



Post Office Box 10279
Wilmington, NC 28404-0279

Phone (910) 452-5861
Fax (910) 452-7563
www.catlinusa.com

January 14, 2010

NAVFAC Mid-Atlantic
Marine Corps North Carolina IPT
Environmental Business Line
Code: OPNCEV
Attn: Mr. Dave Borton, PG
6506 Hampton Blvd.
Bldg. C, Room 314
Norfolk, VA 23508-1278

Re: *TT-2929 UST Closure Report Addendum (FINAL)*
MADEP VPH/EPH Resampling Results
Tarawa Terrace
Marine Corps Base
Camp Lejeune, North Carolina
CATLIN Project No. 209-025

Dear Mr. Borton:

CATLIN Engineers and Scientists (CATLIN) has recollected a soil sample from the center of the former tank basin at the TT-2929 project site. Soil sample TT-2929-7 was collected from a depth of seven feet below land surface (BLS) and analyzed per Massachusetts Department of Environmental Protection (MADEP) extractable and volatile petroleum hydrocarbons (EPH and VPH).

The soil sample was recollected due to the fact that the original sample collected on December 8, 2009 from this location and depth was inadvertently obtained utilizing the improper glassware/preservative for the MADEP VPH portion of the analysis.

On January 7, 2010 a representative from CATLIN arrived on-site and collected a soil sample via hand auger technique from seven feet BLS. New disposable nitrile gloves were worn during sampling activities. The sample was placed into laboratory provided glassware (one 4 oz. Glass jar for EPH analysis and two 40 ml glass VOAs with Methanol for VPH analysis) and packed on ice in an insulated cooler for transportation to the laboratory. Sample integrity was maintained by following proper chain-of-custody procedures. The soil sample TT-2929-7 was submitted to SGS Environmental Services, Inc. (NC Certification #481) for MADEP EPH and VPH analysis.

As indicated on the attached revised Table 2, the C9-C18 Aliphatics hydrocarbon fraction was detected at a concentration of <403 milligrams per kilogram (mg/kg) in the TT-2929-7 sample. The C9-C22 Aromatics hydrocarbon fraction was detected at a concentration of <29 mg/kg in the TT-2929-7 sample. Please note these two values represent the sum of the reported practical quantitation limit of one fraction and the detected concentration of the other fraction. Also, in sample TT-2929-7 the C19-C36 Aliphatics hydrocarbon fraction was detected at a concentration of 106 mg/kg. However, all of the detected concentrations of the MADEP EPH and VPH hydrocarbon fractions were below the lowest Maximum Soil Contaminant Concentrations (MSCCs). The laboratory report and chain-of-custody documentation for the TT-2929-7 sample is also attached.

Based on the findings from the MADEP EPH and VPH resampling of the former tank basin at the TT-2929, CATLIN feels the recommendation of No Further Action (NFA) contained in the January 5, 2010 *TT-2929 UST Closure Report Addendum* is still applicable.

The attached Table 2 and laboratory report should supplement the information contained in the January 5, 2010 *TT-2929 UST Closure Report Addendum* submitted by CATLIN.

CATLIN Engineers and Scientists appreciate the opportunity to continue to provide services to NAVFAC Mid-Atlantic and the MCB on your environmental projects.



Shane A. Chasteen
Project Scientist



Michael E. Mason, PE
Program Manager



Enclosures

cc: Commanding Officer, Attn: Director I&E/EMD/EQB
Ms. Susan Tsimpinos, NAVFAC Mid-Atlantic – Contract Specialist (correspondence only)

TT2929_Resample_Ltr.doc

ATTACHMENTS

TABLES

**TABLE 2
SUMMARY OF SOIL LABORATORY RESULTS
MADEP EPH AND VPH**

Incident Name and No.: TT-2929 - Pending

Sample ID	Analytical Method →		MADEP EPH			MADEP VPH			MADEP EPH/VPH			
	Contaminant of Concern →		C9-C18 Aliphatics	C19-C36 Aliphatics	C11-C22 Aromatics	C5-C8 Aliphatics	C9-C12 Aliphatics	C9-C10 Aromatics	C5-C8 Aliphatics	C9-C18 Aliphatics	C19-C36 Aliphatics	C9-C22 Aromatics
	Date Collected	Sample Depth (ft. BLS)										
TT-2929-7	1/7/2010	7	393	106	19	<10.0	<10.0	<10.0	<10.0	<403*	106	<29.0*
Residential MSCC (mg/kg)									939	9,386	93,860	469
Industrial/Commercial MSCC (mg/kg)									24,528	245,280	#	12,264
Soil to Groundwater MSCC (mg/kg)									72	3,300	##	34

ft. BLS = Feet Below Land Surface

All results in milligrams per kilogram (mg/kg).

< = Less than reporting limit

MSCC = Maximum Soil Contaminant Concentration

= Health-Based Level (>100%)

= Considered Immobile

* = The value represents the sum of the reported practical quantitation limit of one fraction and the detected concentration of the other fraction.

**LABORATORY ANALYTICAL RESULTS AND
CHAIN-OF-CUSTODY DOCUMENTATION**



Ben Ashba
Richard Catlin & Associates
P.O. Box 10279
Wilmington, NC 28404-0279

Report Number: G128-2487

Client Project: TT2929

Dear Ben Ashba,

Enclosed are the results of the analytical services performed under the referenced project for the received samples and associated QC as applicable. 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 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 services performed during this project, please call Barbara Hager at (910) 350-1903. We will be happy to answer any questions or concerns which you may have.

Thank you for using SGS North America, Inc. for your analytical services. We look forward to working with you again on any additional analytical needs.

Sincerely,
SGS North America, Inc.

Barbara Hager Jan 8 2010
Project Manager Date
Barbara Hager

SGS North America, Inc.
List of Reporting Abbreviations
And Data Qualifiers

B = Compound also detected in batch blank

BQL = Below Quantification Limit (RL or MDL)

DF = Dilution Factor

Dup = Duplicate

D = Detected, but RPD is > 40% between results in dual column method.

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

RI/CL = Reporting Limit / Control Limit

RPD = Relative Percent Difference

UJ = Target analytes with recoveries that are $10\% < \%R < LCL$; # of MEs are allowable and compounds are not detected in the sample.

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

% solids = 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.

VPH (Aliphatics/Aromatics) Laboratory Reporting Form

Client Name: Richard Catlin & Associates

Project Name: TT2929


Sample Information	
Sample Identification	TT-2929-7
Sample Matrix	Soil
Collection Option (for Soil)*	2
Date Collected	01/07/10 12:15
Date Received	01/07/10
Date Extracted	01/07/10
Date Analyzed	01/07/10 21:55 - 01/07/10 21:55
Dry Weight	85.3
Dilution Factor	1 - 1

Analytical Results				
Analyte	Result mg/Kg	Report Limit mg/Kg	Flags	
C ₅ -C ₈ Aliphatics**	BQL	10.0		
C ₉ -C ₁₂ Aliphatics**	BQL	10.0		
C ₉ -C ₁₀ Aromatics**	BQL	10.0		
	Percent Recovery	Flags	Limits Lower Upper	
Surrogate % Recovery - PID	92.3		70	130
Surrogate % Recovery - FID	101		70	130

* = 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 and are unadjusted for individual analytes.

Lab Info: g128-2487-1a	Lab Info: g128-2487-1a
FID Info: VP010710/031F0101.D	PID Info: VP010710/031R0101.D

Reviewed By: 

Attachment 2

VPH Laboratory Reporting Form

Calibration and QA/QC Information

FID Initial Calibration Date: 12/04/09 PID Initial Calibration Date: 12/04/09

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	2.02	0.175	6.42	0.557	100	10
C ₉ -C ₁₂ Aliphatics	1.51	0.118	4.80	0.375	100	10
C ₉ -C ₁₀ Aromatics	0.902	0.132	2.87	0.420	100	10

Calibration Concentration Levels

Range	Levels (µg/L)	Levels (mg/Kg)	%RSD if CF r if LR	Method of Quantitation
C ₅ -C ₈ Aliphatics	10	0.8	15.00	Calibration Factor
	50	4		
	100	8		
	200	16		
	500	40		
C ₉ -C ₁₂ Aliphatics	10	0.8	0.99	Linear Regression
	50	4		
	100	8		
	200	16		
	500	40		
C ₉ -C ₁₀ Aromatics	10	0.8	22.39	Calibration Factor
	50	4		
	100	8		
	200	16		
	500	40		

Calibration Check Date: 01/07/10 Filename: VP010710/002F0101.d

Calibration Check

Range	Levels (µg/L)	Levels (mg/Kg)	%Difference if CF %Drift if LR	Limits
C ₅ -C ₈ Aliphatics	200	16	1.9	±25%
C ₉ -C ₁₂ Aliphatics	200	16	-15.1	±25%
C ₉ -C ₁₀ Aromatics	200	16	4.2	±25%

MDL = Method Detection Limit
ML = Minimum Limit
RL = Reportable Limit

RPD = Relative Percent Difference
%RSD = Percent Relative Standard Deviation
CCC = Correlation Coefficient of Curve

Attachment 2

VPH Laboratory Reporting Form

Calibration and QA/QC Information

FID Initial Calibration Date: 12/04/09 PID Initial Calibration Date: 12/04/09

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	2.02	0.175	6.42	0.557	100	10
C ₉ -C ₁₂ Aliphatics	1.51	0.118	4.80	0.375	100	10
C ₉ -C ₁₀ Aromatics	0.902	0.132	2.87	0.420	100	10

Calibration Concentration Levels

Range	Levels (µg/L)	Levels (mg/Kg)	%RSD if CF r if LR	Method of Quantitation
C ₅ -C ₈ Aliphatics	10	0.8	15.00	Calibration Factor
	50	4		
	100	8		
	200	16		
	500	40		
C ₉ -C ₁₂ Aliphatics	10	0.8	0.99	Linear Regression
	50	4		
	100	8		
	200	16		
	500	40		
C ₉ -C ₁₀ Aromatics	10	0.8	22.39	Calibration Factor
	50	4		
	100	8		
	200	16		
	500	40		

Calibration Check Date: 01/07/10 Filename: VP010710/025F0101.d

Calibration Check

Range	Levels (µg/L)	Levels (mg/Kg)	%Difference if CF %Drift if LR	Limits
C ₅ -C ₈ Aliphatics	200	16	5.1	±25%
C ₉ -C ₁₂ Aliphatics	200	16	-11.2	±25%
C ₉ -C ₁₀ Aromatics	200	16	14.6	±25%

MDL = Method Detection Limit
ML = Minimum Limit
RL = Reportable Limit

RPD = Relative Percent Difference
%RSD = Percent Relative Standard Deviation
CCC = Correlation Coefficient of Curve

Attachment 2

VPH Laboratory Reporting Form

Calibration and QA/QC Information

FID Initial Calibration Date: 12/04/09 PID Initial Calibration Date: 12/04/09

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	2.02	0.175	6.42	0.557	100	10
C ₉ -C ₁₂ Aliphatics	1.51	0.118	4.80	0.375	100	10
C ₉ -C ₁₀ Aromatics	0.902	0.132	2.87	0.420	100	10

Calibration Concentration Levels

Range	Levels (µg/L)	Levels (mg/Kg)	%RSD if CF r if LR	Method of Quantitation
C ₅ -C ₈ Aliphatics	10	0.8	15.00	Calibration Factor
	50	4		
	100	8		
	200	16		
	500	40		
C ₉ -C ₁₂ Aliphatics	10	0.8	0.99	Linear Regression
	50	4		
	100	8		
	200	16		
	500	40		
C ₉ -C ₁₀ Aromatics	10	0.8	22.39	Calibration Factor
	50	4		
	100	8		
	200	16		
	500	40		

Calibration Check Date: 01/07/10 Filename: VP010710/034F0101.d

Calibration Check

Range	Levels (µg/L)	Levels (mg/Kg)	%Difference if CF %Drift if LR	Limits
C ₅ -C ₈ Aliphatics	200	16	0.2	±25%
C ₉ -C ₁₂ Aliphatics	200	16	-15.7	±25%
C ₉ -C ₁₀ Aromatics	200	16	9.8	±25%

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) Laboratory Reporting Form

Client Name: Richard Catlin & Associates

Project Name: TT2929


Sample Information	
Sample Identification	TT-2929-7
Sample Matrix	Soil
Date Collected	01/07/10 12:15
Date Received	01/07/10
Date Extracted	01/07/10
Date Analyzed	01/08/10 15:09 - 01/08/10 12:48
Dry Weight	85.3
Dilution Factor	2 - 1
Initial weight (g)	12.23
Final Volume (mL)	10.0

Analytical Results			
Analytes**	Result mg/Kg	Report Limit mg/Kg	Flags
C9-C18 Aliphatics	393	10.0	
C19-C36 Aliphatics	106	10.0	
C11-C22 Aromatics	19.0	10.0	

Surrogates	Percent Recovery	Flags	Limits	
			Lower	Upper
Aliphatic (tricosane)	92.0		40	140
Aromatic (ortho-terphenyl)	93.3		40	140
Fractionation 1 (2-bromonaphthalene)	93.0		40	140
Fractionation 2 (2-fluorobiphenyl)	96.3		40	140

** = Excludes any surrogates or internal standards and are unadjusted for individual analytes.

Lab Info: G128-2487-1D	Lab Info: G128-2487-1D
Aliphatic: EP010810/014F1101.D	Aromatic: EP010810/009F0601.D

Reviewed By: 

Attachment 3

EPH Laboratory Reporting Form

Calibration and QA/QC Information

Initial Calibration Date: 10/06/09

Calibration Ranges and Limits

Range	MDL		ML		RL	
	(02/15/08) (µg/L)	(02/11/08) (mg/Kg)	(µg/L)	(mg/Kg)	(µg/L)	(mg/Kg)
C9-C18 Aliphatics	1.66	0.274	5.28	0.871	100	10
C19-C36 Aliphatics	2.79	0.201	8.87	0.639	100	10
C11-C22 Aromatics	2.64	0.110	8.40	0.350	100	10

Calibration Concentration Levels

Range	Levels (µg/L)	Levels (mg/Kg)	%RSD if CF r if LR	Method of Quantitation
C ₉ -C ₁₈ Aliphatics	200	33.3	12.22	Calibration Factor
	100	16.7		
	50	8.33		
	25	4.17		
	5	0.833		
C ₁₉ -C ₃₆ Aliphatics	200	33.3	8.95	Calibration Factor
	100	16.7		
	50	8.33		
	25	4.17		
	5	0.833		
C ₁₁ -C ₂₂ Aromatics	200	33.3	3.21	Calibration Factor
	100	16.7		
	50	8.33		
	25	4.17		
	5	0.833		

Calibration Check Date: 01/08/10 Filenames: EP010810/001f0101.d
01/08/10 EP010810/002f0201.d

Calibration Check

Range	Levels (mg/Kg)	(µg/L)	%Difference if CF %Drift if LR	Limits
C9-C18 Aliphatics	100	16.7	18.2	±25%
C19-C36 Aliphatics	100	16.7	19.3	±25%
C11-C22 Aromatics	100	16.7	22.8	±25%

MDL = Method Detection Limit
 ML = Minimum Limit
 RL = Reportable Limit

RPD = Relative Percent Difference
 %RSD = Percent Relative Standard Deviation
 CCC = Correlation Coefficient of Curve

Attachment 3

EPH Laboratory Reporting Form

Calibration and QA/QC Information

Initial Calibration Date: 10/06/09

Calibration Ranges and Limits

Range	MDL		ML		RL	
	(02/15/08) (µg/L)	(02/11/08) (mg/Kg)	(µg/L)	(mg/Kg)	(µg/L)	(mg/Kg)
C9-C18 Aliphatics	1.66	0.274	5.28	0.871	100	10
C19-C36 Aliphatics	2.79	0.201	8.87	0.639	100	10
C11-C22 Aromatics	2.64	0.110	8.40	0.350	100	10

Calibration Concentration Levels

Range	Levels (µg/L)	Levels (mg/Kg)	%RSD if CF r if LR	Method of Quantitation
C ₉ -C ₁₈ Aliphatics	200	33.3	12.22	Calibration Factor
	100	16.7		
	50	8.33		
	25	4.17		
	5	0.833		
C ₁₉ -C ₃₆ Aliphatics	200	33.3	8.95	Calibration Factor
	100	16.7		
	50	8.33		
	25	4.17		
	5	0.833		
C ₁₁ -C ₂₂ Aromatics	200	33.3	3.21	Calibration Factor
	100	16.7		
	50	8.33		
	25	4.17		
	5	0.833		

Calibration Check Date: 01/08/10 Filenames: EP010810/015f1201.d
01/08/10 EP010810/016f1301.d

Calibration Check

Range	Levels (mg/Kg)	(µg/L)	%Difference if CF %Drift if LR	Limits
C9-C18 Aliphatics	100	16.7	18.3	±25%
C19-C36 Aliphatics	100	16.7	19.3	±25%
C11-C22 Aromatics	100	16.7	23.7	±25%

MDL = Method Detection Limit
 ML = Minimum Limit
 RL = Reportable Limit

RPD = Relative Percent Difference
 %RSD = Percent Relative Standard Deviation
 CCC = Correlation Coefficient of Curve

