CATLIN
Engineers and Scientists

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August 19, 2009

NAVFAC Mid-Atlantic
Marine Corps North Carolina IPT
Environmental Business Line
Attn: Mr. David Borton, P.G.
6506 Hampton Boulevard
Building C, Room 314
Norfolk, VA 23508-1278

Re: **UST Site 1613 – Additional Groundwater Assessment**
Marine Corps Base, Camp Lejeune, North Carolina
Navy Contract No. N62470-05-D-6200
Delivery Order No. 0070
CATLIN Project No. 209-025

Dear Mr. Borton:

CATLIN Engineers and Scientists (CATLIN) has collected a groundwater sample at the Building 1613 site aboard Marine Corps Base (MCB) Camp Lejeune. The groundwater sample was collected in the vicinity of the historic HP-11 location within the former underground storage tank (UST) basin per the request of Mr. Bruce Reed of the North Carolina Department of Environment and Natural Resources (NCDENR). The sample was collected to determine if groundwater contamination was still present at elevated levels in this location. Please find below a summary of the sampling activities, results and CATLIN's recommendations.

General Site Information and History

As stated in the most recent Annual Monitoring Report (AMR) for the 1613 UST Site from June 2009 produced by CATLIN in cooperation with Osage of Virginia (Osage), the 1613 project site consists of an active Marine Corps Community Services (MCCS) gas station, located on the northwest side of West Street between Gum and Fir streets. The site is located in the 1600 block of the Hadnot Point Industrial Area of MCB, Camp Lejeune, North Carolina. See Figure 1 for the site location.

Building 1613 is a single story building with three concrete pump islands located on the east and west sides of the building. The two concrete pump islands closest to either side of the building contain two petroleum dispensers per pump island. The dispensers that were located in the outer islands were reportedly removed prior to the mid-1980s. Four gasoline USTs were reportedly installed in the 1950s and removed in January 1995. They were located northeast of Building 1613. The gasoline USTs consisted of

two 30,000-gallon, one 10,000-gallon, and one 9,000-gallon tanks. The USTs were replaced by three aboveground storage tanks (ASTs), located northwest of the building.

Various site assessment activities were completed to delineate the presence and, if applicable, the extent of free-phase product, soil contamination, and groundwater contamination. The reports from the various site assessments were utilized by CATLIN to develop a Corrective Action Plan (CAP) dated April 6, 1998. The CAP identified Aggressive Fluid Vapor Recovery (AFVR) coupled with Air Sparge/Soil Vapor Extraction (AS/SVE) as the preferred remedial technology to remediate soil and groundwater at the site. OHM (now known as Shaw) installed the AS/SVE treatment system in accordance with the CAP in 1998.

Per the request of the NCDENR, OHM conducted an additional soil investigation in September 2000 to verify soil contamination was not present in the vicinity of the fuel dispensers and buried transfer piping at the site. Results from the additional soil assessment indicated two locations with gasoline and diesel range organics above action limits. However, OHM stated that the MADEP VPH and EPH concentrations of these samples were below the risk-based cleanup levels and active remediation of the soils was not required. This additional soil data report was submitted in January 2001 and recommended no additional soil remediation.

In addition to the soil investigation, OHM conducted a groundwater investigation to better define the extent of groundwater contamination at the site. Two areas were identified as not being treated by the original remedial system layout; therefore, OHM expanded the AS/SVE treatment system to address these additional areas of groundwater contamination in March and April 2001. The expanded portion of the system was operational as of late April 2001.

Based on additional soil and groundwater investigations and consequent expansions to the remedial systems referenced in the CAP, CATLIN conducted a Remedial Action Optimization and Revised Corrective Action Plan (RAO & RCAP) report to address and review the effectiveness of the remedial actions being conducted at the site up to 2004. Reclassification of the site based on Risk-based Corrective Action (RBCA) rules determined that the site met the criteria to be classified as low risk with residential land use. This ranking revised the target cleanup goals for soil to Residential Maximum Soil Contaminant Concentrations (MSCCs) and groundwater to Gross Contaminant Levels (GCLs). Recommendations of the RAO & RCAP included shutting down the groundwater remediation system, collecting two soil samples from the previously identified sample locations, and quarterly groundwater monitoring from 21 site monitoring wells.

Shaw sampled the site in June and October of 2004. Details explaining wells sampled and consequent analytical results can be referenced in Shaw's report titled "2004

Annual Monitoring Report, Building 1613, Marine Corps Base Camp Lejeune, North Carolina", dated July 2005. Recommendations based on this report included sustained shutdown of the existing AS/SVE system and continued post operational monitoring of the groundwater wells.

Sovereign conducted an annual gauging and sampling event as a follow on action to the July 2005 report. An annual event was performed to analyze the site groundwater for petroleum constituents using EPA Methods 601, 602, 625, and the MADEP Methods.

During the 2007-2008 monitoring period, Sovereign conducted monitoring well gauging and sampling of 10 site monitoring wells and operated and maintained oxygen diffusion groundwater treatment (iSOC®) units in selected monitoring wells. Groundwater samples were analyzed for volatile and semi-volatile compounds via EPA Methods 601 (2007 only), 602, and 625 in accordance with the program scope of work, as well as volatile and extractable hydrocarbons using MADEP methods. No free product was identified during the monitoring period. Several volatile and semi-volatile compounds were detected at the site above the 2L Groundwater Quality Standards (GWQSs) and above the GCL standards. MADEP compounds were also detected above their applicable groundwater standards.

Osage took over monitoring of the site for the most recent monitoring period – from June 2008 to May 2009. Osage conducted semi-annual monitoring well gauging and sampling of 13 site monitoring wells and operated and maintained oxygen diffusion groundwater treatment (iSOC®) units in monitoring wells MW22 and GW06. Groundwater samples were analyzed for volatile and semi-volatile compounds via EPA Methods 602, and 625 in accordance with the program scope of work, as well as volatile hydrocarbons using MADEP methods. No free product was identified during the monitoring period. Several volatile and semi-volatile compounds were detected at the site above the North Carolina 2L GWQSs and above the GCL standards. MADEP VPH compounds were also detected above their applicable groundwater standards.

After review of recently submitted AMR for the subject site, Mr. Bruce Reed of the NCDENR requested a groundwater sample in the vicinity of the historic HP-11 groundwater sample location within the former UST basin. Therefore, CATLIN was tasked to collect the requested groundwater sample.

Current Groundwater Sampling

On July 28, 2009 CATLIN personnel arrived on-site to collect a groundwater sample via direct push technology (DPT). A boring was installed to approximately 20 feet Below Land Surface (BLS) and a grab groundwater sample was collected utilizing a peristaltic pump. The groundwater sample HP-11 (2009) was pumped directly into pre-labeled glassware and placed in a cooler with ice for transport to SGS Laboratories in Wilmington, North Carolina for analysis per Standard Method 6200B, EPA Method 625

and MADEP EPH and VPH. The borehole was properly abandoned following groundwater sample collection.

The complete laboratory report and Chain of Custody (COC) documentation is included in Appendix A and summarized as follows:

Standard Method 6200B

As indicated in Table 1 and illustrated on Figure 2, eleven compounds were detected at concentrations above the Method Detection Limits (MDLs) in the HP-11 (2009) groundwater sample. Nine of these compounds were detected at concentrations in excess of the 2L GWQSs, however none of the compounds were detected at concentrations above any of the established GCLs.

EPA Method 625

As indicated in Table 2 and illustrated on Figure 2, seventeen compounds were detected at concentrations above the MDLs in the HP-11 (2009) groundwater sample. Thirteen of these compounds were detected at concentrations in excess of the 2L GWQSs. In addition, ten compounds were detected at concentrations above the established GCLs, these were: Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Chrysene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-c,d)pyrene, Phenanthrene and Pyrene.

MADEP VPH/EPH

As indicated in Tables 3 and 4 and illustrated on Figure 2, in the HP-11 (2009) groundwater sample the C_5-C_8 aliphatics hydrocarbon fraction was detected at a concentration of 7,630 ug/L which was above the 2L GWQS of 420 ug/L for this compound. The C_9-C_{18} aliphatics hydrocarbon fraction was detected at a concentration of 12,600 ug/L which was above the 2L GWQS of 4,200 ug/L for this compound. Also, the C_9-C_{22} aromatics hydrocarbon fraction was detected at a concentration of 11,490 ug/L which was above the 2L GWQS of 210 ug/L for this compound. The C_{19}-C_{36} aliphatics hydrocarbon fraction was not detected at concentrations above the MDLs. Also, please note there are no established GCLs for the aliphatic and aromatic hydrocarbon fractions.

Recommendations

The groundwater sample collected during the current investigation from the historic HP-11 location revealed several dissolved-phase petroleum contaminants at concentrations above the established GCLs. CATLIN recommends that a permanent monitoring well be installed in the vicinity of the HP-11 location. This newly installed monitoring well should

be sampled during the next scheduled semi-annual monitoring event at the subject site. The analytical results obtained from this monitoring well should be utilized to evaluate potential remediation options in this area of the subject site. In addition, CATLIN recommends that monitoring well UST1613-MW02 which is to the northeast of the former UST basin, be sampled during the semi-annual monitoring events.

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

Sincerely,

Shane A. Chasteen
Project Manager

Michael E. Mason, P.E.
Program Manager

cc: Ms. Susan Tsimpinos - NAVFAC Mid-Atlantic Contracts (letter only)
Commanding Officer - Attn: Director I&E/EMD/EQB (with two copies)
Mr. Michael Cree – Osage of Virginia, Inc. (with one copy)

209025_1613_GW_LtrRpt.doc

TABLES

TABLE 1
SUMMARY OF GROUNDWATER LABORATORY RESULTS
STANDARD METHOD 6200B

Incident Name and No.: Building 1613 - 20660

Well ID	Contaminant of Concern →		Benzene	sec-Butylbenzene	Ethylbenzene	Isopropylbenzene	4-Isopropyltoluene	Naphthalene	n-Propyl benzene	Toluene	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	Total Xylenes	All Other SM 6200B Compounds
	Sample ID	**Date Collected**												
GCL (µg/L)			5,000	8,500	84,500	25,000	NE	15,500	30,000	257,500	28,500	25,000	87,500	Varies
2L GWQS (µg/L)			1	70	550	70	NE	21	70	1,000	350	350	530	Varies
HP-11 (2009)	HP-11 (2009)	7/28/2009	**102**	4.20	**1,250**	33.6	**21.4**	**416**	**91.6**	**1,940**	**1,740**	**486**	**10,240**	BMDL

All results in micrograms per liter (ug/L).
BMDL = Below Method Detection Limit
NE = None Established
< = Less than method detection limit
2L GWQS = NCAC T15A:02L Groundwater Quality Standards
GCL = Gross Contaminant Level
Bold results indicate concentrations above 2L GWQS or GCL.

TABLE 2
SUMMARY OF GROUNDWATER LABORATORY RESULTS
EPA METHOD 625

Incident Name and No.: Building 1613 - 20660

Well ID	Contaminant of Concern →		Acenaphthene	Anthracene	Benzo[a]anthracene	Benzo[a]pyrene	Benzo[b]fluoranthene	Benzo[g,h,i]peryiene	Benzo[k]fluoranthene	Chrysene	Dibenzo[a,h]anthracene	2,4-Dimethylphenol	Diphenylamine	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene	All Other EPA Method 625 Compounds
	Sample ID	Date Collected																		
GCL (µg/L)			2,120	2,100	22	1.5	0.6	210	0.47	0.8	0.25	140,000	NE	280	950	31	15,500	410	210	Varies
2L GWQS (µg/L)			80	2,100	0.0479	0.00479	0.0479	210	0.479	4.79	0.0047	140	NE	280	280	0.047	21	210	210	Varies
HP-11 (2009)	HP-11 (2009)	7/28/2009	**105**	233	**235**	**106**	**166**	36.7 J	**72.8**	**210**	**9.17 J**	72.8	**9.17 J**	**894**	71.2	**36.7 J**	**1,080**	**1,020**	**650**	BMDL

All results in micrograms per liter (ug/L).
BMDL = Below Method Detection Limit
NE = None Established
< = Less than method detection limit
J = Estimated concentration, below calibration range and above MDL
2L GWQS = NCAC T15A:02L Groundwater Quality Standards
GCL = Gross Contaminant Level
Bold results indicate concentrations above 2L GWQS or GCL.

TABLE 3
SUMMARY OF GROUNDWATER LABORATORY RESULTS
MADEP VPH/EPH

Incident Name and No.: Building 1613 - 20660

Well ID	Contaminant of Concern →		C5-C8 Aliphatics	C9-C12 Aliphatics	C9-C10 Aromatics	C9-C18 Aliphatics	C19-C36 Aliphatics	C11-C22 Aromatics
	Sample ID	Date Collected						
HP-11 (2009)	HP-11 (2009)	7/28/2009	7,630	17,800	7,250	2,050	<100	4,240

All results in micrograms per liter (ug/L).

< = Less than method detection limit

TABLE 4
SUMMARY OF GROUNDWATER LABORATORY RESULTS
MADEP VPH/EPH AS COMPARED TO 2L GWQS

Incident Name and No.: Building 1613 - 20660

Well ID	Contaminant of Concern →		C5-C8 Aliphatics	C9-C18 Aliphatics	C19-C36 Aliphatics	C9-C22 Aromatics
	Sample ID	Date Collected				
GCL (µg/L)			NE	NE	NE	NE
2L GWQS (µg/L)			420	4,200	42,000	210
HP-11 (2009)	HP-11 (2009)	7/28/2009	**7,630**	**12,600**	<100	**11,490**

All results in micrograms per liter (ug/L).

NE = None Established

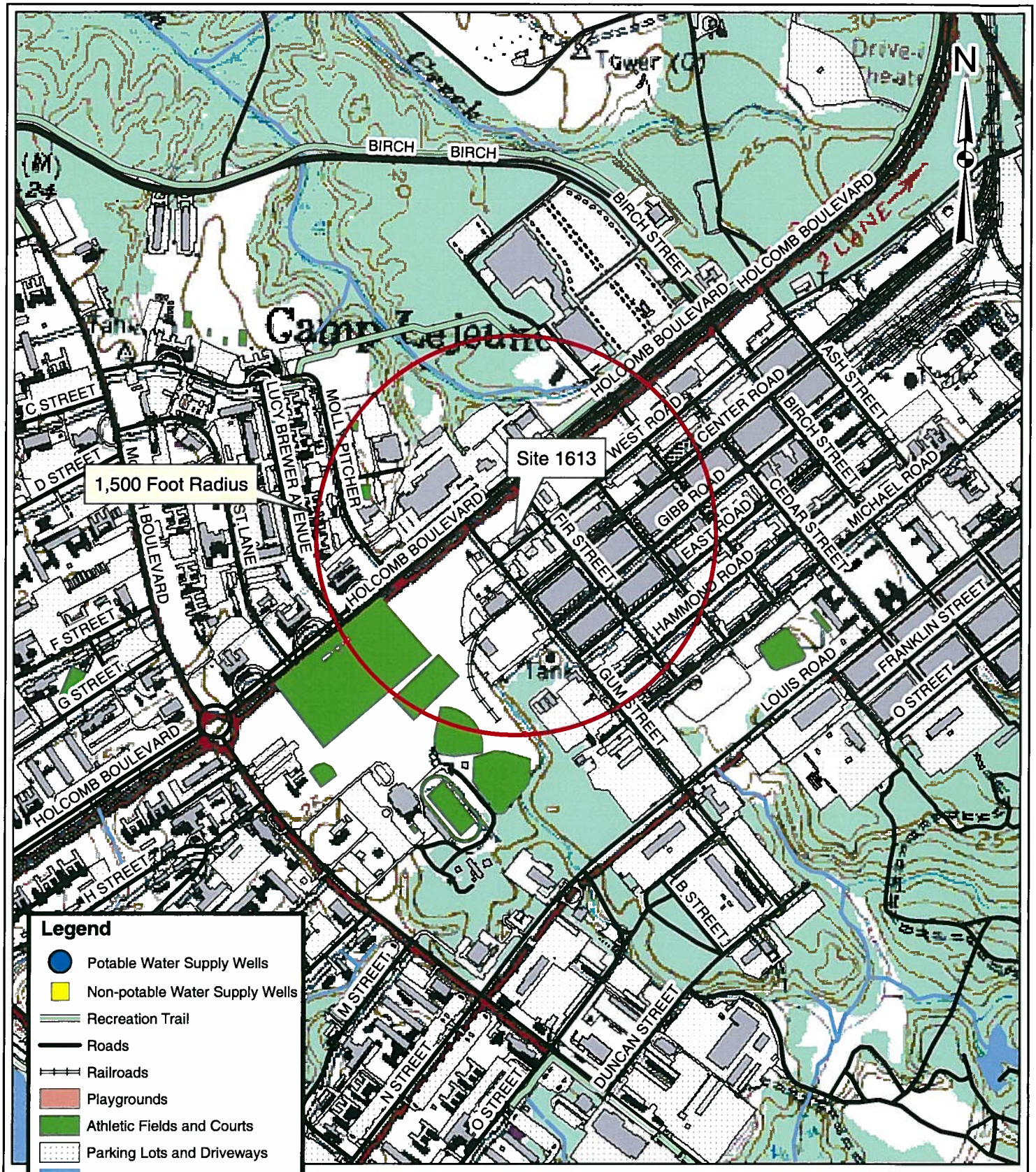
< = Less than method detection limit

2L GWQS = NCAC T15A:02L Groundwater Quality Standards

GCL = Gross Contaminant Level

Bold results indicate concentrations above 2L GWQS.

FIGURES



Data Sources: Data Layers provided by MCB Camp Lejeune GIS Office.

CATLIN Engineers and Scientists 220 Old Dairy Road Wilmington, NC 28405 Corporate Licensure No. for Engineering Services C-0585	PROJECT GROUNDWATER REPORT SITE 1613 MARINE CORPS BASE CAMP LEJEUNE, NC	TITLE **SITE LOCATION MAP**				**FIGURE** **1**
	JOB NO. 209-025	DATE AUG 2009	SCALE AS SHOWN	DRAWN BY SAC	CHECKED BY MEM	

EPA METHOD 625

Well ID	Contaminant of Concern →		Acenaphthene	Anthracene	Benzo[a]anthracene	Benzo[a]pyrene	Benzo[b]fluoranthene	Benzo[g,h,i]perylene	Benzo[k]fluoranthene	Chrysene	Dibenzo[a,h]anthracene	2,4-Dimethylphenol	Diphenylamine	Fluoranthrene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene	All Other EPA Method 625 Compounds
	Sample ID	Date Collected																		
GCL (µg/L)			2,120	2,100	22	1.5	0.6	210	0.47	0.8	0.25	140,000	NE	280	950	31	15,500	410	210	Varies
2L GWQS (µg/L)			80	2,100	0.0479	0.00479	0.0479	210	0.479	4.79	0.0047	140	NE	280	280	0.047	21	210	210	Varies
HP-11 (2009)	HP-11 (2009)	7/28/2009	**105**	233	**235**	**106**	**166**	36.7 J	**72.8**	**210**	**9.17 J**	72.8	**9.17 J**	**894**	71.2	**36.7 J**	**1,080**	**1,020**	**650**	BMDL

STANDARD METHOD 6200B

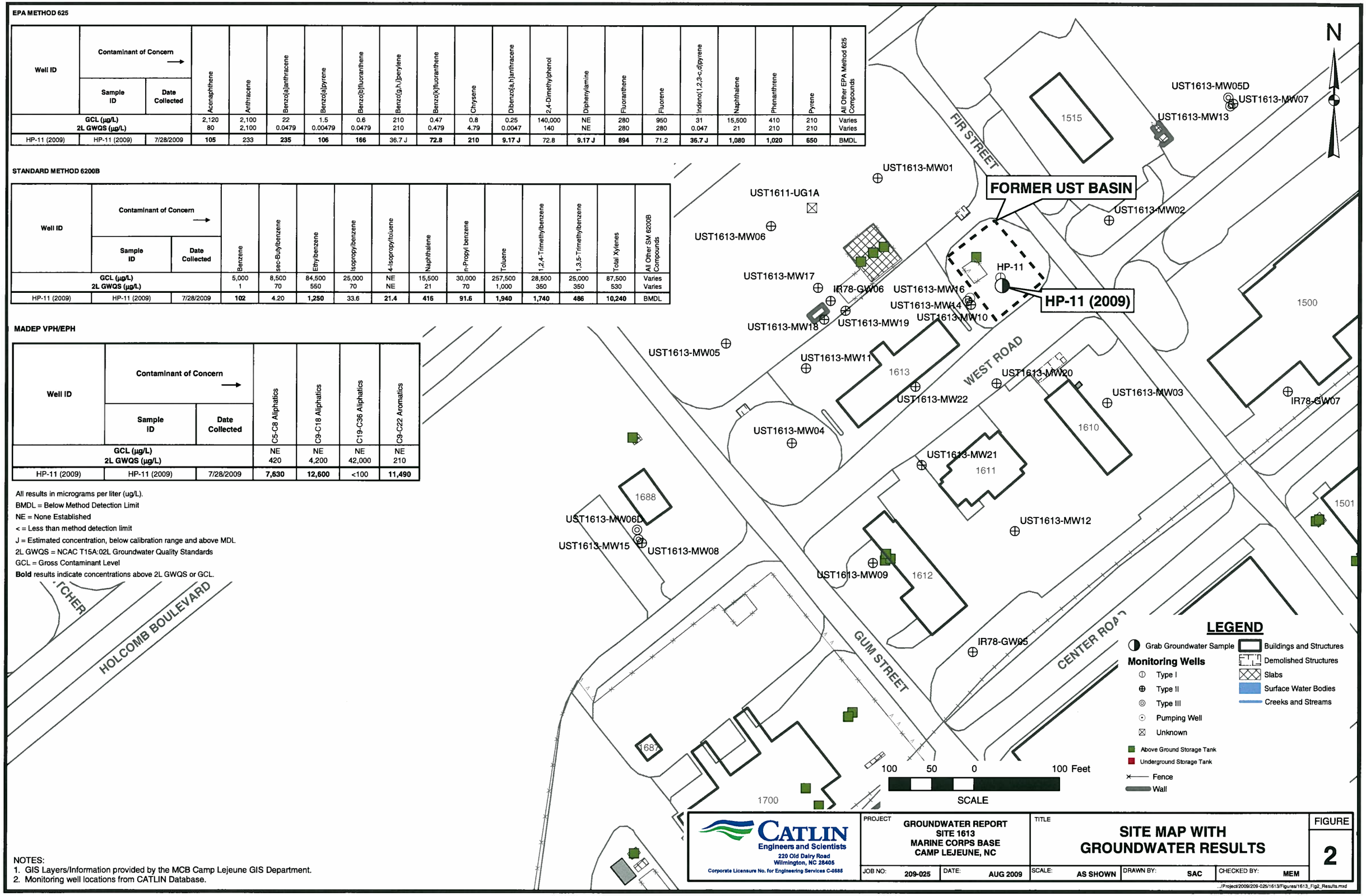
Well ID	Contaminant of Concern →		Benzene	sec-Butylbenzene	Ethylbenzene	Isopropylbenzene	4-Isopropyltoluene	Naphthalene	n-Propyl benzene	Toluene	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	Total Xylenes	All Other SM 6200B Compounds
	Sample ID	Date Collected												
GCL (µg/L)			5,000	8,500	84,500	25,000	NE	15,500	30,000	257,500	28,500	25,000	87,500	Varies
2L GWQS (µg/L)			1	70	550	70	NE	21	70	1,000	350	350	530	Varies
HP-11 (2009)	HP-11 (2009)	7/28/2009	**102**	4.20	**1,250**	33.6	**21.4**	**416**	**91.6**	**1,940**	**1,740**	**486**	**10,240**	BMDL

MADEP VPH/EPH

Well ID	Contaminant of Concern →		C5-C8 Aliphatics	C9-C18 Aliphatics	C19-C36 Aliphatics	C9-C22 Aromatics
	Sample ID	Date Collected				
GCL (µg/L)			NE	NE	NE	NE
2L GWQS (µg/L)			420	4,200	42,000	210
HP-11 (2009)	HP-11 (2009)	7/28/2009	**7,630**	**12,600**	<100	**11,490**

All results in micrograms per liter (ug/L).
BMDL = Below Method Detection Limit
NE = None Established
< = Less than method detection limit
J = Estimated concentration, below calibration range and above MDL
2L GWQS = NCAC T15A:02L Groundwater Quality Standards
GCL = Gross Contaminant Level
Bold results indicate concentrations above 2L GWQS or GCL.

NOTES:
1. GIS Layers/Information provided by the MCB Camp Lejeune GIS Department.
2. Monitoring well locations from CATLIN Database.



CATLIN Engineers and Scientists
220 Old Dairy Road
Wilmington, NC 28405
Corporate Licensure No. for Engineering Services C-0585

PROJECT: GROUNDWATER REPORT
SITE 1613
MARINE CORPS BASE
CAMP LEJEUNE, NC

TITLE: SITE MAP WITH GROUNDWATER RESULTS

FIGURE 2

JOB NO: 209-025 | DATE: AUG 2009 | SCALE: AS SHOWN | DRAWN BY: SAC | CHECKED BY: MEM

../Project/2009/209-025/1613/Figures/1613_Fig2_Results.mxd

APPENDIX A

LABORATORY ANALYTICAL REPORTS AND CHAIN OF CUSTODY DOCUMENTATION

SGS

Shane Chasteen
Richard Catlin & Associates
P.O. Box 10279
Wilmington, NC 28404-0279

Report Number: G128-2424

Client Project: Site 1613

Dear Shane Chasteen,

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 Aug 14, 2009

Project Manager
Barbara Hager

Date

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

RL/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

% 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.

MI34.021808.4

SGS North America, Inc.

Results for Volatiles
by GCMS 6200B

Client Sample ID: HP-11 (2009)
Client Project ID: Site 1613
Lab Sample ID: G128-2424-1B
Lab Project ID: G128-2424

Analyzed By: DVO
Date Collected: 7/28/2009 12:15
Date Received: 7/28/2009
Matrix: Water
Sample Amount: 5 mL

Compound	Result UG/L	Quantitation Limit UG/L	MDL UG/L	Dilution Factor	Date Analyzed	Flag
Benzene	**102**	2.00	0.260	4	8/3/2009	
Bromobenzene	BQL	2.00	0.224	4	8/3/2009	
Bromochloromethane	BQL	2.00	0.404	4	8/3/2009	
Bromodichloromethane	BQL	2.00	0.304	4	8/3/2009	
Bromoform	BQL	2.00	0.480	4	8/3/2009	
Bromomethane	BQL	2.00	0.532	4	8/3/2009	
n-Butylbenzene	BQL	2.00	0.436	4	8/3/2009	
sec-Butylbenzene	**4.20**	2.00	0.336	4	8/3/2009	
tert-Butylbenzene	BQL	2.00	0.200	4	8/3/2009	
Carbon tetrachloride	BQL	2.00	0.348	4	8/3/2009	
Chlorobenzene	BQL	2.00	0.328	4	8/3/2009	
Chloroethane	BQL	2.00	0.424	4	8/3/2009	
Chloroform	BQL	2.00	0.316	4	8/3/2009	
Chloromethane	BQL	2.00	0.584	4	8/3/2009	
2-Chlorotoluene	BQL	2.00	0.396	4	8/3/2009	
4-Chlorotoluene	BQL	2.00	0.320	4	8/3/2009	
Dibromochloromethane	BQL	2.00	0.360	4	8/3/2009	
1,2-Dibromo-3-chloropropane	BQL	20.0	4.84	4	8/3/2009	
Dibromomethane	BQL	2.00	0.452	4	8/3/2009	
1,2-Dibromoethane (EDB)	BQL	2.00	0.496	4	8/3/2009	
1,2-Dichlorobenzene	BQL	2.00	0.508	4	8/3/2009	
1,3-Dichlorobenzene	BQL	2.00	0.324	4	8/3/2009	
1,4-Dichlorobenzene	BQL	2.00	0.316	4	8/3/2009	
1,1-Dichloroethane	BQL	2.00	0.296	4	8/3/2009	
1,1-Dichloroethene	BQL	2.00	0.356	4	8/3/2009	
1,2-Dichloroethane	BQL	2.00	0.316	4	8/3/2009	
cis-1,2-Dichloroethene	BQL	2.00	0.260	4	8/3/2009	
trans-1,2-dichloroethene	BQL	2.00	0.356	4	8/3/2009	
1,2-Dichloropropane	BQL	2.00	0.376	4	8/3/2009	
1,3-Dichloropropane	BQL	2.00	0.508	4	8/3/2009	
2,2-Dichloropropane	BQL	2.00	0.236	4	8/3/2009	
1,1-Dichloropropene	BQL	2.00	0.288	4	8/3/2009	
cis-1,3-Dichloropropene	BQL	2.00	0.304	4	8/3/2009	
trans-1,3-Dichloropropene	BQL	2.00	0.304	4	8/3/2009	
Dichlorodifluoromethane	BQL	20.0	0.376	4	8/3/2009	
Diisopropyl ether (DIPE)	BQL	2.00	0.292	4	8/3/2009	
Ethylbenzene	**1250**	100	15.4	200	7/31/2009	
Hexachlorobutadiene	BQL	2.00	0.912	4	8/3/2009	
Isopropylbenzene	**33.6**	2.00	0.284	4	8/3/2009	
4-Isopropyltoluene	**21.4**	2.00	0.192	4	8/3/2009	
Methylene chloride	BQL	20.0	0.392	4	8/3/2009	
Methyl-tert-butyl ether (MTBE)	BQL	2.00	0.268	4	8/3/2009	
Naphthalene	**416**	100	26.6	200	7/31/2009	
n-Propyl benzene	**91.6**	2.00	0.320	4	8/3/2009	
Styrene	BQL	2.00	0.340	4	8/3/2009	

SGS North America, Inc.

Results for Volatiles
by GCMS 6200B

Client Sample ID: HP-11 (2009)
Client Project ID: Site 1613
Lab Sample ID: G128-2424-1B
Lab Project ID: G128-2424

Analyzed By: DVO
Date Collected: 7/28/2009 12:15
Date Received: 7/28/2009
Matrix: Water
Sample Amount: 5 mL

Compound	Result UG/L	Quantitation Limit UG/L	MDL UG/L	Dilution Factor	Date Analyzed	Flag
1,1,1,2-Tetrachloroethane	BQL	2.00	0.360	4	8/3/2009	
1,1,2,2-Tetrachloroethane	BQL	2.00	0.460	4	8/3/2009	
Tetrachloroethene	BQL	2.00	0.276	4	8/3/2009	
Toluene	**1940**	100	15.2	200	7/31/2009	
1,2,3-Trichlorobenzene	BQL	2.00	0.760	4	8/3/2009	
1,2,4-Trichlorobenzene	BQL	2.00	0.476	4	8/3/2009	
Trichloroethene	BQL	2.00	0.216	4	8/3/2009	
1,1,1-Trichloroethane	BQL	2.00	0.216	4	8/3/2009	
1,1,2-Trichloroethane	BQL	2.00	0.728	4	8/3/2009	
Trichlorofluoromethane	BQL	2.00	0.444	4	8/3/2009	
1,2,3-Trichloropropane	BQL	2.00	0.480	4	8/3/2009	
1,2,4-Trimethylbenzene	**1740**	100	13.0	200	7/31/2009	
1,3,5-Trimethylbenzene	**486**	100	14.8	200	7/31/2009	
Vinyl chloride	BQL	2.00	0.596	4	8/3/2009	
m-,p-Xylene	**7290**	200	19.6	200	7/31/2009	
o-Xylene	**2950**	100	13.0	200	7/31/2009	

	Spike Added	Spike Result	Percent Recovered
1,2-Dichloroethane-d4	10	10.4	104
Toluene-d8	10	10.6	106
4-Bromofluorobenzene	10	10	100

Comments:

Flags:
BQL = Below Quantitation Limits.

Analyst: DVO

Reviewed By: [signature]

Results for Semivolatiles by GCMS 625

Client Sample ID: HP-11 (2009)
Client Project ID: Site 1613
Lab Sample ID: G128-2424-1J
Lab Project ID: G128-2424

Initial/Final Amt: 927 mL / 5.0 mL

Analyzed By: EAW
Date Collected: 7/28/2009 12:15
Date Received: 7/28/2009
Date Extracted: 7/31/2009
Matrix: Water

Compound	Result ug/L	RL ug/L	MDL ug/L	Dilution Factor	Date Analyzed	Flag
Acenaphthene	**105**	53.9	8.04	10	8/4/2009	
Acenaphthylene	BQL	53.9	8.04	10	8/4/2009	
Anthracene	**233**	53.9	9.44	10	8/4/2009	
Benzo[a]anthracene	**235**	53.9	7.34	10	8/4/2009	
Benzo[a]pyrene	**106**	53.9	6.85	10	8/4/2009	
Benzo[b]fluoranthene	**166**	53.9	7.71	10	8/4/2009	
Benzo[g,h,i]perylene	**36.7**	53.9	6.63	10	8/4/2009	J
Benzo[k]fluoranthene	**72.8**	53.9	5.93	10	8/4/2009	
Bis(2-chloroethoxy)methane	BQL	53.9	11.1	10	8/4/2009	
Bis(2-chloroethyl)ether	BQL	53.9	11.2	10	8/4/2009	
Bis(2-chloroisopropyl)ether	BQL	53.9	10.5	10	8/4/2009	
Bis(2-ethylhexyl)phthalate	BQL	53.9	4.42	10	8/4/2009	
4-bromophenyl phenyl ether	BQL	53.9	8.41	10	8/4/2009	
Butylbenzylphthalate	BQL	53.9	4.80	10	8/4/2009	
2-Chloronaphthalene	BQL	53.9	9.33	10	8/4/2009	
2-Chlorophenol	BQL	53.9	12.6	10	8/4/2009	
4-Chloro-3-methylphenol	BQL	53.9	8.58	10	8/4/2009	
4-Chlorophenyl phenyl ether	BQL	53.9	35.1	10	8/4/2009	
Chrysene	**210**	53.9	5.99	10	8/4/2009	
Dibenzo[a,h]anthracene	**9.17**	53.9	4.75	10	8/4/2009	J
Di-n-Butylphthalate	BQL	53.9	8.90	10	8/4/2009	
3,3'-Dichlorobenzidine	BQL	108	13.2	10	8/4/2009	
2,4-Dichlorophenol	BQL	53.9	12.1	10	8/4/2009	
Diethylphthalate	BQL	53.9	7.98	10	8/4/2009	
Dimethylphthalate	BQL	53.9	5.99	10	8/4/2009	
2,4-Dimethylphenol	**72.8**	53.9	17.5	10	8/4/2009	
Di-n-octylphthalate	BQL	53.9	6.26	10	8/4/2009	
4,6-Dinitro-2-methylphenol	BQL	270	5.93	10	8/4/2009	
2,4-Dinitrophenol	BQL	270	6.90	10	8/4/2009	
2,4-Dinitrotoluene	BQL	53.9	5.77	10	8/4/2009	
2,6-Dinitrotoluene	BQL	53.9	7.01	10	8/4/2009	
Diphenylamine *	**9.17**	53.9	6.15	10	8/4/2009	J
Fluoranthene	**894**	53.9	7.61	10	8/4/2009	
Fluorene	**71.2**	53.9	7.82	10	8/4/2009	
Hexachlorobenzene	BQL	53.9	5.45	10	8/4/2009	
Hexachlorobutadiene	BQL	53.9	8.20	10	8/4/2009	
Hexachlorocyclopentadiene	BQL	108	108	10	8/4/2009	
Hexachloroethane	BQL	53.9	8.04	10	8/4/2009	
Indeno(1,2,3-c,d)pyrene	**36.7**	53.9	24.6	10	8/4/2009	J
Isophorone	BQL	53.9	9.55	10	8/4/2009	
Naphthalene	**1080**	53.9	9.82	10	8/4/2009	
Nitrobenzene	BQL	53.9	11.3	10	8/4/2009	
2-Nitrophenol	BQL	53.9	13.3	10	8/4/2009	
4-Nitrophenol	BQL	270	11.7	10	8/4/2009	
N-Nitrosodi-n-propylamine	BQL	53.9	16.2	10	8/4/2009	
Pentachlorophenol	BQL	270	15.3	10	8/4/2009	
Phenanthrene	**1020**	53.9	4.80	10	8/4/2009	

Results for Semivolatiles
by GCMS 625

Client Sample ID: HP-11 (2009)
Client Project ID: Site 1613
Lab Sample ID: G128-2424-1J
Lab Project ID: G128-2424

Initial/Final Amt: 927 mL / 5.0 mL

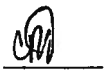
Analyzed By: EAW
Date Collected: 7/28/2009 12:15
Date Received: 7/28/2009
Date Extracted: 7/31/2009
Matrix: Water

Compound	Result ug/L	RL ug/L	MDL ug/L	Dilution Factor	Date Analyzed	Flag
Phenol	BQL	53.9	11.4	10	8/4/2009	
Pyrene	**650**	53.9	22.3	10	8/4/2009	
1,2,4-Trichlorobenzene	BQL	53.9	7.77	10	8/4/2009	
2,4,6-Trichlorophenol	BQL	53.9	9.98	10	8/4/2009	

	Spike Added	Spike Result	Percent Recovered
2-Fluorobiphenyl	1	NA	NA
2-Fluorophenol	1	NA	NA
Nitrobenzene-d5	1	NA	NA
Phenol-d6	1	NA	NA
2,4,6-Tribromophenol	1	NA	NA
4-Terphenyl-d14	1	NA	NA

Comments:
* N-Nitrosodiphenylamine is reported as the breakdown product Diphenylamine.

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

Reviewed By: 

VPH (Aliphatics/Aromatics) Laboratory Reporting Form

Client Name: Richard Catlin & Associates

Project Name: Site 1613

Sample Information	
Sample Identification	HP-11 (2009)
Sample Matrix	Water
Collection Option (for Soil)*	NA
Date Collected	07/28/09 12:15
Date Received	07/28/09
Date Extracted	08/03/09 19:58 - 08/03/09 19:58
Date Analyzed	08/03/09 19:58 - 08/03/09 19:58
Dry Weight	NA
Dilution Factor	40 - 40

Analytical Results			
Analyte	Result µg/L	Report Limit µg/L	Flags
C_5-C_8 Aliphatics**	7630	202	
C_9-C_{12} Aliphatics**	17800	151	
C_9-C_{10} Aromatics**	7250	90.2	

	Percent Recovery	Flags	Limits Lower	Limits Upper
Surrogate % Recovery - PID	95.0		70	130
Surrogate % Recovery - FID	108		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: g128-2424-1e	Lab Info: g128-2424-1e
FID Info: VP080309/025F0101.D	PID Info: VP080309/025R0101.D

Reviewed By: 

Attachment 2

VPH Laboratory Reporting Form

Calibration and QA/QC Information

FID Initial Calibration Date: 05/08/09 PID Initial Calibration Date: 05/08/09

Calibration Ranges and Limits

Range	MDL (µg/L)	MDL (mg/Kg)	ML (µg/L)	ML (mg/Kg)	RL (µg/L)	RL (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	8.80	Calibration Factor
	50	4		
	100	8		
	200	16		
	500	40		
C_9-C_{12} Aliphatics	10	0.8	1.00	Linear Regression
	50	4		
	100	8		
	200	16		
	500	40		
C_9-C_{10} Aromatics	10	0.8	21.76	Calibration Factor
	50	4		
	100	8		
	200	16		
	500	40		

Calibration Check Date: 08/03/09 Filename: VP080309/002F0101.d

Calibration Check

Range	Levels (µg/L)	Levels (mg/Kg)	%Difference if CF %Drift if LR	Limits
C_5-C_8 Aliphatics	200	16	-19.9	±25%
C_9-C_{12} Aliphatics	200	16	-4.5	±25%
C_9-C_{10} Aromatics	200	16	12.3	±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: 05/08/09 PID Initial Calibration Date: 05/08/09

Calibration Ranges and Limits

Range	MDL (µg/L)	MDL (mg/Kg)	ML (µg/L)	ML (mg/Kg)	RL (µg/L)	RL (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	8.80	Calibration Factor
	50	4		
	100	8		
	200	16		
	500	40		
C_9-C_{12} Aliphatics	10	0.8	1.00	Linear Regression
	50	4		
	100	8		
	200	16		
	500	40		
C_9-C_{10} Aromatics	10	0.8	21.76	Calibration Factor
	50	4		
	100	8		
	200	16		
	500	40		

Calibration Check Date: 08/03/09 Filename: VP080309/030F0101.d

Calibration Check

Range	Levels (µg/L)	Levels (mg/Kg)	%Difference if CF %Drift if LR	Limits
C_5-C_8 Aliphatics	200	16	11.7	±25%
C_9-C_{12} Aliphatics	200	16	-5.8	±25%
C_9-C_{10} Aromatics	200	16	16.2	±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

EPH (Aliphatics/Aromatics) Laboratory Reporting Form

Client Name: Richard Catlin & Associates

Project Name: Site 1613

Sample Information	
Sample Identification	HP-11 (2009)
Sample Matrix	Water
Date Collected	07/28/09 12:15
Date Received	07/28/09
Date Extracted	08/10/09
Date Analyzed	08/12/09 16:05 - 08/13/09 13:28
Dry Weight	NA
Dilution Factor	1 - 5
Initial Volume (mL)	956
Final Volume (mL)	5.0

Analytical Results			
Analytes**	Result µg/L	Report Limit µg/L	Flags
C9-C18 Aliphatics	2050	100	
C19-C36 Aliphatics	BQL	100	
C11-C22 Aromatics	4240	100	

Surrogates	Percent Recovery	Flags	Limits	
			Lower	Upper
Aliphatic (tricosane)	42.8		40	140
Aromatic (ortho-terphenyl)	75.5		40	140
Fractionation 1 (2-bromonaphthalene)	92.6		40	140
Fractionation 2 (2-fluorobiphenyl)	88.1		40	140

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

Lab Info: G128-2424-1M	Lab Info: G128-2424-1M
Aliphatic: EP081209/013F0101.D	Aromatic: EP081309/003F0601.D

Reviewed By: MA

Attachment 3

EPH Laboratory Reporting Form

Calibration and QA/QC Information

Initial Calibration Date: 07/17/09

Calibration Ranges and Limits

Range	MDL (02/15/08) (µg/L)	MDL (02/11/08) (mg/Kg)	ML (µg/L)	ML (mg/Kg)	RL (µg/L)	RL (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	14.33	Calibration Factor
	100	16.7		
	50	8.33		
	25	4.17		
	5	0.833		
C_{19}-C_{36} Aliphatics	200	33.3	16.98	Calibration Factor
	100	16.7		
	50	8.33		
	25	4.17		
	5	0.833		
C_{11}-C_{22} Aromatics	200	33.3	7.33	Calibration Factor
	100	16.7		
	50	8.33		
	25	4.17		
	5	0.833		

Calibration Check Date: 08/12/09
08/12/09

Filenames: ep081209/012f1001.d
ep081209/011f0901.d

Calibration Check

Range	Levels (µg/L)	Levels (mg/Kg)	%Difference if CF %Drift if LR	Limits
C9-C18 Aliphatics	100	16.7	13.1	≤±25%
C19-C36 Aliphatics	100	16.7	11.5	≤±25%
C11-C22 Aromatics	100	16.7	8.2	≤±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 3

EPH Laboratory Reporting Form

Calibration and QA/QC Information

Initial Calibration Date: 07/17/09

Calibration Ranges and Limits

Range	MDL (02/15/08) (µg/L)	MDL (02/11/08) (mg/Kg)	ML (µg/L)	ML (mg/Kg)	RL (µg/L)	RL (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	14.33	Calibration Factor
	100	16.7		
	50	8.33		
	25	4.17		
	5	0.833		
C_{19}-C_{36} Aliphatics	200	33.3	16.98	Calibration Factor
	100	16.7		
	50	8.33		
	25	4.17		
	5	0.833		
C_{11}-C_{22} Aromatics	200	33.3	7.33	Calibration Factor
	100	16.7		
	50	8.33		
	25	4.17		
	5	0.833		

Calibration Check Date: 08/13/09
08/13/09

Filenames: ep081309/001f0101.d
ep081309/002f0201.d

Calibration Check

Range	Levels (µg/L)	Levels (mg/Kg)	%Difference if CF %Drift if LR	Limits
C9-C18 Aliphatics	100	16.7	-5.3	≤±25%
C19-C36 Aliphatics	100	16.7	0.1	≤±25%
C11-C22 Aromatics	100	16.7	2.4	≤±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: 07/17/09

Calibration Ranges and Limits

Range	MDL (02/15/08) (µg/L)	MDL (02/11/08) (mg/Kg)	ML (µg/L)	ML (mg/Kg)	RL (µg/L)	RL (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	14.33	Calibration Factor
	100	16.7		
	50	8.33		
	25	4.17		
	5	0.833		
C_{19}-C_{36} Aliphatics	200	33.3	16.98	Calibration Factor
	100	16.7		
	50	8.33		
	25	4.17		
	5	0.833		
C_{11}-C_{22} Aromatics	200	33.3	7.33	Calibration Factor
	100	16.7		
	50	8.33		
	25	4.17		
	5	0.833		

Calibration Check Date: 08/13/09
08/13/09

Filenames: ep081309/006f0101.d
ep081309/007f0201.d

Calibration Check

Range	Levels (µg/L)	Levels (mg/Kg)	%Difference if CF %Drift if LR	Limits
C9-C18 Aliphatics	100	16.7	13.9	≤±25%
C19-C36 Aliphatics	100	16.7	5.1	≤±25%
C11-C22 Aromatics	100	16.7	9.1	≤±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

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098113

(1)
CLIENT: Catlin
CONTACT: Shane Chasteen PHONE NO:(910) 452-5861
PROJECT: Site 1613 SITE/PWSID#: 209-025
REPORTS TO: Shane Chasteen FAX NO.:( )
INVOICE TO: Sheila @ Catlin QUOTE #: DOD101 P.O. NUMBER: 290728-4

SGS Reference: G128-2424

PAGE 1 OF 1

(2)

LAB NO.	SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	No CONTAINERS	SAMPLE TYPE (C=COMP G=GRAB)	Preservatives Used	HCl	—	HCl	HCl						REMARKS
							Analysis Required (3)	6200B	625	EPH	VPH						
✓	HP-11 (2009)	7/28	1215	GW	9	G		3	2	2	2						* All glassware marked "HP-11" but sample should be analyzed as "HP-11 (2009)"

(5)

Collected/Relinquished By:(1)	Date	Time	Received By:
	7/28/09 ✓	1455	
Relinquished By: (2)	Date	Time	Received By:
Relinquished By: (3)	Date	Time	Received By:
Relinquished By: (4)	Date	Time	Received By:

(4)

Shipping Carrier:
Shipping Ticket No:
Samples Received Cold? (Circle) YES NO
Temperature°C: 6.6 coming about to temp
Special Deliverable Requirements:
Chain of Custody Seal: (Circle) INTACT BROKEN ABSENT
Special Instructions: Report lowest runs. Report in EDD format.
Requested Turnaround Time: ☐ RUSH _____ Date Needed ☑ STD

N.C. Certification #481

SGS North America, Inc.

Page 14 of 14

☐ 200 W. Potter Drive Anchorage, AK 99518 Tel: (907) 562-2343 Fax: (907) 561-5301
☐ 5500 Business Drive Wilmington, NC 28405 Tel: (910) 350-1903 Fax: (910) 350-1557

White - Retained by Lab
Pink - Retained by Client