C ₁₉ -C ₃₆ Aliphatics*	< 100 (µg/L)
C ₁₁ -C ₂₂ Aromatics*	270 (µg/L)
Aliphatic Surrogate % Recovery	36
Aromatic Surrogate % Recovery	81
Fractionation Surrogate 1 % Recovery	96

Comments:

* = Excludes any surrogates or internal standards.

Low surrogate confirmed by duplicate analysis.

Lab info: G132-857-18470

Reviewed By: 

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Volatiles

by GCMS 6210D

Client Sample ID: USTM232-GW20-01B

Client Project ID: M-232

Lab Sample ID: 18471

Lab Project ID: G132-857

Matrix: Water

Date Analyzed: 4/19/01

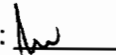
Analyzed By: EKR

Date Collected: 4/10/01

Date Received: 4/13/01

Dilution: 1.0

Compound	Quantitation Limit (ug/L)	Result (ug/L)
Benzene	0.5	BQL
Bromobenzene	0.5	BQL
Bromochloromethane	0.5	BQL
Bromodichloromethane	0.5	BQL
Bromoform	0.5	BQL
Bromomethane	0.5	BQL
n-Butylbenzene	0.5	BQL
sec-Butylbenzene	0.5	2
tert-Butylbenzene	0.5	BQL
Carbon tetrachloride	0.5	BQL
Chlorobenzene	0.5	BQL
Chloroethane	0.5	BQL
Chloroform	0.5	BQL
Chloromethane	0.5	BQL
2-Chlorotoluene	0.5	BQL
4-Chlorotoluene	0.5	BQL
Dibromochloromethane	0.5	BQL
1,2-Dibromo-3-chloropropane	5	BQL
Dibromomethane	0.5	BQL
1,2-Dibromoethane (EDB)	0.5	BQL
1,2-Dichlorobenzene	0.5	BQL
1,3-Dichlorobenzene	0.5	BQL
1,4-Dichlorobenzene	0.5	BQL
1,1-Dichloroethane	0.5	BQL
1,1-Dichloroethene	0.5	BQL
1,2-Dichloroethane	0.5	BQL
cis-1,2-Dichloroethene	0.5	BQL
trans-1,2-dichloroethene	0.5	BQL
1,2-Dichloropropane	0.5	BQL
1,3-Dichloropropane	0.5	BQL
2,2-Dichloropropane	0.5	BQL
1,1-Dichloropropene	0.5	BQL
Dichlorodifluoromethane	5	BQL
Diisopropyl ether (DIPE)	0.5	BQL
Ethylbenzene	0.5	BQL
Hexachlorobutadiene	0.5	BQL
Isopropylbenzene	0.5	BQL
4-Isopropyltoluene	0.5	BQL
Methylene chloride	5	BQL
Methyl-tert-butyl ether (MTBE)	0.5	BQL

Reviewed by: 

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Volatiles

by GCMS 6210D

Client Sample ID: USTM232-GW20-01B

Client Project ID: M-232

Lab Sample ID: 18471

Lab Project ID: G132-857

Matrix: Water

Date Analyzed: 4/19/01

Analyzed By: EKR

Date Collected: 4/10/01

Date Received: 4/13/01

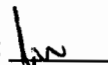
Dilution: 1.0

Compound	Quantitation Limit (ug/L)	Result (ug/L)
Naphthalene	0.5	1
n-Propyl benzene	0.5	0.6
Styrene	0.5	BQL
1,1,1,2-Tetrachloroethane	0.5	BQL
1,1,2,2-Tetrachloroethane	0.5	BQL
Tetrachloroethene	0.5	BQL
Toluene	0.5	BQL
1,2,3-Trichlorobenzene	0.5	BQL
1,2,4-Trichlorobenzene	0.5	BQL
Trichloroethene	0.5	BQL
1,1,1-Trichloroethane	0.5	BQL
1,1,2-Trichloroethane	0.5	BQL
Trichlorofluoromethane	0.5	BQL
1,2,3-Trichloropropane	0.5	BQL
1,2,4-Trimethylbenzene	0.5	BQL
1,3,5-Trimethylbenzene	0.5	BQL
Vinyl chloride	0.5	BQL
m-,p-Xylene	1	BQL
o-Xylene	0.5	BQL

Surrogate Spike Recoveries	Spike Added	Surrogate Result	%Rec
Compound	(ug/L)	(ug/L)	
Bromofluorobenzene	10.0	10.3	103
1,2-Dichloroethane-d4	10.0	11.2	112
Toluene-d8	10.0	10.2	102

Comments:

All results are corrected for dilution.

Reviewed by: 

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Semivolatiles

by GCMS 625

Client Sample ID: USTM232-GW20-01B

Client Project ID: M-232

Lab Sample ID: 18471

Lab Project ID: G132-857

Matrix: Water

Date Collected: 4/10/01

Date Received: 4/13/01

Date Analyzed: 4/19/01

Analyzed By: MRC

Dilution: 1

Compound	Quantitation Limit (ug/L)	Result (ug/L)
Acenaphthene	10	BQL
Acenaphthylene	10	BQL
Anthracene	10	BQL
Benzo[a]anthracene	10	BQL
Benzo[a]pyrene	10	BQL
Benzo[b]fluoranthene	10	BQL
Benzo[g,h,i]perylene	10	BQL
Benzo[k]fluoranthene	10	BQL
Bis(2-chloroethoxy)methane	10	BQL
Bis(2-chloroethyl)ether	10	BQL
Bis(2-chloroisopropyl)ether	10	BQL
Bis(2-ethylhexyl)phthalate	10	BQL
4-bromophenyl phenyl ether	10	BQL
Butylbenzylphthalate	10	BQL
4-Chloro-3-methylphenol	10	BQL
2-Chloronaphthalene	10	BQL
2-Chlorophenol	10	BQL
4-Chlorophenyl phenyl ether	10	BQL
Chrysene	10	BQL
Di-n-Butylphthalate	10	BQL
Di-n-octylphthalate	10	BQL
Dibenzo[a,h]anthracene	10	BQL
1,2-Dichlorobenzene	10	BQL
1,3-Dichlorobenzene	10	BQL
1,4-Dichlorobenzene	10	BQL
3,3'-Dichlorobenzidine	20	BQL
2,4-Dichlorophenol	10	BQL
Diethylphthalate	10	BQL
2,4-Dimethylphenol	10	BQL
Dimethylphthalate	10	BQL
4,6-Dinitro-2-methylphenol	50	BQL
2,4-Dinitrophenol	50	BQL
2,4-Dinitrotoluene	10	BQL
2,6-Dinitrotoluene	10	BQL
Fluoranthene	10	BQL
Fluorene	10	BQL
Hexachlorobenzene	10	BQL
Hexachlorobutadiene	10	BQL
Hexachlorocyclopentadiene	20	BQL
Hexachloroethane	10	BQL

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Semivolatiles by GCMS 625

Client Sample ID: USTM232-GW20-01B

Client Project ID: M-232

Lab Sample ID: 18471

Lab Project ID: G132-857

Matrix: Water

Date Collected: 4/10/01

Date Received: 4/13/01

Date Analyzed: 4/19/01

Analyzed By: MRC

Dilution: 1

Compound	Quantitation Limit (ug/L)	Result (ug/L)
Indeno(1,2,3-c,d)pyrene	10	BQL
Isophorone	10	BQL
N-Nitrosodi-n-propylamine	10	BQL
N-Nitrosodiphenylamine	10	BQL
Naphthalene	10	BQL
Nitrobenzene	10	BQL
2-Nitrophenol	10	BQL
4-Nitrophenol	50	BQL
Pentachlorophenol	50	BQL
Phenanthrene	10	BQL
Phenol	10	BQL
Pyrene	10	BQL
1,2,4-Trichlorobenzene	10	BQL
2,4,6-Trichlorophenol	10	BQL

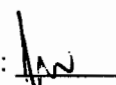
Surrogate Spike Recoveries	Spike Added	Spike Result	Percent Recovered
2-Fluorobiphenyl	10	8.9	89
2-Fluorophenol	10	8.5	85
Nitrobenzene-d5	10	8.3	83
Phenol-d6	10	7.8	78
2,4,6-Tribromophenol	10	9.2	92
4-Terphenyl-d14	10	3.6	36

Comments:

Results are corrected for %solids and dilution where applicable.

Flags:

BQL = Below Quantitation Limit.

Reviewed By: 

Results of Library Search for Semivolatile Compounds
by GCMS

Client Sample ID: USTM232-GW20-01B

Client Project ID: M-232

Lab Sample ID: 18471

Lab Project ID: G132-857

Matrix: Water

Date Collected: 4/10/01

Date Received: 4/13/01

Date Analyzed: 4/19/01

Analyzed By: MRC

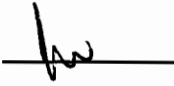
Dilution: 1

Num.	Compound	CAS#	Match Probability	Result (ug/L)
1	Unknown			3.8
2				
3				
4				
5				
6				
7				
8				
9				
10				

Comment:

Tentatively Identified Compound (TIC) refers to substances which are not present in the list of target compounds. Therefore, not all TICs are identified and quantitated using individual standards. TIC listings are prepared utilizing a computerized library search of electron impact mass spectral data and evaluation of the relevant data by a mass spectral data specialist.

Quantitation is accomplished by relative peak height of the compound compared to that of the nearest internal standard from the total ion chromatogram. TICs are identified and quantitated only if the peak height is equal to or greater than 10% of that of the nearest internal standard. Quantitation provided is an estimate.

Reviewed by: 

VPH (Aliphatics/Aromatics) Laboratory Reporting Form

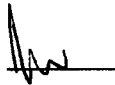
Client Name: LAW ENGINEERINGProject Name: M-232

Sample Information and Analytical Results	
Sample Identification	USTM232-GW20-01B
Sample Matrix	Water
Collection Option (for Soil)*	
Date Collected	04/10/01
Date Received	04/13/01
Date Extracted	04/19/01
Date Analyzed	04/19/01
Dry Weight	
Dilution Factor	1
C ₅ -C ₈ Aliphatics**	< 100 (µg/L)
C ₉ -C ₁₂ Aliphatics**	< 100 (µg/L)
C ₉ -C ₁₀ Aromatics**	< 100 (µg/L)
Surrogate % Recovery - PID	77
Surrogate % Recovery - FID	110

* = Option 1 = Established fill line on vial, Option 2 = Sampling Device/Brand, or Option 3 = Field weight of soil.

** = Excludes any surrogates or internal standards.

Lab Info: G132-857-18471

Reviewed By: 

EPH (Aliphatics/Aromatics) Results

by MDEP-EPH

Client Name: LAW ENGINEERING

Project Name: M-232

Sample Information and Analytical Results	
Sample Identification	USTM232-GW20-01B
Sample Matrix	Water
Date Collected	04/10/01
Date Received	04/13/01
Date Extracted	04/17/01
Date Analyzed	04/23/01
Dry Weight	
Dilution Factor	1
C ₉ -C ₁₈ Aliphatics*	< 100 (µg/L)
C ₁₉ -C ₃₆ Aliphatics*	< 100 (µg/L)
C ₁₁ -C ₂₂ Aromatics*	< 100 (µg/L)
Aliphatic Surrogate % Recovery	37
Aromatic Surrogate % Recovery	72

Comments:

* = Excludes any surrogates or internal standards.

Sample did not require fractionation.

Low surrogate confirmed by duplicate analysis.

Lab info: G132-857-18471

Reviewed By: 

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Volatiles

by GCMS 6210D

Client Sample ID: USTM232-GW21-01B

Client Project ID: M-232

Lab Sample ID: 18472

Lab Project ID: G132-857

Matrix: Water

Date Analyzed: 4/19/01

Analyzed By: EKR

Date Collected: 4/10/01

Date Received: 4/13/01

Dilution: 1.0

Compound	Quantitation Limit (ug/L)	Result (ug/L)
Benzene	0.5	BQL
Bromobenzene	0.5	BQL
Bromochloromethane	0.5	BQL
Bromodichloromethane	0.5	BQL
Bromoform	0.5	BQL
Bromomethane	0.5	BQL
n-Butylbenzene	0.5	4
sec-Butylbenzene	0.5	6
tert-Butylbenzene	0.5	0.6
Carbon tetrachloride	0.5	BQL
Chlorobenzene	0.5	BQL
Chloroethane	0.5	BQL
Chloroform	0.5	BQL
Chloromethane	0.5	BQL
2-Chlorotoluene	0.5	BQL
4-Chlorotoluene	0.5	BQL
Dibromochloromethane	0.5	BQL
1,2-Dibromo-3-chloropropane	5	BQL
Dibromomethane	0.5	BQL
1,2-Dibromoethane (EDB)	0.5	BQL
1,2-Dichlorobenzene	0.5	BQL
1,3-Dichlorobenzene	0.5	BQL
1,4-Dichlorobenzene	0.5	BQL
1,1-Dichloroethane	0.5	BQL
1,1-Dichloroethene	0.5	BQL
1,2-Dichloroethane	0.5	BQL
cis-1,2-Dichloroethene	0.5	BQL
trans-1,2-dichloroethene	0.5	BQL
1,2-Dichloropropane	0.5	BQL
1,3-Dichloropropane	0.5	BQL
2,2-Dichloropropane	0.5	BQL
1,1-Dichloropropene	0.5	BQL
Dichlorodifluoromethane	5	BQL
Diisopropyl ether (DIPE)	0.5	BQL
Ethylbenzene	0.5	1
Hexachlorobutadiene	0.5	BQL
Isopropylbenzene	0.5	3
4-Isopropyltoluene	0.5	3
Methylene chloride	5	BQL
Methyl-tert-butyl ether (MTBE)	0.5	BQL

Reviewed by: 

Flags: BQL = Below Quantitation Limit

N.C. Certification #481 S.C. Certification #99029

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PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Volatiles

by GCMS 6210D

Client Sample ID: USTM232-GW21-01B

Client Project ID: M-232

Lab Sample ID: 18472

Lab Project ID: G132-857

Matrix: Water

Date Analyzed: 4/19/01

Analyzed By: EKR

Date Collected: 4/10/01

Date Received: 4/13/01

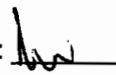
Dilution: 1.0

Compound	Quantitation Limit (ug/L)	Result (ug/L)
Naphthalene	0.5	7
n-Propyl benzene	0.5	6
Styrene	0.5	BQL
1,1,1,2-Tetrachloroethane	0.5	BQL
1,1,2,2-Tetrachloroethane	0.5	BQL
Tetrachloroethene	0.5	0.6
Toluene	0.5	BQL
1,2,3-Trichlorobenzene	0.5	BQL
1,2,4-Trichlorobenzene	0.5	BQL
Trichloroethene	0.5	BQL
1,1,1-Trichloroethane	0.5	BQL
1,1,2-Trichloroethane	0.5	BQL
Trichlorofluoromethane	0.5	BQL
1,2,3-Trichloropropane	0.5	BQL
1,2,4-Trimethylbenzene	0.5	14
1,3,5-Trimethylbenzene	0.5	5
Vinyl chloride	0.5	BQL
m-,p-Xylene	1	BQL
o-Xylene	0.5	BQL

Surrogate Spike Recoveries	Spike Added (ug/L)	Surrogate Result (ug/L)	%Rec
Compound			
Bromofluorobenzene	10.0	10.5	105
1,2-Dichloroethane-d4	10.0	11.2	112
Toluene-d8	10.0	10.2	102

Comments:

All results are corrected for dilution.

Reviewed by: 

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Semivolatiles by GCMS 625

Client Sample ID: USTM232-GW21-01B

Client Project ID: M-232

Lab Sample ID: 18472

Lab Project ID: G132-857

Matrix: Water.

Date Collected: 4/10/01

Date Received: 4/13/01

Date Analyzed: 4/19/01

Analyzed By: MRC

Dilution: 1

Compound	Quantitation Limit (ug/L)	Result (ug/L)
Acenaphthene	10	BQL
Acenaphthylene	10	BQL
Anthracene	10	BQL
Benzo[a]anthracene	10	BQL
Benzo[a]pyrene	10	BQL
Benzo[b]fluoranthene	10	BQL
Benzo[g,h,i]perylene	10	BQL
Benzo[k]fluoranthene	10	BQL
Bis(2-chloroethoxy)methane	10	BQL
Bis(2-chloroethyl)ether	10	BQL
Bis(2-chloroisopropyl)ether	10	BQL
Bis(2-ethylhexyl)phthalate	10	BQL
4-bromophenyl phenyl ether	10	BQL
Butylbenzylphthalate	10	BQL
4-Chloro-3-methylphenol	10	BQL
2-Chloronaphthalene	10	BQL
2-Chlorophenol	10	BQL
4-Chlorophenyl phenyl ether	10	BQL
Chrysene	10	BQL
Di-n-Butylphthalate	10	BQL
Di-n-octylphthalate	10	BQL
Dibenzo[a,h]anthracene	10	BQL
1,2-Dichlorobenzene	10	BQL
1,3-Dichlorobenzene	10	BQL
1,4-Dichlorobenzene	10	BQL
3,3'-Dichlorobenzidine	20	BQL
2,4-Dichlorophenol	10	BQL
Diethylphthalate	10	BQL
2,4-Dimethylphenol	10	BQL
Dimethylphthalate	10	BQL
4,6-Dinitro-2-methylphenol	50	BQL
2,4-Dinitrophenol	50	BQL
2,4-Dinitrotoluene	10	BQL
2,6-Dinitrotoluene	10	BQL
Fluoranthene	10	BQL
Fluorene	10	BQL
Hexachlorobenzene	10	BQL
Hexachlorobutadiene	10	BQL
Hexachlorocyclopentadiene	20	BQL
Hexachloroethane	10	BQL

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Semivolatiles

by GCMS 625

Client Sample ID: USTM232-GW21-01B

Client Project ID: M-232

Lab Sample ID: 18472

Lab Project ID: G132-857

Matrix: Water.

Date Collected: 4/10/01

Date Received: 4/13/01

Date Analyzed: 4/19/01

Analyzed By: MRC

Dilution: 1

Compound	Quantitation Limit (ug/L)	Result (ug/L)
Indeno(1,2,3-c,d)pyrene	10	BQL
Isophorone	10	BQL
N-Nitrosodi-n-propylamine	10	BQL
N-Nitrosodiphenylamine	10	BQL
Naphthalene	10	BQL
Nitrobenzene	10	BQL
2-Nitrophenol	10	BQL
4-Nitrophenol	50	BQL
Pentachlorophenol	50	BQL
Phenanthrene	10	BQL
Phenol	10	BQL
Pyrene	10	BQL
1,2,4-Trichlorobenzene	10	BQL
2,4,6-Trichlorophenol	10	BQL

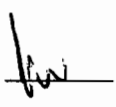
Surrogate Spike Recoveries	Spike Added	Spike Result	Percent Recovered
2-Fluorobiphenyl	10	9.3	93
2-Fluorophenol	10	9.0	90
Nitrobenzene-d5	10	8.6	86
Phenol-d6	10	8.3	83
2,4,6-Tribromophenol	10	9.0	90
4-Terphenyl-d14	10	7.8	78

Comments:

Results are corrected for %solids and dilution where applicable.

Flags:

BQL = Below Quantitation Limit.

Reviewed By: 

Results of Library Search for Semivolatile Compounds
by GCMS

Client Sample ID: USTM232-GW21-01B

Client Project ID: M-232

Lab Sample ID: 18472

Lab Project ID: G132-857

Matrix: Water

Date Collected: 4/10/01

Date Received: 4/13/01

Date Analyzed: 4/19/01

Analyzed By: MRC

Dilution: 1

Num.	Compound	CAS#	Match Probability	Result (ug/L)
1	Naphthalene, 1-methyl-	000090-12-0	94	69
2	Dimethylnaphthalene, Isomer of			67
3	Alkane, Unknown			56
4	Naphthalene, 2-methyl-	000091-57-6	94	51
5	Dimethylnaphthalene, Isomer of			46
6	Dimethylnaphthalene, Isomer of			39
7	Dimethylnaphthalene, Isomer of			29
8	Ethyl dimethylbenzene, Isomer of			27
9	Alkane, Unknown			24
10	Alkane, Unknown			22

Comment:

Tentatively Identified Compound (TIC) refers to substances which are not present in the list of target compounds. Therefore, not all TICs are identified and quantitated using individual standards. TIC listings are prepared utilizing a computerized library search of electron impact mass spectral data and evaluation of the relevant data by a mass spectral data specialist.

Quantitation is accomplished by relative peak height of the compound compared to that of the nearest internal standard from the total ion chromatogram. TICs are identified and quantitated only if the peak height is equal to or greater than 10% of that of the nearest internal standard. Quantitation provided is an estimate.

Reviewed by: 

VPH (Aliphatics/Aromatics) Laboratory Reporting Form

Client Name: LAW ENGINEERING

Project Name: M-232

Sample Information and Analytical Results	
Sample Identification	USTM232-GW21-01B
Sample Matrix	Water
Collection Option (for Soil)*	
Date Collected	04/10/01
Date Received	04/13/01
Date Extracted	04/19/01
Date Analyzed	04/19/01
Dry Weight	
Dilution Factor	1
C ₅ -C ₈ Aliphatics**	< 100 (µg/L)
C ₉ -C ₁₂ Aliphatics**	520 (µg/L)
C ₉ -C ₁₀ Aromatics**	110 (µg/L)
Surrogate % Recovery - PID	79
Surrogate % Recovery - FID	110

* = Option 1 = Established fill line on vial, Option 2 = Sampling Device/Brand, or Option 3 = Field weight of soil.

** = Excludes any surrogates or internal standards.

Lab Info: G132-857-18472

Reviewed By: 

EPH (Aliphatics/Aromatics) Results

by MDEP-EPH

Client Name: LAW ENGINEERING

Project Name: M-232

Sample Information and Analytical Results	
Sample Identification	USTM232-GW21-01B
Sample Matrix	Water
Date Collected	04/10/01
Date Received	04/13/01
Date Extracted	04/17/01
Date Analyzed	04/25/01
Dry Weight	
Dilution Factor	1
C ₉ -C ₁₈ Aliphatics*	< 100 (µg/L)
C ₁₉ -C ₃₆ Aliphatics*	< 100 (µg/L)
C ₁₁ -C ₂₂ Aromatics*	330 (µg/L)
Aliphatic Surrogate % Recovery	46
Aromatic Surrogate % Recovery	74
Fractionation Surrogate 1 % Recovery	99

Comments:

* = Excludes any surrogates or internal standards.

Lab info: G132-857-18472

Reviewed By: 

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Volatiles

by GCMS 6210D

Client Sample ID: USTM232-GW22-01B

Client Project ID: M-232

Lab Sample ID: 18473

Lab Project ID: G132-857

Matrix: Water

Date Analyzed: 4/19/01

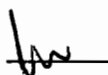
Analyzed By: EKR

Date Collected: 4/10/01

Date Received: 4/13/01

Dilution: 1.0

Compound	Quantitation Limit (ug/L)	Result (ug/L)
Benzene	0.5	BQL
Bromobenzene	0.5	BQL
Bromochloromethane	0.5	BQL
Bromodichloromethane	0.5	BQL
Bromoform	0.5	BQL
Bromomethane	0.5	BQL
n-Butylbenzene	0.5	1
sec-Butylbenzene	0.5	1
tert-Butylbenzene	0.5	BQL
Carbon tetrachloride	0.5	BQL
Chlorobenzene	0.5	BQL
Chloroethane	0.5	BQL
Chloroform	0.5	BQL
Chloromethane	0.5	BQL
2-Chlorotoluene	0.5	BQL
4-Chlorotoluene	0.5	BQL
Dibromochloromethane	0.5	BQL
1,2-Dibromo-3-chloropropane	5	BQL
Dibromomethane	0.5	BQL
1,2-Dibromoethane (EDB)	0.5	BQL
1,2-Dichlorobenzene	0.5	BQL
1,3-Dichlorobenzene	0.5	BQL
1,4-Dichlorobenzene	0.5	BQL
1,1-Dichloroethane	0.5	BQL
1,1-Dichloroethene	0.5	BQL
1,2-Dichloroethane	0.5	BQL
cis-1,2-Dichloroethene	0.5	BQL
trans-1,2-dichloroethene	0.5	BQL
1,2-Dichloropropane	0.5	BQL
1,3-Dichloropropane	0.5	BQL
2,2-Dichloropropane	0.5	BQL
1,1-Dichloropropene	0.5	BQL
Dichlorodifluoromethane	5	BQL
Diisopropyl ether (DIPE)	0.5	BQL
Ethylbenzene	0.5	BQL
Hexachlorobutadiene	0.5	BQL
Isopropylbenzene	0.5	1
4-Isopropyltoluene	0.5	0.8
Methylene chloride	5	BQL
Methyl-tert-butyl ether (MTBE)	0.5	BQL

Reviewed by: 

Flags: BQL = Below Quantitation Limit

N.C. Certification #481 S.C. Certification #99029

Page 1

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Volatiles

by GCMS 6210D

Client Sample ID: USTM232-GW22-01B

Client Project ID: M-232

Lab Sample ID: 18473

Lab Project ID: G132-857

Matrix: Water

Date Analyzed: 4/19/01

Analyzed By: EKR

Date Collected: 4/10/01

Date Received: 4/13/01

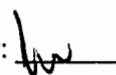
Dilution: 1.0

Compound	Quantitation Limit (ug/L)	Result (ug/L)
Naphthalene	0.5	11
n-Propyl benzene	0.5	2
Styrene	0.5	BQL
1,1,1,2-Tetrachloroethane	0.5	BQL
1,1,2,2-Tetrachloroethane	0.5	BQL
Tetrachloroethene	0.5	BQL
Toluene	0.5	BQL
1,2,3-Trichlorobenzene	0.5	BQL
1,2,4-Trichlorobenzene	0.5	BQL
Trichloroethene	0.5	BQL
1,1,1-Trichloroethane	0.5	BQL
1,1,2-Trichloroethane	0.5	BQL
Trichlorofluoromethane	0.5	BQL
1,2,3-Trichloropropane	0.5	BQL
1,2,4-Trimethylbenzene	0.5	9
1,3,5-Trimethylbenzene	0.5	1
Vinyl chloride	0.5	BQL
m-,p-Xylene	1	BQL
o-Xylene	0.5	BQL

Surrogate Spike Recoveries	Spike Added (ug/L)	Surrogate Result (ug/L)	%Rec
Compound			
Bromofluorobenzene	10.0	10.5	105
1,2-Dichloroethane-d4	10.0	11.2	112
Toluene-d8	10.0	10.2	102

Comments:

All results are corrected for dilution.

Reviewed by: 

Flags: BQL = Below Quantitation Limit

N.C. Certification #481 S.C. Certification #99029

Page 2

Results for Semivolatiles
by GCMS 625

Client Sample ID: USTM232-GW22-01B

Client Project ID: M-232

Lab Sample ID: 18473

Lab Project ID: G132-857

Matrix: Water

Date Collected: 4/10/01

Date Received: 4/13/01

Date Analyzed: 4/19/01

Analyzed By: MRC

Dilution: 1

Compound	Quantitation Limit (ug/L)	Result (ug/L)
Acenaphthene	10	BQL
Acenaphthylene	10	BQL
Anthracene	10	BQL
Benzo[a]anthracene	10	BQL
Benzo[a]pyrene	10	BQL
Benzo[b]fluoranthene	10	BQL
Benzo[g,h,i]perylene	10	BQL
Benzo[k]fluoranthene	10	BQL
Bis(2-chloroethoxy)methane	10	BQL
Bis(2-chloroethyl)ether	10	BQL
Bis(2-chloroisopropyl)ether	10	BQL
Bis(2-ethylhexyl)phthalate	10	BQL
4-bromophenyl phenyl ether	10	BQL
Butylbenzylphthalate	10	BQL
4-Chloro-3-methylphenol	10	BQL
2-Chloronaphthalene	10	BQL
2-Chlorophenol	10	BQL
4-Chlorophenyl phenyl ether	10	BQL
Chrysene	10	BQL
Di-n-Butylphthalate	10	BQL
Di-n-octylphthalate	10	BQL
Dibenzo[a,h]anthracene	10	BQL
1,2-Dichlorobenzene	10	BQL
1,3-Dichlorobenzene	10	BQL
1,4-Dichlorobenzene	10	BQL
3,3'-Dichlorobenzidine	20	BQL
2,4-Dichlorophenol	10	BQL
Diethylphthalate	10	BQL
2,4-Dimethylphenol	10	BQL
Dimethylphthalate	10	BQL
4,6-Dinitro-2-methylphenol	50	BQL
2,4-Dinitrophenol	50	BQL
2,4-Dinitrotoluene	10	BQL
2,6-Dinitrotoluene	10	BQL
Fluoranthene	10	BQL
Fluorene	10	BQL
Hexachlorobenzene	10	BQL
Hexachlorobutadiene	10	BQL
Hexachlorocyclopentadiene	20	BQL
Hexachloroethane	10	BQL

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Semivolatiles

by GCMS 625

Client Sample ID: USTM232-GW22-01B

Client Project ID: M-232

Lab Sample ID: 18473

Lab Project ID: G132-857

Matrix: Water

Date Collected: 4/10/01

Date Received: 4/13/01

Date Analyzed: 4/19/01

Analyzed By: MRC

Dilution: 1

Compound	Quantitation Limit (ug/L)	Result (ug/L)
Indeno(1,2,3-c,d)pyrene	10	BQL
Isophorone	10	BQL
N-Nitrosodi-n-propylamine	10	BQL
N-Nitrosodiphenylamine	10	BQL
Naphthalene	10	13
Nitrobenzene	10	BQL
2-Nitrophenol	10	BQL
4-Nitrophenol	50	BQL
Pentachlorophenol	50	BQL
Phenanthrene	10	BQL
Phenol	10	BQL
Pyrene	10	BQL
1,2,4-Trichlorobenzene	10	BQL
2,4,6-Trichlorophenol	10	BQL

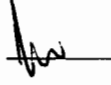
Surrogate Spike Recoveries	Spike Added	Spike Result	Percent Recovered
2-Fluorobiphenyl	10	8.2	82
2-Fluorophenol	10	8.3	83
Nitrobenzene-d5	10	8.2	82
Phenol-d6	10	7.9	79
2,4,6-Tribromophenol	10	8.8	88
4-Terphenyl-d14	10	4.0	40

Comments:

Results are corrected for %solids and dilution where applicable.

Flags:

BQL = Below Quantitation Limit.

Reviewed By: 

Results of Library Search for Semivolatile Compounds
by GCMS

Client Sample ID: USTM232-GW22-01B

Client Project ID: M-232

Lab Sample ID: 18473

Lab Project ID: G132-857

Matrix: Water

Date Collected: 4/10/01

Date Received: 4/13/01

Date Analyzed: 4/19/01

Analyzed By: MRC

Dilution: 1

Num.	Compound	CAS#	Match Probability	Result (ug/L)
1	Naphthalene, 1-methyl-	000090-12-0	94	73
2	Naphthalene, 2-methyl-	000091-57-6	95	70
3	Dimethylnaphthalene, Isomer of			52
4	Dimethylnaphthalene, Isomer of			35
5	Alkane, Unknown			33
6	Dimethylnaphthalene, Isomer of			33
7	Ethyl dimethylbenzene, Isomer of			23
8	Dimethylnaphthalene, Isomer of			18
9	Alkane, Unknown			16
10	Unknown			16

Comment:

Tentatively Identified Compound (TIC) refers to substances which are not present in the list of target compounds. Therefore, not all TICs are identified and quantitated using individual standards. TIC listings are prepared utilizing a computerized library search of electron impact mass spectral data and evaluation of the relevant data by a mass spectral data specialist.

Quantitation is accomplished by relative peak height of the compound compared to that of the nearest internal standard from the total ion chromatogram. TICs are identified and quantitated only if the peak height is equal to or greater than 10% of that of the nearest internal standard. Quantitation provided is an estimate.

Reviewed by: 

VPH (Aliphatics/Aromatics) Laboratory Reporting Form

Client Name: LAW ENGINEERING

Project Name: M-232

Sample Information and Analytical Results	
Sample Identification	USTM232-GW22-01B
Sample Matrix	Water
Collection Option (for Soil)*	
Date Collected	04/10/01
Date Received	04/13/01
Date Extracted	04/19/01
Date Analyzed	04/19/01
Dry Weight	
Dilution Factor	1
C ₅ -C ₈ Aliphatics**	< 100 (µg/L)
C ₉ -C ₁₂ Aliphatics**	200 (µg/L)
C ₉ -C ₁₀ Aromatics**	< 100 (µg/L)
Surrogate % Recovery - PID	78
Surrogate % Recovery - FID	110

* = Option 1 = Established fill line on vial, Option 2 = Sampling Device/Brand, or Option 3 = Field weight of soil.

** = Excludes any surrogates or internal standards.

Lab Info: G132-857-18473

Reviewed By: 

PARADIGM ANALYTICAL LABORATORIES, INC.

EPH (Aliphatics/Aromatics) Results

by MDEP-EPH

Client Name: LAW ENGINEERING

Project Name: M-232

Sample Information and Analytical Results	
Sample Identification	USTM232-GW22-01B
Sample Matrix	Water
Date Collected	04/10/01
Date Received	04/13/01
Date Extracted	04/17/01
Date Analyzed	04/25/01
Dry Weight	
Dilution Factor	1
C ₉ -C ₁₈ Aliphatics*	140 (µg/L)
C ₁₉ -C ₃₆ Aliphatics*	< 100 (µg/L)
C ₁₁ -C ₂₂ Aromatics*	310 (µg/L)
Aliphatic Surrogate % Recovery	27
Aromatic Surrogate % Recovery	77
Fractionation Surrogate 1 % Recovery	100

Comments:

- * = Excludes any surrogates or internal standards.
- Low surrogate confirmed by duplicate analysis.

VPH (Aliphatics/Aromatics) Laboratory Reporting Form

Client Name: LAW ENGINEERINGProject Name: M-232

Sample Information and Analytical Results	
Sample Identification	USTM232-GW99-01B
Sample Matrix	Water
Collection Option (for Soil)*	
Date Collected	04/10/01
Date Received	04/13/01
Date Extracted	04/19/01
Date Analyzed	04/19/01
Dry Weight	
Dilution Factor	1
C ₅ -C ₈ Aliphatics**	< 100 (µg/L)
C ₉ -C ₁₂ Aliphatics**	120 (µg/L)
C ₉ -C ₁₀ Aromatics**	< 100 (µg/L)
Surrogate % Recovery - PID	81
Surrogate % Recovery - FID	110

* = Option 1 = Established fill line on vial, Option 2 = Sampling Device/Brand, or Option 3 = Field weight of soil.

** = Excludes any surrogates or internal standards.

Lab Info: G132-857-18474

Reviewed By: 

PARADIGM ANALYTICAL LABORATORIES, INC.

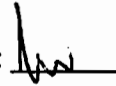
Results for Volatiles

by GCMS 6210D

Client Sample ID: Trip Blank
 Client Project ID: M-232
 Lab Sample ID: 18475
 Lab Project ID: G132-857
 Matrix: Water

Date Analyzed: 4/19/01
 Analyzed By: EKR
 Date Collected: 4/10/01
 Date Received: 4/13/01
 Dilution: 1.0

Compound	Quantitation Limit (ug/L)	Result (ug/L)
Benzene	0.5	BQL
Bromobenzene	0.5	BQL
Bromochloromethane	0.5	BQL
Bromodichloromethane	0.5	BQL
Bromoform	0.5	BQL
Bromomethane	0.5	BQL
n-Butylbenzene	0.5	BQL
sec-Butylbenzene	0.5	BQL
tert-Butylbenzene	0.5	BQL
Carbon tetrachloride	0.5	BQL
Chlorobenzene	0.5	BQL
Chloroethane	0.5	BQL
Chloroform	0.5	BQL
Chloromethane	0.5	BQL
2-Chlorotoluene	0.5	BQL
4-Chlorotoluene	0.5	BQL
Dibromochloromethane	0.5	BQL
1,2-Dibromo-3-chloropropane	5	BQL
Dibromomethane	0.5	BQL
1,2-Dibromoethane (EDB)	0.5	BQL
1,2-Dichlorobenzene	0.5	BQL
1,3-Dichlorobenzene	0.5	BQL
1,4-Dichlorobenzene	0.5	BQL
1,1-Dichloroethane	0.5	BQL
1,1-Dichloroethene	0.5	BQL
1,2-Dichloroethane	0.5	BQL
cis-1,2-Dichloroethene	0.5	BQL
trans-1,2-dichloroethene	0.5	BQL
1,2-Dichloropropane	0.5	BQL
1,3-Dichloropropane	0.5	BQL
2,2-Dichloropropane	0.5	BQL
1,1-Dichloropropene	0.5	BQL
Dichlorodifluoromethane	5	BQL
Diisopropyl ether (DIPE)	0.5	BQL
Ethylbenzene	0.5	BQL
Hexachlorobutadiene	0.5	BQL
Isopropylbenzene	0.5	BQL
4-Isopropyltoluene	0.5	BQL
Methylene chloride	5	BQL
Methyl-tert-butyl ether (MTBE)	0.5	BQL

Reviewed by: 

Flags: BQL = Below Quantitation Limit

N.C. Certification #481 S.C. Certification #99029

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PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Volatiles

by GCMS 6210D

Client Sample ID: Trip Blank

Client Project ID: M-232

Lab Sample ID: 18475

Lab Project ID: G132-857

Matrix: Water

Date Analyzed: 4/19/01

Analyzed By: EKR

Date Collected: 4/10/01

Date Received: 4/13/01

Dilution: 1.0

Compound	Quantitation Limit (ug/L)	Result (ug/L)
Naphthalene	0.5	BQL
n-Propyl benzene	0.5	BQL
Styrene	0.5	BQL
1,1,1,2-Tetrachloroethane	0.5	BQL
1,1,2,2-Tetrachloroethane	0.5	BQL
Tetrachloroethene	0.5	BQL
Toluene	0.5	BQL
1,2,3-Trichlorobenzene	0.5	BQL
1,2,4-Trichlorobenzene	0.5	BQL
Trichloroethene	0.5	BQL
1,1,1-Trichloroethane	0.5	BQL
1,1,2-Trichloroethane	0.5	BQL
Trichlorofluoromethane	0.5	BQL
1,2,3-Trichloropropane	0.5	BQL
1,2,4-Trimethylbenzene	0.5	BQL
1,3,5-Trimethylbenzene	0.5	BQL
Vinyl chloride	0.5	BQL
m-,p-Xylene	1	BQL
o-Xylene	0.5	BQL

Surrogate Spike Recoveries	Spike Added (ug/L)	Surrogate Result (ug/L)	%Rec
Compound			
Bromofluorobenzene	10.0	10.2	102
1,2-Dichloroethane-d4	10.0	11.1	111
Toluene-d8	10.0	10.1	101

Comments:

All results are corrected for dilution.

Reviewed by: 

Flags: BQL = Below Quantitation Limit

N.C. Certification #481 S.C. Certification #99029

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PARADIGM ANALYTICAL LABORATORIES, INC.

Attachment 2

VPH Laboratory Reporting Form

Calibration and QA/QC Information

FID Initial Calibration Date: 12/02/00

PID Initial Calibration Date: 12/02/00

Calibration Ranges and Limits

Range	MDL		ML		RL	
	(µg/L)	(mg/Kg)	(µg/L)	(mg/Kg)	(µg/L)	(mg/Kg)
C ₅ -C ₈ Aliphatics	2.4	0.12	7.5	0.38	100	10
C ₉ -C ₁₂ Aliphatics	1.3	0.065	4.0	0.21	100	10
C ₉ -C ₁₀ Aromatics	0.5	0.025	1.6	0.08	100	10

Calibration Concentration Levels

Range	Levels		%RSD or CCC	Method of Quantitation
	(µg/L)	(mg/Kg)		
C ₅ -C ₈ Aliphatics	40	2	15.5	Calibration Factor
	160	8		
	400	20		
	1600	80		
	4000	200		
C ₉ -C ₁₂ Aliphatics	30	1.5	18.8	Calibration Factor
	120	6		
	300	15		
	1200	60		
	3000	150		
C ₉ -C ₁₀ Aromatics	65	3.25	21.4	Calibration Factor
	260	13		
	650	32.5		
	2600	130		
	6500	325		

Calibration Check Date: 04/20/01

Calibration Check

Range	Levels		RPD
	(µg/L)	(mg/Kg)	
C ₅ -C ₈ Aliphatics	400	20	-13.2
C ₉ -C ₁₂ Aliphatics	300	15	-11.7
C ₉ -C ₁₀ Aromatics	650	32.5	-8.5

MDL = Method Detection Limit

ML = Minimum Limit

RL = Reportable Limit

RPD = Relative Percent Difference

%RSD = Percent Relative Standard Deviation

CCC = Correlation Coefficient of Curve

Reviewed By: [Signature]

N.C. Certification #481 S.C. Certification #99029

PARADIGM ANALYTICAL LABORATORIES, INC.

Attachment 2

VPH Laboratory Reporting Form

Calibration and QA/QC Information

FID Initial Calibration Date: 12/02/00

PID Initial Calibration Date: 12/02/00

Calibration Ranges and Limits

Range	MDL		ML		RL	
	(µg/L)	(mg/Kg)	(µg/L)	(mg/Kg)	(µg/L)	(mg/Kg)
C ₅ -C ₈ Aliphatics	2.4	0.12	7.5	0.38	100	10
C ₉ -C ₁₂ Aliphatics	1.3	0.065	4.0	0.21	100	10
C ₉ -C ₁₀ Aromatics	0.5	0.025	1.6	0.08	100	10

Calibration Concentration Levels

Range	Levels		%RSD or CCC	Method of Quantitation
	(µg/L)	(mg/Kg)		
C ₅ -C ₈ Aliphatics	40	2	15.5	Calibration Factor
	160	8		
	400	20		
	1600	80		
	4000	200		
C ₉ -C ₁₂ Aliphatics	30	1.5	18.8	Calibration Factor
	120	6		
	300	15		
	1200	60		
	3000	150		
C ₉ -C ₁₀ Aromatics	65	3.25	21.4	Calibration Factor
	260	13		
	650	32.5		
	2600	130		
	6500	325		

Calibration Check Date: 04/18/01

Calibration Check

Range	Levels		RPD
	(µg/L)	(mg/Kg)	
C ₅ -C ₈ Aliphatics	400	20	-12.0
C ₉ -C ₁₂ Aliphatics	300	15	-13.0
C ₉ -C ₁₀ Aromatics	650	32.5	-3.2

MDL = Method Detection Limit

ML = Minimum Limit

RL = Reportable Limit

RPD = Relative Percent Difference

%RSD = Percent Relative Standard Deviation

CCC = Correlation Coefficient of Curve

Reviewed By: AW

PARADIGM ANALYTICAL LABORATORIES, INC.

Attachment 3

EPH Laboratory Reporting Form

Calibration and QA/QC Information

Initial Calibration Date: 04/05/01

Calibration Ranges and Limits

Range	MDL (mg/Kg)	(µg/L)	ML (mg/Kg)	(µg/L)	RL (mg/Kg)	(µg/L)
C ₉ -C ₁₈ Aliphatics	0.1	2	0.3	6.5	100	10
C ₁₉ -C ₃₆ Aliphatics	0.1	1	0.3	3.1	100	10
C ₁₁ -C ₂₂ Aromatics	0.2	2.5	0.6	8	100	10

Calibration Concentration Levels

Range	Levels (µg/L) (mg/Kg)	%RSD or CCC	Method of Quantitation
C ₉ -C ₁₈ Aliphatics	0.06 1	5.70	Calibration Factor
	0.15 2.5		
	0.3 5		
	0.6 10		
	1.2 20		
C ₁₉ -C ₃₆ Aliphatics	0.08 1.33	7.0	Calibration Factor
	0.2 3.33		
	0.4 6.67		
	0.8 13.3		
	1.6 26.7		
C ₁₁ -C ₂₂ Aromatics	0.12 2	3.2	Calibration Factor
	0.3 5		
	0.6 10		
	1.2 20		
	2.4 40		

Calibration Check Date: 04/26/01

Calibration Check

Range	Levels (µg/mL) (mg/Kg)	RPD
C ₉ -C ₁₈ Aliphatics	0.6 10	-5.6
C ₁₉ -C ₃₆ Aliphatics	0.8 13.3	-6.8
C ₁₁ -C ₂₂ Aromatics	1.2 20	-21.3

MDL = Method Detection Limit

ML = Minimum Limit

RL = Reportable Limit

RPD = Relative Percent Difference

%RSD = Percent Relative Standard Deviation

CCC = Correlation Coefficient of Curve

EPH Laboratory Reporting Form

Calibration and QA/QC Information

Initial Calibration Date: 04/05/01

Calibration Ranges and Limits

Range	MDL (mg/Kg)	(µg/L)	ML (mg/Kg)	(µg/L)	RL (mg/Kg)	(µg/L)
C ₉ -C ₁₈ Aliphatics	0.1	2	0.3	6.5	100	10
C ₁₉ -C ₃₆ Aliphatics	0.1	1	0.3	3.1	100	10
C ₁₁ -C ₂₂ Aromatics	0.2	2.5	0.6	8	100	10

Calibration Concentration Levels

Range	Levels (µg/L) (mg/Kg)	%RSD or CCC	Method of Quantitation
C ₉ -C ₁₈ Aliphatics	0.06 1	5.70	Calibration Factor
	0.15 2.5		
	0.3 5		
	0.6 10		
	1.2 20		
C ₁₉ -C ₃₆ Aliphatics	0.08 1.33	7.0	Calibration Factor
	0.2 3.33		
	0.4 6.67		
	0.8 13.3		
	1.6 26.7		
C ₁₁ -C ₂₂ Aromatics	0.12 2	3.2	Calibration Factor
	0.3 5		
	0.6 10		
	1.2 20		
	2.4 40		

Calibration Check Date: 04/25/01

Calibration Check

Range	Levels (µg/mL) (mg/Kg)	RPD
C ₉ -C ₁₈ Aliphatics	0.6 10	-2.6
C ₁₉ -C ₃₆ Aliphatics	0.8 13.3	-5.4
C ₁₁ -C ₂₂ Aromatics	1.2 20	-1.7

MDL = Method Detection Limit

ML = Minimum Limit

RL = Reportable Limit

RPD = Relative Percent Difference

%RSD = Percent Relative Standard Deviation

CCC = Correlation Coefficient of Curve

Client: LAW ENGINEERING Project ID: M-232 Date: 4/10/01 Report To: BILL DEEBALD
 Address: 3301 ATLANTIC AVE Contact: BILL DEEBALD Turnaround: STANDARD LAW-CALTECH
 Address: RAVENH NC 27604 Phone: 919-831-8051 Job Number: 307406-0600-88
 Quote #: 1489 Fax: 919-831-8136 P.O. Number: 374 Invoice To: LAW CORP. ALTHARET

Sample ID	Date	Time Matrix	Preservatives		Analyses					Comments: Please specify any special reporting requirements
					VPH w/HCL	EPH	625+TICS	6210P		
45TM232-GW07-01B	4/10/01	12:30 H2O			2	1	1	3		
45TM232-GW05-01B	4/10/01	13:45 H2O			2	1	1	3		
45TM232-GW18-01B	4/10/01	16:45 H2O			2	1	1	3		
45TM232-GW19-01B					DID NOT SAMPLE DUE TO FREE PRODUCT-					
45TM232-GW20-01B	4/10/01	17:00 H2O			2	1	1	3		
45TM232-GW21-01B	4/10/01	15:00 H2O			2	1	1	3		
45TM232-GW22-01B	4/10/01	15:30 H2O			2	1	1	3		
45TM232-GW99-01B	4/10/01	12:30 H2O			2					
TRIP BLANK	-	- H2O						2		

Relinquished By	Date	Time	Received By	Date	Time	Temperature	State Certification Requested
<i>Bill Deebald</i>	4/13/01	12:30	<i>Julie Palmer</i>	4/13/01	12:30	on ice	NC SC Other

SEE REVERSE FOR TERMS AND CONDITIONS