Engineering & Environment, *Inc.*

11 January 2006

Mr. Dave Cleland
Department of the Navy
Navy Facilities Engineering Command, Atlantic
Code OPCEV4
6506 Hampton Boulevard, Building C, Room 311
Norfolk, Virginia 23508

Re: Annual Monitoring Report, Site S-2633, Revision 0
Marine Corps Base, Camp Lejeune, North Carolina
Contract # N62470-03-D-4000, Contract Task Order 0018

Dear Mr. Cleland:

Engineering & Environment, Inc. (EEI) is pleased to provide this monitoring report summarizing groundwater gauging and sampling activities at site S-2633, Marine Corps Base Camp (MCB) Lejeune, North Carolina. Activities included quarterly well gauging and annual groundwater sampling at site monitoring well MW-1.

Site S-2633 includes building S-2633, an active sewage lift station facility located at MCB Camp Lejeune, North Carolina. The site is located approximately 1,000 feet northeast of Morgan Bay and on the western side of Seth-Williams Boulevard. Figure 1-1 presents the site location on the 7.5 minute United States Geological Survey (USGS) Camp Lejeune and Jacksonville South Topographic Quadrangle Map. Figure 1-2 presents a more detailed site location Map.

According to base records, Building S-2633 was constructed approximately 60 years ago and currently is being utilized to house a sewage lift station. At the time of construction, a 150-gallon capacity gasoline underground storage tank (UST) was installed to fuel an emergency backup generator for the lift station. This UST was closed by removal and replaced by an above ground storage tank. Previous site investigations indicated that petroleum constituents were released from the former UST. Well MW-1 is located in the immediate vicinity of the former UST (Figure 1-2).

Monitoring activities at the site included an annual groundwater sampling event, conducted on 23 February 2005 at well MW-1, and four quarterly gauging events, conducted on 23 February, 2 May, 2 August, and 26 November 2005 at well MW-1. Table 1 presents a summary of the gauging data for the four events; field gauging data sheets are included as an attachment.

Well MW-1 was gauged using an oil-water interface probe, with data recorded to the nearest 0.01 foot and referenced to the top of the well casing. No measurable free product was detected at the well during any of the gauging events. Measured depths to water for the four events ranged from 2.45 to 2.87 feet. This range of 0.42 feet is consistent with expected seasonal

fluctuations in the water table. Groundwater elevation contour maps could not be generated as only a single elevation datum per event was available. Historical data suggest that the general groundwater flow direction at the site is to the west.

On 23 February 2005, an EEI representative mobilized to site for the annual sampling event. A stainless-steel submersible pump with new dedicated polyethylene tubing was lowered into well MW-1 and used to purge the well. Upon completion of the purge, a groundwater sample was collected for the following analyses: Aromatic Volatile Organic Compounds (AVOCs) by Method 602 (with total xylene isomers, methyl-tert-butyl ether, and diisopropyl ether); Semi-Volatile Organic Compounds (SVOCs) by Method 625 (with 10 largest non-target peaks); Volatile Petroleum Hydrocarbons (VPH) by MADEP VPH; and Extractable Petroleum Hydrocarbons (EPH) by MADEP EPH. The samples were submitted under chain-of-custody to Paradigm Analytical Laboratories, Inc. The field sampling data sheet, laboratory report, and chain-of-custody form are attached.

Six AVOCs were detected in the groundwater sample for MW-1 during the 23 February 2005 sampling event (Table 2). Benzene, ethylbenzene, toluene, total xylenes, and diisopropyl ether were detected at concentrations that exceeded North Carolina Groundwater Quality Standards (NCGWQSs); concentrations were below Gross Contamination Levels (GCLs). Methyl-tert butyl ether (MTBE) was not detected, at an elevated reporting limit of 400 µg/L. (The reporting limit was elevated as sample aliquot dilution was conducted by the laboratory in order to quantitate other constituents.) As the NCGWQS for methyl-tert butyl ether is 200 µg/L, evaluation of the MTBE result relative the NCGWQS is not possible. The GCL for MTBE is 70,000 ug/L; therefore, the data indicate MTBE is not present above the GCL.

Three target analyte SVOCs were detected in the groundwater sample for MW-1. Detected compounds included 2,4-Dimethylphenol, naphthalene, and phenol. Of these three SVOCs, only naphthalene was detected above the NCGWQS. Naphthalene was reported at a concentration of 130 ug/L., above the NCGWQS of 21 ug/L and substantially below the GCL of 15,5000 ug/L. Ten Tentatively Identified Compounds (TICs) were reported, with a total estimated concentration of 2,742.1 ug/L. None of the TICs were identified as specific compounds. (TICs are substances not on the target compound list, and not all TICs are identified and quantitated using individual standards. Frequently, TICs cannot be identified as specific compounds, and are reported as compound isomers or as unknown. All TIC quantitations are estimated.) Given the uncertainties associated with TIC quantitation and the lack of specific compound identification, the significance of the data is limited.

Of the constituents reported for the VPH and EPH analyses, three hydrocarbon fractions were decteded at concentrations above NCGWQSs. The C_5-C_8 Aliphatics were reported at a concentration of 22,000 ug/L, above the NCGWQS of 420 ug/L. The C_9-C_{18} Aliphatics (reported in Table 2 as the sum of the individually quantitated VPH C_9-C_{12} and EPH C_9-C_{18} Aliphatics) concentration was reported at 7,300 ug/L, above the NCGWQS of 4,200 ug/L. The C_9-C_{22} Aromatics (reported in Table 2 as the sum of the individually quantitated VPH C_9-C_{10} and EPH C_{11}-C_{22} Aromatics) concentration was reported at 3,500 ug/L, above the NCGWQS of 210 ug/L. GCLs have not been established for these three hydrocarbon fractions.

In summary, no measurable free product was observed at well MW-1 during the four gauging events. Some constituents were detected at concentrations above NCGWQSs, but all were below established GCLs. It recommended to continue site monitoring in a manner consistent with this monitoring program.

Engineering and Environment, Inc. appreciates the opportunity to work with the Navy on this project. If you have any questions regarding this report, please contact me at (910) 989-3214 (bmorris@eeimail.com).

Sincerely,

ENGINEERING AND ENVIRONMENT, INC.

Mr. William C. Morris, P.G.
Project Manager

attachments

cc: Mr. Andrew Smith, (MCB/EMD) Camp Lejeune

1-11-06

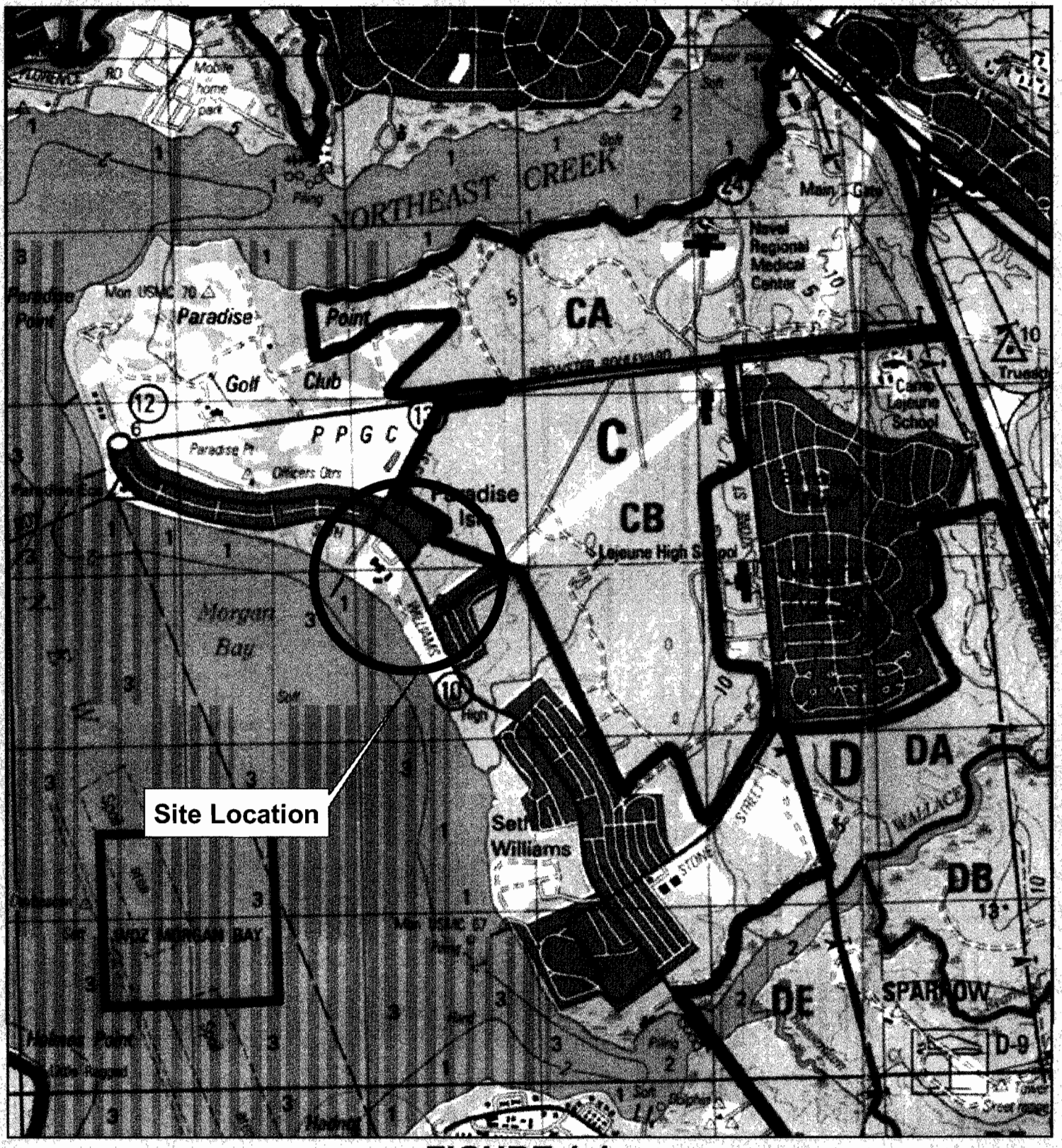
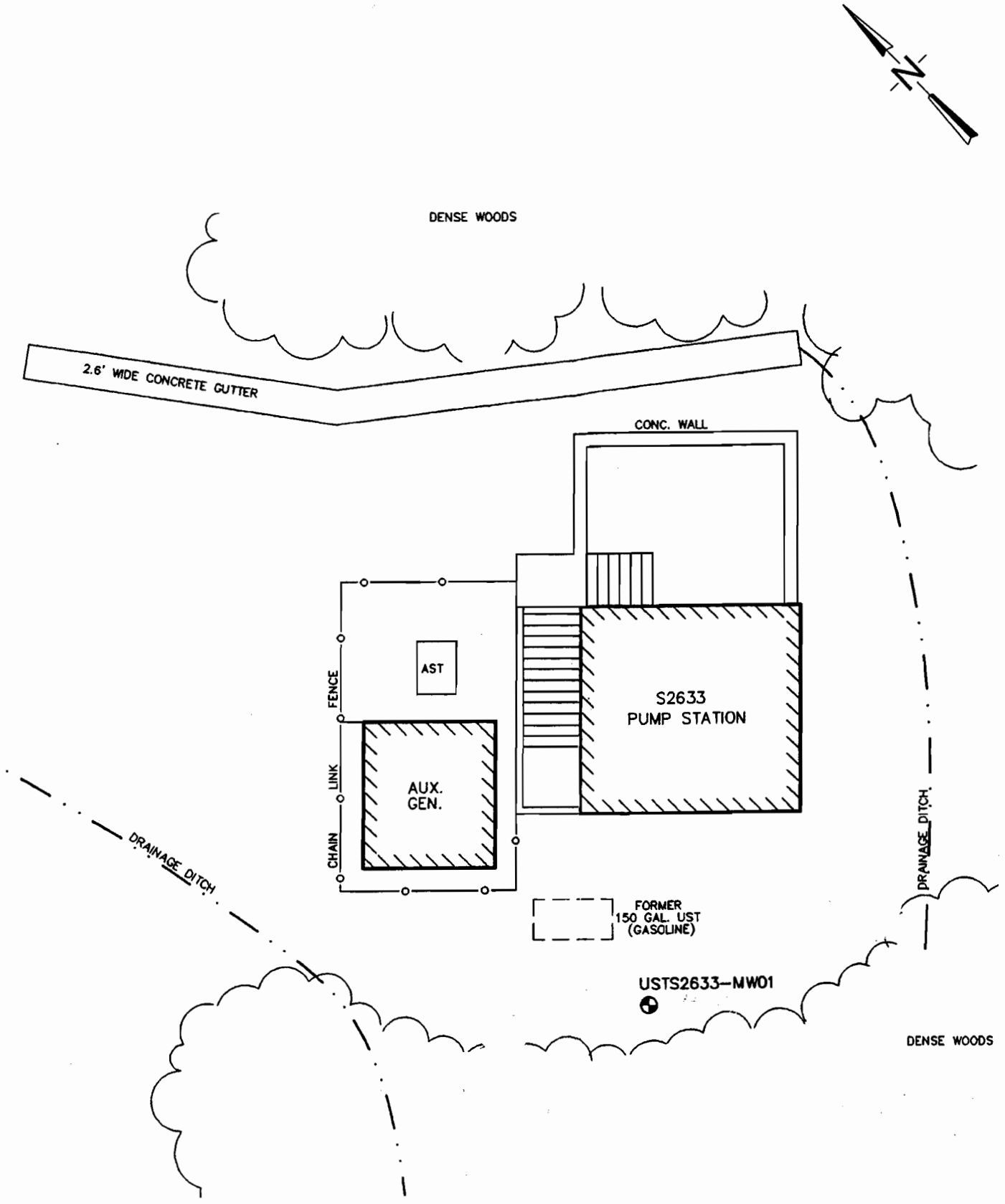


FIGURE 1-1
SITE LOCATION MAP

BUILDING S-2633
MARINE CORPS BASE
CAMP LEJEUNE, N.C.

Engineering & Environment, *Inc.*
www.eeiinfo.com



SCALE (Feet)

0 10

(Map adapted from S2633 LIST CSA, 1998, Catlin)

Engineering & Environment, Inc.

FIGURE	1-2
DATE	12/20/05
REVISION	0
DRAWN BY	AER
FILE	S2633 Site Map

SITE LAYOUT

S-2633 SITE
ANNUAL MONITORING REPORT
MCB CAMP LEJEUNE, NC

Table 1

Summary of Groundwater Gauging Data for 2005

Site S-2633

Monitoring Well	Depths to Water (feet)			
	23 February 2005	2 May 2005	2 August 2005	26 November 2005
MW-1	2.75	2.5	2.45	2.87

Depths to water measured from the top of PVC well casing.

No measurable free product was detected during the gauging events

Table 2

Summary of Groundwater Quality Analytical Data for February 2005

Site S-2633

EPA Method 602 (ug/L)	NCGWQS	GCL	MW-1 23 February 2005
Benzene	1	5000	**3020**
Ethylbenzene	29	29,000	**297**
Toluene	1000	257,500	**2380**
m,p-Xylene [1]			**1970**
o-Xylene [1]			**811**
Total Xylenes [1]	530	87,500	**2781**
Methyl-tert butyl ether	200	200,000	<400
Diisopropyl ether	70	70,000	**222**
EPA Method 625 (ug/L)			
2,4-Dimethylphenol	140	140,000	**68.2**
Naphthalene	21	15,500	**130**
Phenol	300	NE	**60.8**
TICs (total)			**2742.1 J**
MADEP VPH (ug/L)			
C_5-C_8 Aliphatics	420	NE	**22,000**
C_9-C_{12} Aliphatics [2]			**6,100**
C_9-C_{10} Aromatics [2]			**3,200**
MADEP EPH (ug/L)			
C_9-C_{18} Aliphatics [2]			**1,200**
C_{19}-C_{36} Aliphatics	42,000	NE	<100
C_{11}-C_{22} Aromatics [2]			**300**
MADEP VPH + EPH (ug/L)			
C_9-C_{12} + C_9-C_{18} Aliphatics [2]	4200	NE	**7,300**
C_9-C_{10} + C_{11}-C_{22} Aromatics [2]	210	NE	**3,500**

[1] Laboratory quantiation is performed on the m,p-xylene isomers and on the o-xylene isomer; the NCGWQS is based on the sum of the m-, p-, and o-xylene isomers; the sum of the m,p-xylene isomers and the o-xylene isomer is presented as Total Xylenes

[2] Laboratory quantiation is performed on each of the indicated hydrocarbon fractions; NCGWQSs are based on the sum of the indicated fractions; the sums for the indicated fractions are presented as MADEP VPH + EPH

J: Estimated concentration below reporting limits or estimated concentration for TIC quantitations

NR: None Reported; no TICs were identified in the sample

NS: Not Sampled; measurable free product detected

GCL: Gross Contamination Level

NE: Not Established; a GCL has not been established for the analyte

NCGWQS: North Carolina Groundwater Quality Standard

TICs (total): Tentatively Identified Compound; sum of all TICs; all TIC concentrations are estimated

ug/L: micrograms per liter

Bold type indicates analyte detection

Shaded area in bold indicates analyte detection at a concentration above the NCGWQS

Shaded area in bold italics indicates analyte detection at a concentration above the GCL

ENGINEERING AND ENVIRONMENT, INC.

S-2633 Field Data

Project #LD03-020

Date 2/23/2005 **Time** 10:45 Weather sunny, 50 degrees

Sampler BS **Well/Sample #** USTS2366-MW01

Depth To Bottom (ft) 12.28 **Depth To \Water (ft)** 2.75 **Water Depth (ft)** 9.53

Well Vol. 1.55 **Purge Vol.** 4.65 **Vol. Purged**

Sampling Device (pump/Bailer)

	ONE	TWO	THREE	FOUR	FIVE	SIX	UNIT
Time	10:15						N/A
Temperature	13.84						©
Spec. Conductivity	0.63						(m s/m)
Dissolved Oxygen	1.06						ms/L
PH	6.53						STD
ORP	-84.6						(G/L)
Turbitidy	O/L						(NTU)

Analyte	Size	Preserv.
6210D	3 X 40 ml	HCL
625	1 X 1 L	None
VPH	2 X 40 ml	HCL

Comments:	Dry at 1.5 vol.; waited 20 minutes; took sample

2" well vol.=water depth X 0.1632 4" well vol.=water depth x 0.6528

Pid							
Time							
SWL							
Pump Depth							

ENGINEERING AND ENVIRONMENT, INC.

Water Level S2633

Date: 2/23/2005

Well ID	MW01	Depth to Bottom	24.40	Depth to Product		Depth to Water	2.75

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Water Level S2633

Date: 5/2/2005

Well ID	MW01	Depth to Bottom	24.40	Depth to Product		Depth to Water	2.50

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Water Level S2633

Date: 8/2/2005

Well ID	MW01	Depth to Bottom	24.40	Depth to Product		Depth to Water	2.45

ENGINEERING AND ENVIRONMENT, INC.

Water Level S2633

Date: 11/26/2005

Well ID	MW01	Depth to Bottom	24.40	Depth to Product		Depth to Water	2.87

Mr. Bill Morris
Engineering & Environment, Inc.
824 Gum Branch Road
Jacksonville NC 28546

Report Number: G546-22

Client Project: S2633

Dear Mr. Morris:

Enclosed are the results of the analytical services performed under the referenced project. The samples are certified to meet the requirements of the National Environmental Laboratory Accreditation Conference Standards. 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 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 Paradigm at (910) 350-1903. 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.

3/30/05

Laboratory Director Date
J. Patrick Weaver

Results for Volatiles
by GC 602

Client Sample ID: USTS2633
Client Project ID: S2633
Lab Sample ID: G546-22-1A
Lab Project ID: G546-22

Analyzed By: DCS
Date Collected: 2/23/2005 10:45
Date Received: 2/24/2005
Matrix: Water

Analyte	Result ug/L	RL ug/L	MDL ug/L	Dilution Factor	Date Analyzed	Flags
Benzene	**3020**	200	63.2	200	3/1/2005	
Diisopropyl ether (DIPE)	**222**	200	58.8	200	3/1/2005	
Ethylbenzene	**297**	200	59.8	200	3/1/2005	
Methyl-tert butyl ether (MTBE)	BQL	400	118	200	3/1/2005	
Toluene	**2380**	200	60.4	200	3/1/2005	
m/p-Xylene	**1970**	400	122	200	3/1/2005	
o-Xylene	**811**	400	119	200	3/1/2005	

Surrogate Spike Recoveries	Spike Added	Spike Result	Percent Recovery
Trifluorotoluene	40	36.3	90.6

Comments:
All values corrected for dilution.
BQL = Below quantitation limit.

Reviewed By: _____

Results for Volatiles
by GC 602

Client Sample ID: Trip Blank
Client Project ID: S2633
Lab Sample ID: G546-22-2A
Lab Project ID: G546-22

Analyzed By: DCS
Date Collected: 2/23/2005 0:00
Date Received: 2/24/2005
Matrix: Water

Analyte	Result ug/L	RL ug/L	MDL ug/L	Dilution Factor	Date Analyzed	Flags
Benzene	BQL	1.00	0.316	1	3/1/2005	
Diisopropyl ether (DIPE)	BQL	1.00	0.294	1	3/1/2005	
Ethylbenzene	BQL	1.00	0.299	1	3/1/2005	
Methyl-tert butyl ether (MTBE)	BQL	2.00	0.588	1	3/1/2005	
Toluene	BQL	1.00	0.302	1	3/1/2005	
m/p-Xylene	BQL	2.00	0.608	1	3/1/2005	
o-Xylene	BQL	2.00	0.596	1	3/1/2005	

Surrogate Spike Recoveries	Spike Added	Spike Result	Percent Recovery
Trifluorotoluene	40	36.3	90.8

Comments:
All values corrected for dilution.
BQL = Below quantitation limit.

Reviewed By:

Results for Volatiles
by GC 602

Client Sample ID: Method Blank
Client Project ID:
Lab Sample ID: VBLK3022805D
Lab Project ID:

Analyzed By: DCS
Date Collected:
Date Received:
Matrix: Water

Analyte	Result ug/L	RL ug/L	Dilution Factor	Date Analyzed
Benzene	BQL	1.00	1	2/28/2005
Diisopropyl ether (DIPE)	BQL	1.00	1	2/28/2005
Ethylbenzene	BQL	1.00	1	2/28/2005
Methyl-tert butyl ether (MTBE)	BQL	2.00	1	2/28/2005
Toluene	BQL	1.00	1	2/28/2005
m/p-Xylene	BQL	2.00	1	2/28/2005
o-Xylene	BQL	2.00	1	2/28/2005

Surrogate Spike Recoveries	Spike Added	Spike Result	Percent Recovery
Trifluorotoluene	40	36.5	91.2

Comments:
All values corrected for dilution.
BQL = Below quantitation limit.

Control Limits for QC Check / Laboratory Control Spike

Method: 602 **Spike[ppb] :** 10
Instrument : gc3
Filename : 022805\025r0101.txt

				QC Limits			LCS Limits	
	Compound	ppb	Q(%)	Lower	Upper	P_s(%)	Lower	Upper
	Benzene	9.8	97.8	77.0	123.0	98	39	150
	Chlorobenzene	9.9	99.1	80.5	119.5	99	55	135
	1,2-Dichlorobenzene	9.8	98.3	68.0	132.0	98	37	154
	1,3-Dichlorobenzene	9.8	98.2	72.5	127.5	98	50	141
	1,4-Dichlorobenzene	9.9	99.3	69.5	130.5	99	42	143
•	Diisopropyl ether	9.7	97.1	43.1	156.9	97	30	170
	Ethylbenzene	10.0	100.0	63.0	137.0	100	32	160
•	MTBE	9.7	97.0	46.8	153.2	97	35	165
	Toluene	9.9	98.6	77.5	127.0	99	46	148
•	m,p-Xylene	20.3	101.6	11.2	188.8	102	D	239
•	o-Xylene	10.1	101.1	47.6	152.4	101	36	164

Flags :

+ = out of QC limits.
• = lab generated limits.
D = Detected

Reviewed by: 

Control Limits for MS-MSD

Method: 602 **Spike[ppb]:** 10
Instrument: gc3
Sample: 022805\040r0101.txt
MS: 022805\041r0101.txt
MSD: 022805\042r0101.txt

		µg/L			P(%)		P Limits	
	Compound	Sam.	MS	MSD	MS	MSD	Lower	Upper
	Benzene	15.1	25.2	24.7	101	96	39	150
	Chlorobenzene	ND	9.4	9.2	94	92	55	135
	1,2-Dichlorobenzene	ND	8.6	8.2	86	82	37	154
	1,3-Dichlorobenzene	ND	8.7	8.5	86	85	50	141
	1,4-Dichlorobenzene	ND	8.3	8.1	83	81	42	143
•	Diisopropyl ether	1.1	11.1	10.7	99	96	30	170
	Ethylbenzene	1.5	11.3	11.1	98	96	32	160
•	MTBE	ND	9.4	9.2	94	92	35	165
	Toluene	11.9	22.2	21.9	103	100	46	148
•	m,p-Xylene	9.8	30.0	29.6	101	99	D	239
•	o-Xylene	2.0	11.6	11.5	96	95	36	164

Flags :

+ = out of QC limits.
• = lab generated limits.
D = Detected
ND = None Detected

Reviewed by: _____

VPH (Aliphatics/Aromatics) Laboratory Reporting Form

Client Name: Engineering & Environment, Inc.

Project Name: S2633

Sample Information and Analytical Results	
Sample Identification	USTS2633
Sample Matrix	Water
Collection Option (for Soil)*	
Date Collected	02/23/05
Date Received	02/24/05
Date Extracted	03/02/05
Date Analyzed	03/02/05
Dry Weight	
Dilution Factor	25
C_5-C_8 Aliphatics**	22000 (µg/L)
C_9-C_{12} Aliphatics**	6100 (µg/L)
C_9-C_{10} Aromatics**	3200 (µg/L)
Surrogate % Recovery - PID	140***
Surrogate % Recovery - FID	170***

* = 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.

***= High surrogate recovery due to matrix interference

Lab Info: g546-22-1e

Reviewed By: 

Attachment 2

VPH Laboratory Reporting Form

Calibration and QA/QC Information

FID Initial Calibration Date: 12/17/04 PID Initial Calibration Date: 12/17/04

Calibration Ranges and Limits

Range	MDL (07/15/2004) (µg/L)	ML (µg/L)	RL (µg/L)	RL (mg/Kg)
C_5-C_8 Aliphatics	4.4	14	100	10
C_9-C_{12} Aliphatics	3.4	11	100	10
C_9-C_{10} Aromatics	0.13	0.41	100	10

Calibration Concentration Levels

Range	Levels (µg/L)	%RSD or CCC	Method of Quantitation
C_5-C_8 Aliphatics	40	4.8	Calibration Factor
	1000		
	2000		
	3000		
	4000		
C_9-C_{12} Aliphatics	10	0.993	Linear Regression
	250		
	500		
	750		
	1000		
C_9-C_{10} Aromatics	10	6.8	Calibration Factor
	250		
	500		
	750		
	1000		

Calibration Check Date: 03/02/05

Calibration Check

Range	Levels (µg/L)	Levels (mg/Kg)	RPD
C_5-C_8 Aliphatics	2000	200	11.8
C_9-C_{12} Aliphatics	500	50	3.4
C_9-C_{10} Aromatics	500	50	1.8

MDL = Method Detection Limit
ML = Minimum Limit
RL = Reportable Limit
RPD = Relative Percent Difference
%RSD = Percent Relative Standard Deviation
CCC = Correlation Coefficient of Curve

EPH (Aliphatics/Aromatics) Results

by MDEP-EPH

Client Name: Engineering & Environment, Inc.

Project Name: S2633

Sample Information and Analytical Results	
Sample Identification	USTS2633
Sample Matrix	Water
Date Collected	02/23/05
Date Received	02/24/05
Date Extracted	03/08/05
Date Analyzed	03/19/05
Dry Weight	
Dilution Factor	1:1
C_9-C_{18} Aliphatics*	1200 (ug/L)
C_{19}-C_{36} Aliphatics*	< 100 (ug/L)
C_{11}-C_{22} Aromatics*	300 (ug/L)
Aliphatic Surrogate % Recovery	65
Aromatic Surrogate % Recovery	61
Fractionation Surrogate 1 % Recovery	64

Comments:

* = Excludes any surrogates or internal standards.

Lab info: G546-22-1I

Reviewed By: GF

Attachment 3

EPH Laboratory Reporting Form

Calibration and QA/QC Information

Initial Calibration Date: 03/14/05

Calibration Ranges and Limits

Range	MDL (2/2004) (µg/L)	ML (µg/L)	RL (µg/L)	RL (mg/Kg)
C_9-C_{18} Aliphatics	3.84	12.2	100	10
C_{19}-C_{36} Aliphatics	0.57	1.8	100	10
C_{11}-C_{22} Aromatics	4.54	14.4	100	10

Calibration Concentration Levels

Range	Levels (µg/mL)	%RSD or CCC	Method of Quantitation
C_9-C_{18} Aliphatics	6	8.10	Calibration Factor
	30		
	60		
	120		
	240		
C_{19}-C_{36} Aliphatics	8	5.1	Calibration Factor
	40		
	80		
	160		
	320		
C_{11}-C_{22} Aromatics	17	9.5	Calibration Factor
	85		
	170		
	340		
	680		

Calibration Check Date: 03/18/05

Calibration Check

Range	Levels (µg/mL)	RPD
C_9-C_{18} Aliphatics	120	12.2
C_{19}-C_{36} Aliphatics	160	8.8
C_{11}-C_{22} Aromatics	340	6.1

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.

Results for Semivolatiles by GCMS 625

Client Sample ID: USTS2633
Client Project ID: S2633
Lab Sample ID: G546-22-1H
Lab Project ID: G546-22

Analyzed By: MRC
Date Collected: 2/23/2005 10:45
Date Received: 2/24/2005
Date Extracted: 3/3/2005
Matrix: Water

Compound	Result ug/L	Quantitation Limit ug/L	MDL ug/L	Dilution Factor	Date Analyzed	Flag
Acenaphthene	BQL	10.0	1.22	1	3/6/2005	
Acenaphthylene	BQL	10.0	1.12	1	3/6/2005	
Anthracene	BQL	10.0	1.75	1	3/6/2005	
Benzo[a]anthracene	BQL	10.0	1.36	1	3/6/2005	
Benzo[a]pyrene	BQL	10.0	1.27	1	3/6/2005	
Benzo[b]fluoranthene	BQL	10.0	1.43	1	3/6/2005	
Benzo[g,h,i]perylene	BQL	10.0	4.57	1	3/6/2005	
Benzo[k]fluoranthene	BQL	10.0	1.09	1	3/6/2005	
Bis(2-chloroethoxy)methane	BQL	10.0	1.11	1	3/6/2005	
Bis(2-chloroethyl)ether	BQL	10.0	1.09	1	3/6/2005	
Bis(2-chloroisopropyl)ether	BQL	10.0	1.57	1	3/6/2005	
Bis(2-ethylhexyl)phthalate	BQL	10.0	1.33	1	3/6/2005	
4-bromophenyl phenyl ether	BQL	10.0	1.99	1	3/6/2005	
Butylbenzylphthalate	BQL	10.0	1.53	1	3/6/2005	
2-Chloronaphthalene	BQL	10.0	1.25	1	3/6/2005	
2-Chlorophenol	BQL	10.0	4.22	1	3/6/2005	
4-Chloro-3-methylphenol	BQL	10.0	3.26	1	3/6/2005	
4-Chlorophenyl phenyl ether	BQL	10.0	1.42	1	3/6/2005	
Chrysene	BQL	10.0	1.11	1	3/6/2005	
Dibenzo[a,h]anthracene	BQL	10.0	4.87	1	3/6/2005	
Di-n-Butylphthalate	BQL	10.0	1.65	1	3/6/2005	
1,2-Dichlorobenzene	BQL	10.0	1.25	1	3/6/2005	
1,3-Dichlorobenzene	BQL	10.0	1.24	1	3/6/2005	
1,4-Dichlorobenzene	BQL	10.0	1.20	1	3/6/2005	
3,3'-Dichlorobenzidine	BQL	20.0	4.10	1	3/6/2005	
2,4-Dichlorophenol	BQL	10.0	3.75	1	3/6/2005	
Diethylphthalate	BQL	10.0	1.48	1	3/6/2005	
Dimethylphthalate	BQL	10.0	1.04	1	3/6/2005	
2,4-Dimethylphenol	68.2	10.0	9.25	1	3/6/2005	
Di-n-octylphthalate	BQL	10.0	1.16	1	3/6/2005	
4,6-Dinitro-2-methylphenol	BQL	50.0	3.71	1	3/6/2005	
2,4-Dinitrophenol	BQL	50.0	4.20	1	3/6/2005	
2,4-Dinitrotoluene	BQL	10.0	1.52	1	3/6/2005	
2,6-Dinitrotoluene	BQL	10.0	1.41	1	3/6/2005	
Fluoranthene	BQL	10.0	1.41	1	3/6/2005	
Fluorene	BQL	10.0	1.22	1	3/6/2005	
Hexachlorobenzene	BQL	10.0	1.22	1	3/6/2005	
Hexachlorobutadiene	BQL	10.0	1.58	1	3/6/2005	
Hexachlorocyclopentadiene	BQL	20.0	20.0	1	3/6/2005	
Hexachloroethane	BQL	10.0	1.58	1	3/6/2005	
Indeno(1,2,3-c,d)pyrene	BQL	10.0	4.57	1	3/6/2005	
Isophorone	BQL	10.0	1.27	1	3/6/2005	

Results for Semivolatiles
by GCMS 625

Client Sample ID: USTS2633
Client Project ID: S2633
Lab Sample ID: G546-22-1H
Lab Project ID: G546-22

Analyzed By: MRC
Date Collected: 2/23/2005 10:45
Date Received: 2/24/2005
Date Extracted: 3/3/2005
Matrix: Water

Compound	Result ug/L	Quantitation Limit ug/L	MDL ug/L	Dilution Factor	Date Analyzed	Flag
Naphthalene	**130**	10.0	1.08	1	3/6/2005	
Nitrobenzene	BQL	10.0	1.32	1	3/6/2005	
2-Nitrophenol	BQL	10.0	3.52	1	3/6/2005	
4-Nitrophenol	BQL	50.0	3.17	1	3/6/2005	
N-Nitrosodi-n-propylamine	BQL	10.0	1.87	1	3/6/2005	
N-Nitrosodiphenylamine	BQL	10.0	1.53	1	3/6/2005	
Pentachlorophenol	BQL	50.0	2.83	1	3/6/2005	
Phenanthrene	BQL	10.0	1.38	1	3/6/2005	
Phenol	**60.8**	10.0	3.38	1	3/6/2005	
Pyrene	BQL	10.0	2.08	1	3/6/2005	
1,2,4-Trichlorobenzene	BQL	10.0	1.33	1	3/6/2005	
2,4,6-Trichlorophenol	BQL	10.0	2.92	1	3/6/2005	

	Spike Added	Spike Result	Percent Recovered
2-Fluorobiphenyl	10	8	80
2-Fluorophenol	10	8.1	81
Nitrobenzene-d5	10	9.4	94
Phenol-d6	10	7.6	76
2,4,6-Tribromophenol	5	4.5	91
4-Terphenyl-d14	10	8.6	86

Comments:

Flags:

BQL = Below Quantitation Limits.
J = Detected below the quantitation limit.

Reviewed By: JF

Results of Library Search for Semivolatile Compounds

by GCMS

Client Sample ID: USTS2633
Client Project ID: S2633
Lab Sample ID: G546-22-1H
Lab Project ID: G546-22
Sample Wt/Vol: 500 ML
Dilution: 1

Analyzed By: MRC
Date Collected: 2/23/2005 10:45
Date Received: 2/24/2005
Date Analyzed: 3/5/2005
Date Extracted: 3/3/2005
Matrix: Water

No.	Compound	Retention Time	CAS#	Match Probability	Result (ug/L)
1	Dimethylbenzene, Isomer of	5.10			673
2	Trimethylbenzene, Isomer of	6.37			571
3	Ethylmethylbenzene, Isomer of	5.96			317
4	Trimethylbenzene, Isomer of	6.06			257
5	Unknown	6.86			218
6	Trimethylbenzene, Isomer of	6.70			201
7	Ethylmethylbenzene, Isomer of	6.00			178
8	Alcohol, Unknown	3.82			127
9	Ethyldimethylbenzene, Isomer of	7.09			125
10	Unknown	7.12			75.1

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 area 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 area 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: Method Blank
Client Project ID:
Lab Sample ID: PB2471
Lab Project ID:

Analyzed By: MRC
Date Collected:
Date Received:
Date Extracted: 3/3/2005
Matrix: WATER

Compound	Result ug/L	Quantitation Limit ug/L	MDL ug/L	Dilution Factor	Date Analyzed	Flag
Acenaphthene	BQL	10.0	1.22	1	3/5/2005	
Acenaphthylene	BQL	10.0	1.12	1	3/5/2005	
Anthracene	BQL	10.0	1.75	1	3/5/2005	
Benzo[a]anthracene	BQL	10.0	1.36	1	3/5/2005	
Benzo[a]pyrene	BQL	10.0	1.27	1	3/5/2005	
Benzo[b]fluoranthene	BQL	10.0	1.43	1	3/5/2005	
Benzo[g,h,i]perylene	BQL	10.0	4.57	1	3/5/2005	
Benzo[k]fluoranthene	BQL	10.0	1.09	1	3/5/2005	
Bis(2-chloroethoxy)methane	BQL	10.0	1.11	1	3/5/2005	
Bis(2-chloroethyl)ether	BQL	10.0	1.09	1	3/5/2005	
Bis(2-chloroisopropyl)ether	BQL	10.0	1.57	1	3/5/2005	
Bis(2-ethylhexyl)phthalate	BQL	10.0	1.33	1	3/5/2005	
4-bromophenyl phenyl ether	BQL	10.0	1.99	1	3/5/2005	
Butylbenzylphthalate	BQL	10.0	1.53	1	3/5/2005	
2-Chloronaphthalene	BQL	10.0	1.25	1	3/5/2005	
2-Chlorophenol	BQL	10.0	4.22	1	3/5/2005	
4-Chloro-3-methylphenol	BQL	10.0	3.26	1	3/5/2005	
4-Chlorophenyl phenyl ether	BQL	10.0	1.42	1	3/5/2005	
Chrysene	BQL	10.0	1.11	1	3/5/2005	
Dibenzo[a,h]anthracene	BQL	10.0	4.87	1	3/5/2005	
Di-n-Butylphthalate	BQL	10.0	1.65	1	3/5/2005	
1,2-Dichlorobenzene	BQL	10.0	1.25	1	3/5/2005	
1,3-Dichlorobenzene	BQL	10.0	1.24	1	3/5/2005	
1,4-Dichlorobenzene	BQL	10.0	1.20	1	3/5/2005	
3,3'-Dichlorobenzidine	BQL	20.0	4.10	1	3/5/2005	
2,4-Dichlorophenol	BQL	10.0	3.75	1	3/5/2005	
Diethylphthalate	BQL	10.0	1.48	1	3/5/2005	
Dimethylphthalate	BQL	10.0	1.04	1	3/5/2005	
2,4-Dimethylphenol	BQL	10.0	9.25	1	3/5/2005	
Di-n-octylphthalate	BQL	10.0	1.16	1	3/5/2005	
4,6-Dinitro-2-methylphenol	BQL	50.0	3.71	1	3/5/2005	
2,4-Dinitrophenol	BQL	50.0	4.20	1	3/5/2005	
2,4-Dinitrotoluene	BQL	10.0	1.52	1	3/5/2005	
2,6-Dinitrotoluene	BQL	10.0	1.41	1	3/5/2005	
Fluoranthene	BQL	10.0	1.41	1	3/5/2005	
Fluorene	BQL	10.0	1.22	1	3/5/2005	
Hexachlorobenzene	BQL	10.0	1.22	1	3/5/2005	
Hexachlorobutadiene	BQL	10.0	1.58	1	3/5/2005	
Hexachlorocyclopentadiene	BQL	20.0	20.0	1	3/5/2005	
Hexachloroethane	BQL	10.0	1.58	1	3/5/2005	
Indeno(1,2,3-c,d)pyrene	BQL	10.0	4.57	1	3/5/2005	
Isophorone	BQL	10.0	1.27	1	3/5/2005	

Results for Semivolatiles
by GCMS 625

Client Sample ID: Method Blank
Client Project ID:
Lab Sample ID: PB2471
Lab Project ID:

Analyzed By: MRC
Date Collected:
Date Received:
Date Extracted: 3/3/2005
Matrix: WATER

Compound	Result ug/L	Quantitation Limit ug/L	MDL ug/L	Dilution Factor	Date Analyzed	Flag
Naphthalene	BQL	10.0	1.08	1	3/5/2005	
Nitrobenzene	BQL	10.0	1.32	1	3/5/2005	
2-Nitrophenol	BQL	10.0	3.52	1	3/5/2005	
4-Nitrophenol	BQL	50.0	3.17	1	3/5/2005	
N-Nitrosodi-n-propylamine	BQL	10.0	1.87	1	3/5/2005	
N-Nitrosodiphenylamine	BQL	10.0	1.53	1	3/5/2005	
Pentachlorophenol	BQL	50.0	2.83	1	3/5/2005	
Phenanthrene	BQL	10.0	1.38	1	3/5/2005	
Phenol	BQL	10.0	3.38	1	3/5/2005	
Pyrene	BQL	10.0	2.08	1	3/5/2005	
1,2,4-Trichlorobenzene	BQL	10.0	1.33	1	3/5/2005	
2,4,6-Trichlorophenol	BQL	10.0	2.92	1	3/5/2005	

	Spike Added	Spike Result	Percent Recovered
2-Fluorobiphenyl	10	8.3	83
2-Fluorophenol	10	7.9	79
Nitrobenzene-d5	10	8	80
Phenol-d6	10	7.7	77
2,4,6-Tribromophenol	5	3.1	62
4-Terphenyl-d14	10	9.8	98

Comments:

Flags:
BQL = Below Quantitation Limits.
J = Detected below the quantitation limit.

Reviewed By: 

Results For Water Laboratory Control Standard (LCS)
by GCMS

Client Sample ID: Batch QC
Client Project ID:
Lab Sample ID: W-LCS-2471
Lab Project ID:
Matrix: Water

Date Collected:
Date Received:
Date Analyzed: 03/05/05
Analyzed By: MRC

	Spiked	LCS	LCS	LIMITS	
	ng	ng	% Rec.	LOWER	UPPER
Acenaphthylene	10	8.66	87	71	110
4-Chloro-3-methylphenol	10	7.28	73	61	104
2-Chlorophenol	10	6.91	69	61	95
1,4-Dichlorobenzene	10	5.32	53	28	86
2,4-Dinitrotoluene	10	7.70	77	63	109
N-Nitrosodi-n-propylamine	10	7.92	79	62	106
4-Nitrophenol	10	5.71	57	54	130
Pentachlorophenol	10	5.55	55	37	103
Phenol	10	6.86	69	56	108
Pyrene	10	9.01	90	64	127
1,2,4-Trichlorobenzene	10	7.37	74	50	96

Comments:

Concentrations are on column amounts.

Flags:

* = Out of limits.
NA = Not applicable.

Reviewed By: 

Results For Water Matrix Spike / Matrix Spike Duplicate (MS/MSD)
by GCMS

Client Sample ID: Batch QC
Client Project ID:
Lab Sample ID: W-MS-2471
Lab Project ID:
Matrix: Water

Date Collected:
Date Received:
Date Analyzed: 03/05/05
Analyzed By: MRC
Dilution: 1

					Limits			Limit
	Sample	Spiked	MS	MSD	Lower	Upper	RPD	Max.
	ng	ng	%	%	%	%	%	%
Acenaphthylene	BQL	10	89	93	62	115	4.0	30
4-Chloro-3-methylphenol	BQL	10	75	80	56	109	6.6	30
2-Chlorophenol	BQL	10	75	77	52	102	2.5	30
1,4-Dichlorobenzene	BQL	10	60	63	40	86	4.8	30
2,4-Dinitrotoluene	BQL	10	80	85	54	116	4.9	30
N-Nitrosodi-n-propylamine	BQL	10	78	86	51	115	10.1	30
4-Nitrophenol	BQL	10	66	74	46	147	11.7	30
Pentachlorophenol	BQL	10	64	70	40	117	9.3	30
Phenol	BQL	10	73	76	45	117	4.2	30
Pyrene	BQL	10	87	93	63	125	5.7	30
1,2,4-Trichlorobenzene	BQL	10	77	83	50	96	7.2	30

Comments:

Concentrations are on column amounts.

Flags:

* = Out of limits.
NA = Not applicable.

Reviewed By: AF

List of Reporting Abbreviations and Data Qualifiers

B = Compound also detected in batch blank

BQL = Below Quantitation Limit

DF = Dilution Factor

Dup = Duplicate

E = Estimated concentration, exceeds calibration range.

J = Estimated concentration, below calibration range and above MDL

LCS(D) = Laboratory Control Spike (Duplicate)

MDL = Method Detection Limit

MS(D) = Matrix Spike (Duplicate)

PQL = Practical Quantitation Limit

RL = Reporting Limit

RPD = Relative Percent Difference

mg/kg = milligram per kilogram, ppm, parts per million

ug/kg = micrograms per kilogram, ppb, parts per billion

mg/L = milligram per liter, ppm, parts per million

ug/L = micrograms per liter, ppb, parts per billion

% Rec = Percent Recovery

% soilds = Percent Solids

Special Notes:

1) Metals and mercury samples are digested with a hot block, see the standard operating procedure document for details.

2) Uncertainty for all reported data is less than or equal to 30 percent.

PARADIGM ANALYTICAL LABORATORIES, INC.
5500 Business Drive, Wilmington, NC 28405
Phone: (910)-350-1903 FAX: (910)-350-1557

Chain-of Custody Record & Analytical Request

COC# 44042

Page _____ **of** _____

Client: Engineering + Environment **Project ID:** S2633 **Date:** 2/23/05 **Report To:** _____
Address: 824 Gumbranch rd **Contact:** Bill morris **Turnaround:** Standard
Address: Jacksonville NC, 28540 **Phone:** 910-989-3214 **Job Number:** _____
Quote #: _____ **Fax:** 910-989-3341 **P.O. Number:** _____ **Invoice To:** _____

Sample ID	Date	Time	Matrix	Preservatives				Analyses									Comments: Please specify any special reporting requirements
				HCl	none			602 V/Xylenes	VPH	EPH	6259 10 Tics						
USTS2633	2/23/05	10:45	GW	6	1			3	2	1	1						G546-22
Trip Blank	2/23/05	12:00															

Relinquished By	Date	Time	Received By	Date	Time	Temperature	State Certification Requested
Bob Sellers	2/23/05	12:00	Julie Johnson	2/24/05	1015	5.8°	NC ____ SC ____ Other ____
Bob Sellers							SEE REVERSE FOR TERMS AND CONDITIONS

ORIGINAL

PARADIGM ANALYTICAL LABORATORIES, INC.

N.C. CERTIFICATION #481