CATLIN
Engineers and Scientists

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March 12, 2009

NAVFAC Mid-Atlantic
Marine Corps North Carolina IPT
Environmental Business Line
Code: OPCEV3MA
Attn: Mr. Melvin Acree
6506 Hampton Boulevard
Building C, Room 314
Norfolk, VA 23508-1278

Re: **Site TT-3026 – Groundwater Sampling**
Marine Corps Base, Camp Lejeune, North Carolina
Navy Contract No. N62470-05-D-6200
Delivery Order No. 0016
CATLIN Project No. 205-077

Dear Mr. Acree:

CATLIN Engineers and Scientists (CATLIN) has installed a temporary monitoring well and collected a representative groundwater sample at the TT-3026 site within the Tarawa Terrace housing area aboard Marine Corps Base (MCB) Camp Lejeune. The sample was collected to determine if groundwater contamination above the North Carolina Groundwater Quality Standards (2L GWQSs) was present at the subject site. Please find below a summary of the sampling activities, results and CATLIN's recommendations.

TT-3026 Site Information and History

The TT-3026 site is located within the Tarawa Terrace housing area of MCB, Camp Lejeune in Onslow County, North Carolina. Building TT-3026 has been demolished and the underground storage tank (UST) was discovered during demolition. The UST was inactive at the time of discovery but had been used previously to store #2 Heating Oil. The site is currently covered with dirt and gravel, however new military housing is being constructed in the area and is scheduled at the subject site. See Figure 1 for the site location and Figure 2 for a site plan.

The summary below of the tank closure activities was obtained from the January 2009 UST Closure Report prepared by Osage of Virginia (Osage). The Camp Lejeune Environmental Management Division (EMD) contacted Osage on October 23, 2008 about the discovery of the tank. Osage mobilized to the site to conduct a site survey and removed the UST on October 24, 2008. Once the UST was removed, petroleum odor

and staining were noted in the tank basin. A Mini Rae photo ionization detector (PID) was used to scan soils in the tank basin; readings exceeded 50 parts per million (ppm).

As stated in the Osage UST Closure Report, the excavation was extended horizontally until readings diminished below 40 ppm on the PID. The excavation was extended vertically to a depth of 5.5 feet Below Land Surface (BLS), at which point PID readings were approximately 100 ppm. The initial excavation measured 14' (length) x 10' (width) x 5.5' (depth). Approximately 31.19 tons of contaminated soil was transported to Camp Lejeune's soil staging area, TP-467. Confirmation soil samples were collected from the tank basin on October 24, 2008 immediately following excavation of the basin. Soil samples TT3026-S001 through S004 were collected from the sidewalls at a depth of 3.0 feet. Soil sample TT3026-S005 was obtained from the bottom of the tank basin at approximately 5.0 feet BLS. The samples were analyzed for Total Petroleum Hydrocarbons (TPH) Gasoline and Diesel Range Organics (GRO/DRO) via EPA Method 8015. Analytical results revealed soil samples TT3026-S002 and TT3026-S005 exhibited non-compliant TPH GRO concentrations. Each soil sample (S001 through S005) contained noncompliant TPH DRO concentrations.

On October 30, 2008 Osage returned to the site to conduct over excavation of all tank basin sidewalls, as well as the floor since laboratory analysis indicated all samples contained noncompliant TPH concentrations. The resultant excavation measured 24' (length) x 23' (width) x 7' (depth). An additional 87.14 tons of soil was excavated and transported to TP-467. Site activity was suspended on October 31, 2008 due to the need for tank pulls at other Tarawa Terrace locations. As a result, the area was fenced off to ensure security.

Osage attempted to restart site work between November 11 and 14, 2008 however, heavy and continuous rain prevented further work. Rain water filled the excavation; therefore, EMD utilized a vacuum truck to remove the standing rain water. Approximately 2,000 gallons of water was removed from the excavation. Bad weather continued, which prevented further actions at this site. Osage personnel were able to resume site work from November 18 - 21, 2008. Saturated soils were removed from the excavation and caved sidewalls were cleaned up. As a result, an additional 206.42 tons of soil was removed from the tank basin and transported to TP467.

Confirmation soil samples were collected on November 21, 2008 and submitted for analysis via EPA Methods 8260, 8270, and MADEP VPH/EPH. Soil samples TT3026-S006 through S009 were collected at a depth of 3 feet BLS, and sample TT3026-S010 was collected at a depth of 7 feet BLS. Confirmation soil sample results indicated that site soils have been remediated to less than the Residential Maximum Soil Contaminant Concentrations (MSCCs). All detections at the site were below the lowest MSCC, with the exception of results for 2-Methylnaphthalene, 4-Isopropyltoluene, Naphthalene, and C_9-C_{22} Aromatics. Detected concentrations for these compounds were above the Soil-to-Groundwater (STGW) MSCCs, but below the Residential MSCCs. Although there

are no established MSCCs for 4-Isopropyltoluene, comparison to the C_9-C_{22} Aromatics MSCC standards shows compliance with the STGW and Residential values of 34 mg/kg and 469 mg/kg.

A total of 324.75 tons of contaminated soil was removed from the Building TT-3026 site during the tank closure activities. Site soils have been remediated to less than the Residential MSCCs, the site's Land Use is assumed Residential, and there are no water supply wells within 1,500 feet of the site. The collection of a groundwater sample from the former UST basin was requested by the North Carolina Department of Environment and Natural Resources (NCDENR) Wilmington Regional Office (WiRO) after review of the UST Closure Report.

Current Groundwater Sampling

To address NCDENR's request, CATLIN mobilized to the site on February 11, 2009 to install a temporary monitoring well in the center of the former TT-3026 tank basin. The temporary monitoring well, TT3026-TW01, was installed by a North Carolina Licensed Well Contractor and lithology was described by a field geologist. A boring log and well construction and abandonment records are attached. After well installation the monitoring well was properly developed. The following day CATLIN personnel returned to the subject site and purged three volumes of water from the well and then collected a representative groundwater sample. The groundwater sample was placed in appropriate laboratory provided glassware and transported under proper Chain-of-Custody to SGS Environmental Services, Inc. of Wilmington, North Carolina for analysis by EPA Methods 602, 625 and MADEP VPH and EPH. Results of the February 12, 2009 laboratory analyses are attached and summarized as follows:

EPA Method 602

As indicated in the attached Table 1 and illustrated on Figure 2, two EPA Method 602 compounds were detected in the TT3026-TW01 groundwater sample. Ethylbenzene and Toluene were detected at estimated concentrations of 0.738 ug/L and 0.550 ug/L, respectively, both of which were well below their respective 2L GWQSs. No other EPA Method 602 compounds were detected above the laboratory Method Detection Limits (MDLs).

EPA Method 625

As indicated in the attached Table 2 and illustrated on Figure 2, two EPA Method 625 compounds were detected in the TT3026-TW01 groundwater sample. Bis(2-ethylhexyl)phthalate and Naphthalene were detected at concentrations of 0.517 ug/L and 11.8 ug/L, respectively, both of which were below their respective 2L GWQSs. No other EPA Method 625 compounds were detected above the laboratory MDLs.

MADEP VPH/EPH

As indicated in the attached Table 3 and illustrated on Figure 2. No MADEP VPH/EPH compounds were detected above the laboratory MDLs.

Recommendations

Confirmation soil sample analytical results from the tank closure activities conducted by Osage indicated that soil contamination was not detected above the Residential MSCCs. The groundwater sample collected from the center of the former TT-3026 tank basin by CATLIN during the current investigation revealed no compounds at concentrations in excess of the 2L GWQSs. Based on the above-stated analytical results, the site should qualify for "No Further Action" (NFA). Upon receipt of the NFA letter from the NCDENR WiRO, public notice should be given as soil contaminant concentrations remain on-site above the STGW MSCCs.

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
Commanding Officer - Attn: Director I&E/EMD/EQB (with two copies)

205077_TT3026_GW_LtrRpt.doc

TABLES

TABLE 1
SUMMARY OF GROUNDWATER LABORATORY RESULTS
EPA METHOD 602

Incident Name and No.: TT-3026 - Pending

Well ID	Contaminant of Concern →		Ethylbenzene	Toluene	All Other EPA Method 602 Compounds
	Sample ID	Date Collected			
GCL (µg/L)			84,500	257,500	Varies
2L GWQS (µg/L)			550	1,000	Varies
TT3026-TW01	TT3026-TW01	2/12/2009	0.738 J	0.550 J	BMDL

All results in micrograms per liter (µg/L).
BMDL = Below Method Detection Limit
GCL = Gross Contaminant Level
2L GWQS = NCAC T15A:02L Groundwater Quality Standards
J = Estimated concentration, below calibration range and above MDL
Bold results indicate concentrations above 2L GWQS or GCL.

TABLE 2
SUMMARY OF GROUNDWATER LABORATORY RESULTS
EPA METHOD 625

Incident Name and No.: TT-3026 - Pending

Well ID	Contaminant of Concern →		Bis(2-ethylhexyl)phthalate	Naphthalene	All Other EPA Method 625 Compounds
	Sample ID	Date Collected			
GCL (µg/L)			2,500	15,500	Varies
2L GWQS (µg/L)			2.5	21	Varies
TT3026-TW01	TT3026-TW01	2/12/2009	0.517 J	11.8	BMDL

All results in micrograms per liter (µg/L).
BMDL = Below Method Detection Limit
GCL = Gross Contaminant Level
2L GWQS = NCAC T15A:02L Groundwater Quality Standards
J = Estimated concentration, below calibration range and above MDL
Bold results indicate concentrations above 2L GWQS or GCL.

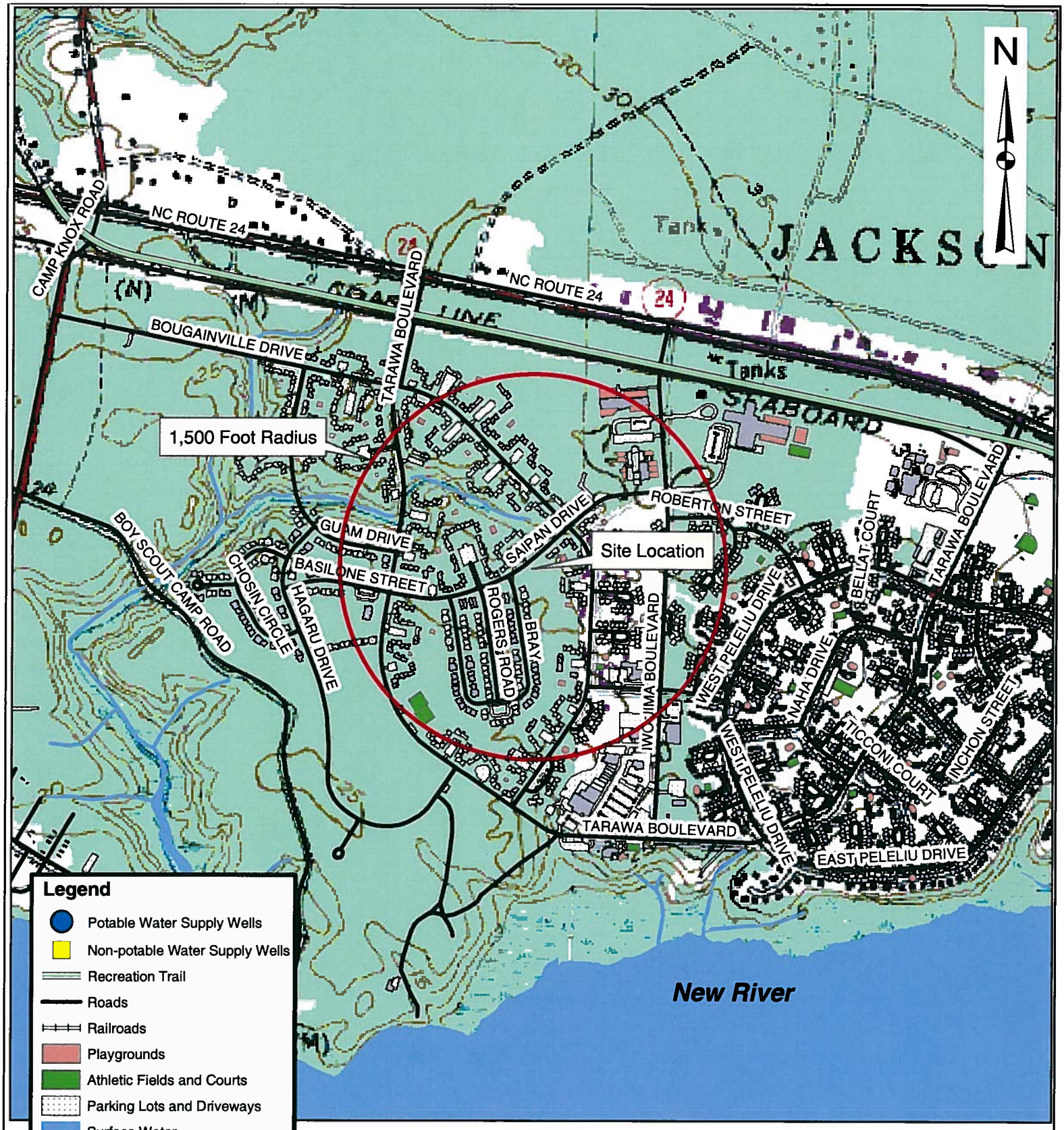
TABLE 3
SUMMARY OF GROUNDWATER LABORATORY RESULTS
MADEP VPH/EPH AS COMPARED TO 2L GWQSs

Incident Name and No.: TT-3026 - Pending

Well ID	Contaminant of Concern →		C5-C8 Aliphatics	C9-C18 Aliphatics	C19-C36 Aliphatics	C9-C22 Aromatics
	Sample ID	Date Collected				
2L GWQS (µg/L)			420	4,200	42,000	210
TT3026-TW01	TT3026-TW01	2/12/2009	<100	<200	<100	<200

All results in micrograms per liter (µg/L).
BMDL = Below Method Detection Limit
2L GWQS = NCAC T15A:02L Groundwater Quality Standards
Bold results indicate concentrations above 2L GWQS or GCL.

FIGURES



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

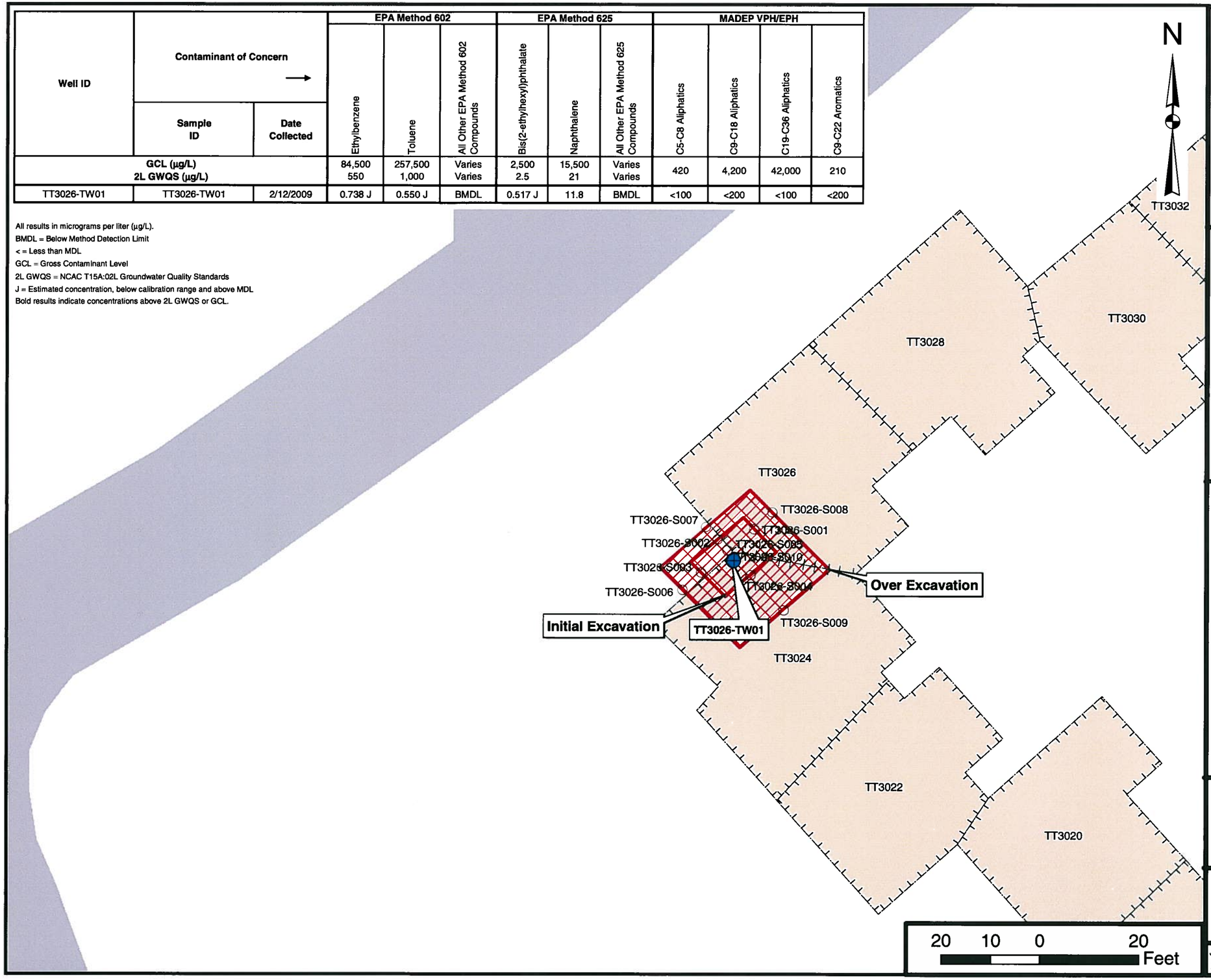
CATLIN Engineers and Scientists

PROJECT	TITLE	FIGURE
GROUNDWATER SAMPLING BUILDING TT-3026 MARINE CORPS BASE CAMP LEJEUNE, NC	SITE LOCATION MAP	1

JOB NO.	DATE	SCALE	DRAWN BY	CHECKED BY
205-077	MAR 2009	AS SHOWN	SAC	MEM

Well ID	Contaminant of Concern →		EPA Method 602			EPA Method 625			MADEP VPH/EPH			
	Sample ID	Date Collected	Ethylbenzene	Toluene	All Other EPA Method 602 Compounds	Bis(2-ethylhexyl)phthalate	Naphthalene	All Other EPA Method 625 Compounds	C5-C8 Aliphatics	C9-C18 Aliphatics	C19-C36 Aliphatics	C9-C22 Aromatics
GCL (µg/L) 2L GWQS (µg/L)			84,500 550	257,500 1,000	Varies Varies	2,500 2.5	15,500 21	Varies Varies	420	4,200	42,000	210
TT3026-TW01	TT3026-TW01	2/12/2009	0.738 J	0.550 J	BMDL	0.517 J	11.8	BMDL	<100	<200	<100	<200

All results in micrograms per liter (µg/L).
BMDL = Below Method Detection Limit
< = Less than MDL
GCL = Gross Contaminant Level
2L GWQS = NCAC T15A:02L Groundwater Quality Standards
J = Estimated concentration, below calibration range and above MDL
Bold results indicate concentrations above 2L GWQS or GCL.



GROUNDWATER SAMPLING
BUILDING TT-3026
MARINE CORPS BASE
CAMP LEJEUNE, NC

NAVFAC Naval Facilities Engineering Command
ATLANTIC DIVISION

LEGEND

- Temporary Well Location
- Historical Soil Sample Location
- Excavation Areas
- Demolished Buildings and Structures
- Slabs
- Driveways
- Parking Lots
- Woods

NOTES

1. Data layers provided by MCB Camp Lejeune GIS office.
2. Temporary well TT3026-TW01 was installed on February 11, 2009 and sampled on February 12, 2009. The well was properly abandoned after groundwater sample collection.

CATLIN Engineers and Scientists

SITE PLAN WITH GROUNDWATER LABORATORY RESULTS

FIGURE 2

Job No.:	Date:	Scale:	Drawn By:	Checked By:
205-077	MAR 2009	AS SHOWN	SAC	MEM

ATTACHMENT 1

BORING LOG AND WELL CONSTRUCTION/ABANDONMENT RECORD

WELL LOG

CATLIN ENGINEERS and SCIENTISTS
205-077-34
Wilmington, NC

SHEET 1 OF 1

PROJECT NO.: 205-077-34	STATE: NC	COUNTY: Onslow	LOCATION: Jacksonville
PROJECT NAME: TT-3026	LOGGED BY: Steve Tyler		WELL ID: TT3026-TW01
	DRILLER: Bobbie D. Fowler		
NORTHING: 3846400.9	EASTING: 282482.4	CREW: N/A	
SYSTEM: UTM NAD83 (m)	BORING LOCATION: TT-3026		T.O.C. ELEV.:
DRILL MACHINE: Power Probe	METHOD: Direct Push	0 HOUR DTW: 5.0	TOTAL DEPTH: 16.0
START DATE: 2/11/09	FINISH DATE: 2/11/09	24 HOUR DTW: 6.8	WELL DEPTH: 12.0

DEPTH	BLOW COUNT 6in	6in	6in	6in	OVA (ppm)	LAB.	USCS	LOG	DEPTH	SOIL AND ROCK DESCRIPTION	WELL DETAIL
									0.0	LAND SURFACE	3.0 / 0.0
							SM			Olive, SILTY f. to vf. SAND. No hydrocarbon odor. Wet at approximately 4' BLS. Grades to greenish-olive colored silty clay with depth.	2" Sch 40 PVC; 2.0
									8.5		2" Slot 010 Sch. 40 PVC
							OL			Olive, SILTY CLAY. Moderate plasticity. Wet.	12.0 / 12.0
									13.0		
							SC			Olive, f. SANDY CLAY. Moderate plasticity.	
									15.0		
							SM			Olive, SILTY f. SAND. Wet.	
									16.0		
										Boring Terminated at Depth 16.0 ft	

Native Backfill

CATLIN BORING LOG 205-077 TT-3026.GPJ CATLIN.GDT 2/24/09

NORTH CAROLINA – DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES
– DIVISION OF WATER QUALITY – GROUNDWATER SECTION
1636 MAIL SERVICE CENTER –
RALEIGH, N.C. 27699-1636 – PHONE (919) 733-3221

WELL CONSTRUCTION RECORD

WELL CONTRACTOR: Bobbie Fowler
WELL CONTRACTOR CERTIFICATION #: 2869
STATE WELL CONSTRUCTION PERMIT #: N/A

1. WELL USE (Check Applicable Box): Residential Municipal Industrial Agricultural Monitoring
   Recovery Heat Pump Water Injection Other If Other, list use: _____
2. WELL LOCATION: (Show sketch of the location below)
   Nearest Town: Jacksonville County: Onslow
   _____
   (Road Name and Numbers, Community, or Subdivision and Lot No.)
3. OWNER _____
   Address TT 3026
   (Street or Route No.)
   _____
   City or Town State Zip Code
4. DATE DRILLED 2-11-09
5. TOTAL DEPTH 12'
6. CUTTINGS COLLECTED ____YES __X__NO
7. DOES WELL REPLACE EXISTING WELL? ____YES __X__NO
8. STATIC WATER LEVEL Below Top of Casing 6 Ft.
   (Use "+" if Above Top of Casing)
9. TOP OF CASING IS 3 Ft. Above Land Surface*
   *Top of casing terminated at/or below land surface requires a variance in accordance with 15A NCAC 2C.0118
10. YIELD (gpm): _____ METHOD OF TEST _____
11. WATER ZONES (depth) _____
12. CHLORINATION: Type — Amount —
13. CASING:

	Depth		Diameter	Wall Thickness or Weight/Ft.	Material
From +3	To -2	Ft. 2"		Sch40	PVC
From	To	Ft.			
From	To	Ft.			

14. GROUT:

	Depth		Material	Method
From —	To	Ft.		
From	To	Ft.		

15. SCREEN:

	Depth		Diameter	Slot Size	Material
From -2	To -12	Ft. 2"	in. .010	in.	PVC
From	To	Ft.	in.	in.	
From	To	Ft.	in.	in.	

16. SAND/GRAVEL PACK:

	Depth		Size	Material
From —	To	Ft.		
From	To	Ft.		

17. REMARKS: _____

DRILLING LOG From	To	DEPTH Formation Description
SEE BORING LOG		

If additional space is needed use back of form

LOCATION SKETCH
(Show direction and distance from at least two State Roads, or other map reference points)

SEE FIGURE 1.2

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C, WELL CONSTRUCTIONN STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

SIGNATURE OF PERSON CONSTRUCTING THE WELL — DATE 2-16-09

FOR OFFICE USE ONLY
Quad No: _____
Serial No: _____

Submit original to Division of Water Quality, Groundwater Section within 30 days

GW-1 REV 12/99

North Carolina Department of Environment and Natural Resources - Division of Water Quality

WELL ABANDONMENT RECORD

WELL CONTRACTOR Bobbie Fowler

WELL CONTRACTOR CERTIFICATION # 2869

1. WELL USE (Check Applicable Box): Residential ☐ Municipal ☐ Industrial ☐ Agricultural ☐ Monitoring ☒ Recovery ☐ Heat Pump Water Injection ☐ Other ☐ If Other, List Use: _____

2. WELL LOCATION: (Show a sketch of the location on back of form.)
Nearest Town: Jacksonville County Onslow
(Road Name and Number, Community, Subdivision , Lot No.) Quadrangle No.

3. OWNER: _____

4. ADDRESS: TT-3026

5. TOPOGRAPHY: draw, slope, hilltop, valley, flat (circle one)

6. TOTAL DEPTH: 12 DIAMETER 2"

7. CASING REMOVED:

feet	diameter
12'	2"

8. DISINFECTION: —
(Amount of 70% hypochlorite used:)

9. SEALING MATERIAL:

Neat Cement	Sand Cement
bags of cement _____	bags of cement _____
gallons of water _____	gallons of water _____

Other
Type material Hole Plug
Amount 25lbs

10. EXPLAIN METHOD EMPLACEMENT OF MATERIAL.
Pour from Surface

11. DATE WELL ABANDONED 2-12-09

WELL DIAGRAM: Draw a detailed sketch of the well showing total depth, depth and diameter of screens remaining in the well, gravel interval, intervals of casing perforations, and depths and types of fill materials used.

I do hereby certify that this well was abandoned in accordance with 15A NCAC 2C, well construction standards, and that a copy of the record has been provided to the well owner.

Signature of person abandoning the well _____ Date 2-12-09

WELL LOCATION: Draw a location sketch on the reverse of this sheet, showing the direction and distance of the well to at least two (2) nearby reference points such as roads, intersections and streams. Identify roads with State Highway road identification numbers.

Submit original to the Division of Water Quality, Attn: Information Management- 1617 Mail Service Center - Raleigh, NC 27699-1617, Phone No. (919) 733-7015, and one copy to the owner within 30 days from completion of abandonment.

ATTACHMENT 2

LABORATORY REPORT AND CHAIN-OF-CUSTODY DOCUMENATION

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

Report Number: G128-2319

Client Project: DOD/TT3026

Dear Shane Chasteen,

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 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 SGS Environmental Services at (910) 350-1903. We will be happy to answer any questions or concerns which you may have.

Thank you for using SGS Environmental Services for your analytical services. We look forward to working with you again on any additional analytical needs which you may have.

Sincerely,
SGS Environmental Services, Inc.

Ashley Nifong 2/25/09

Project Manager Date
Ashley Nifong

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

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

Results for Volatiles
by GC 602

Client Sample ID: TT3026-TW01
Client Project ID: DOD/TT3026
Lab Sample ID: G128-2319-1A
Lab Project ID: G128-2319

Analyzed By: RSB
Date Collected: 2/12/2009 12:00
Date Received: 2/13/2009
Matrix: Water

Analyte	Result ug/L	RL ug/L	MDL ug/L	Dilution Factor	Date Analyzed	Flags
Benzene	BQL	1.00	0.177	1	2/20/2009	
Diisopropyl ether (DIPE)	BQL	1.00	0.253	1	2/20/2009	
Ethylbenzene	**0.738**	1.00	0.19	1	2/20/2009	J
Methyl-tert butyl ether (MTBE)	BQL	2.00	0.306	1	2/20/2009	
Toluene	**0.550**	1.00	0.313	1	2/20/2009	J
m/p-Xylene	BQL	2.00	0.481	1	2/20/2009	
o-Xylene	BQL	2.00	0.405	1	2/20/2009	

Surrogate Spike Recoveries	Spike Added	Spike Result	Percent Recovery
Trifluorotoluene	40	39.6	98.9

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

Reviewed By:

Results for Semivolatiles
by GCMS 625

Client Sample ID: TT3026-TW01
Client Project ID: DOD/TT3026
Lab Sample ID: G128-2319-1J
Lab Project ID: G128-2319

Initial/Final Amt: 871 mL / 5.0 mL

Analyzed By: DCS
Date Collected: 2/12/2009 12:00
Date Received: 2/13/2009
Date Extracted: 2/13/2009
Matrix: Water

Compound	Result ug/L	RL ug/L	MDL ug/L	Dilution Factor	Date Analyzed	Flag
Acenaphthene	BQL	5.74	0.855	1	2/18/2009	
Acenaphthylene	BQL	5.74	0.855	1	2/18/2009	
Anthracene	BQL	5.74	1.00	1	2/18/2009	
Benzo[a]anthracene	BQL	5.74	0.781	1	2/18/2009	
Benzo[a]pyrene	BQL	5.74	0.729	1	2/18/2009	
Benzo[b]fluoranthene	BQL	5.74	0.821	1	2/18/2009	
Benzo[g,h,i]perylene	BQL	5.74	0.706	1	2/18/2009	
Benzo[k]fluoranthene	BQL	5.74	0.631	1	2/18/2009	
Bis(2-chloroethoxy)methane	BQL	5.74	1.18	1	2/18/2009	
Bis(2-chloroethyl)ether	BQL	5.74	1.19	1	2/18/2009	
Bis(2-chloroisopropyl)ether	BQL	5.74	1.12	1	2/18/2009	
Bis(2-ethylhexyl)phthalate	**0.517**	5.74	0.471	1	2/18/2009	J
4-bromophenyl phenyl ether	BQL	5.74	0.896	1	2/18/2009	
Butylbenzylphthalate	BQL	5.74	0.511	1	2/18/2009	
2-Chloronaphthalene	BQL	5.74	0.993	1	2/18/2009	
2-Chlorophenol	BQL	5.74	1.34	1	2/18/2009	
4-Chloro-3-methylphenol	BQL	5.74	0.913	1	2/18/2009	
4-Chlorophenyl phenyl ether	BQL	5.74	3.74	1	2/18/2009	
Chrysene	BQL	5.74	0.637	1	2/18/2009	
Dibenzo[a,h]anthracene	BQL	5.74	0.505	1	2/18/2009	
Di-n-Butylphthalate	BQL	5.74	0.947	1	2/18/2009	
3,3'-Dichlorobenzidine	BQL	11.5	1.40	1	2/18/2009	
2,4-Dichlorophenol	BQL	5.74	1.29	1	2/18/2009	
Diethylphthalate	BQL	5.74	0.850	1	2/18/2009	
Dimethylphthalate	BQL	5.74	0.637	1	2/18/2009	
2,4-Dimethylphenol	BQL	5.74	1.86	1	2/18/2009	
Di-n-octylphthalate	BQL	5.74	0.666	1	2/18/2009	
4,6-Dinitro-2-methylphenol	BQL	28.7	0.631	1	2/18/2009	
2,4-Dinitrophenol	BQL	28.7	0.735	1	2/18/2009	
2,4-Dinitrotoluene	BQL	5.74	0.614	1	2/18/2009	
2,6-Dinitrotoluene	BQL	5.74	0.746	1	2/18/2009	
Diphenylamine *	BQL	5.74	0.654	1	2/18/2009	
Fluoranthene	BQL	5.74	0.809	1	2/18/2009	
Fluorene	BQL	5.74	0.832	1	2/18/2009	
Hexachlorobenzene	BQL	5.74	0.580	1	2/18/2009	
Hexachlorobutadiene	BQL	5.74	0.873	1	2/18/2009	
Hexachlorocyclopentadiene	BQL	11.5	11.5	1	2/18/2009	
Hexachloroethane	BQL	5.74	0.855	1	2/18/2009	
Indeno(1,2,3-c,d)pyrene	BQL	5.74	2.62	1	2/18/2009	
Isophorone	BQL	5.74	1.02	1	2/18/2009	
Naphthalene	**11.8**	5.74	1.04	1	2/18/2009	
Nitrobenzene	BQL	5.74	1.21	1	2/18/2009	
2-Nitrophenol	BQL	5.74	1.41	1	2/18/2009	
4-Nitrophenol	BQL	28.7	1.24	1	2/18/2009	
N-Nitrosodi-n-propylamine	BQL	5.74	1.72	1	2/18/2009	
Pentachlorophenol	BQL	28.7	1.62	1	2/18/2009	
Phenanthrene	BQL	5.74	0.511	1	2/18/2009	

Results for Semivolatiles
by GCMS 625

Client Sample ID: TT3026-TW01
Client Project ID: DOD/TT3026
Lab Sample ID: G128-2319-1J
Lab Project ID: G128-2319

Initial/Final Amt: 871 mL / 5.0 mL

Analyzed By: DCS
Date Collected: 2/12/2009 12:00
Date Received: 2/13/2009
Date Extracted: 2/13/2009
Matrix: Water

Compound	Result ug/L	RL ug/L	MDL ug/L	Dilution Factor	Date Analyzed	Flag
Phenol	BQL	5.74	1.22	1	2/18/2009	
Pyrene	BQL	5.74	2.37	1	2/18/2009	
1,2,4-Trichlorobenzene	BQL	5.74	0.827	1	2/18/2009	
2,4,6-Trichlorophenol	BQL	5.74	1.06	1	2/18/2009	

	Spike Added	Spike Result	Percent Recovered
2-Fluorobiphenyl	10	8.3	83
2-Fluorophenol	10	7.3	73
Nitrobenzene-d5	10	9.3	93
Phenol-d6	10	8	80
2,4,6-Tribromophenol	10	8.5	85
4-Terphenyl-d14	10	9.1	91

Comments:

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

Reviewed By:

Results of Library Search for Semivolatile Compounds

by GCMS

Client Sample ID: TT3026-TW01
Client Project ID: DOD/TT3026
Lab Sample ID: G128-2319-1J
Lab Project ID: G128-2319
Sample Wt/Vol: 871 ML
Dilution: 1

Analyzed By: DES
Date Collected: 2/12/2009 12:00
Date Received: 2/13/2009
Date Extracted: 2/13/2009
Date Analyzed: 2/18/2009
Matrix: Water

No.	Compound	Retention Time	CAS#	Match Probability	Result ug/L
1	3-Cyclohexen-1-ol, 4-methyl-1-(1-methylethy	5.25	562-74-3	95	16.4
2	Benzene, 1-methyl-4-(1-methylethyl)-	4.16	99-87-6	95	13.7

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: 

VPH (Aliphatics/Aromatics) Laboratory Reporting Form

Client Name: Richard Catlin & Associates

Project Name: DOD/TT3026

Sample Information	
Sample Identification	TT3026-TW01
Sample Matrix	Water
Collection Option (for Soil)*	NA
Date Collected	02/12/09
Date Received	02/13/09
Date Extracted	02/18/09 21:39 - 02/18/09 21:39
Date Analyzed	02/18/09 21:39 - 02/18/09 21:39
Dry Weight	NA
Dilution Factor	1 - 1

Analytical Results			
Analyte	Result µg/L	Report Limit µg/L	Flags
C_5-C_8 Aliphatics**	BQL	100	
C_9-C_{12} Aliphatics**	BQL	100	
C_9-C_{10} Aromatics**	BQL	100	

	Percent Recovery	Flags	Limits Lower	Limits Upper
Surrogate % Recovery - PID	97.9		70	130
Surrogate % Recovery - FID	102		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: g128-2319-1e	Lab Info: g128-2319-1e
FID Info: VP021809/031F0101.D	PID Info: VP021809/031R0101.D

Reviewed By:

Attachment 2

VPH Laboratory Reporting Form

Calibration and QA/QC Information

FID Initial Calibration Date: 02/13/09 PID Initial Calibration Date: 02/13/09

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	3.35	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	11.92	Calibration Factor
	50	4		
	100	8		
	200	16		
	500	40		

Calibration Check Date: 02/18/09 Filename: VP021809/002F0101.d

Calibration Check

Range	Levels (µg/L)	Levels (mg/Kg)	%Difference if CF %Drift if LR ✓	Limits
C_5-C_8 Aliphatics	200	16	0.2	±25%
C_9-C_{12} Aliphatics	200	16	1.1	±25%
C_9-C_{10} Aromatics	200	16	0.7	±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

Attachment 2

VPH Laboratory Reporting Form

Calibration and QA/QC Information

FID Initial Calibration Date: 02/13/09 PID Initial Calibration Date: 02/13/09

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	3.35	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	11.92	Calibration Factor
	50	4		
	100	8		
	200	16		
	500	40		

Calibration Check Date: 02/18/09 Filename: VP021809/043F0101.d

Calibration Check

Range	Levels (µg/L)	Levels (mg/Kg)	%Difference if CF ✓ %Drift if LR	Limits
C_5-C_8 Aliphatics	200	16	-7.8	±25%
C_9-C_{12} Aliphatics	200	16	-6.4	±25%
C_9-C_{10} Aromatics	200	16	-8.1	±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

EPH (Aliphatics/Aromatics) Laboratory Reporting Form

Client Name: Richard Catlin & Associates

Project Name: DOD/TT3026

Sample Information	
Sample Identification	TT3026-TW01
Sample Matrix	WATER
Date Collected	02/12/09
Date Received	02/13/09
Date Extracted	02/13/09
Date Analyzed	02/16/09 21:02 - 02/16/09 21:30
Dry Weight	NA
Dilution Factor	1 - 1
Initial Volume (mL)	920
Final Volume (mL)	5.0

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

Surrogates	Percent Recovery	Flags	Limits Lower	Limits Upper
Aliphatic (tricosane)	99.8		40	140
Aromatic (ortho-terphenyl)	89.5		40	140
Fractionation 1 (2-bromonaphthalene)	99.9		40	140
Fractionation 2 (2-fluorobiphenyl)	97.9		40	140

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

Lab Info: G128-2319-1L	Lab Info: G128-2319-1L
Aliphatic: EP021609/025F2301.D	Aromatic: EP021609/026F2401.D

Reviewed By:

Attachment 3

EPH Laboratory Reporting Form

Calibration and QA/QC Information

Initial Calibration Date: 10/22/08

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	17.73	Calibration Factor
	100	16.7		
	50	8.33		
	25	4.17		
	5	0.833		
C_{19}-C_{36} Aliphatics	200	33.3	10.65	Calibration Factor
	100	16.7		
	50	8.33		
	25	4.17		
	5	0.833		
C_{11}-C_{22} Aromatics	200	33.3	10.39	Calibration Factor
	100	16.7		
	50	8.33		
	25	4.17		
	5	0.833		

Calibration Check Date: 02/16/09 / 02/16/09

Filenames: ep021609/003f0101.d / ep021609/002f0201.d

Calibration Check

Range	Levels (µg/L)	Levels (mg/Kg)	%Difference if CF %Drift if LR ✓	Limits
C9-C18 Aliphatics	100	16.7	8.6	≤±25%
C19-C36 Aliphatics	100	16.7	5.1	≤±25%
C11-C22 Aromatics	100	16.7	9.5	≤±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: 10/22/08

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	17.73	Calibration Factor
	100	16.7		
	50	8.33		
	25	4.17		
	5	0.833		
C_{19}-C_{36} Aliphatics	200	33.3	10.65	Calibration Factor
	100	16.7		
	50	8.33		
	25	4.17		
	5	0.833		
C_{11}-C_{22} Aromatics	200	33.3	10.39	Calibration Factor
	100	16.7		
	50	8.33		
	25	4.17		
	5	0.833		

Calibration Check Date: 02/17/09
02/17/09

Filenames: ep021709/001f0101.d
ep021709/002f0201.d

Calibration Check

Range	Levels (µg/L)	Levels (mg/Kg)	%Difference if CF %Drift if LR ✓	Limits
C9-C18 Aliphatics	100	16.7	7.2	≤±25%
C19-C36 Aliphatics	100	16.7	4.6	≤±25%
C11-C22 Aromatics	100	16.7	7.9	≤±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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(1)

CLIENT: CATLIN ENG. & SCI

CONTACT: SHANE CHASTANE PHONE NO: 910-452-5861

PROJECT: DOD / TT3026 SITE/PWSID#: 205-077

REPORTS TO: CATLIN: ATTN: SHANE CHASTANE EMAIL:

INVOICE TO: CATLIN: ATTN: SHEILA SMITH QUOTE #: DOD 101

P.O. #: [redacted] 290213-1

SGS Reference #: 6128-2319

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(2)

LAB NO.	SAMPLE IDENTIFICATION	DATE	TIME	MATRIX/ MATRIX CODE	# CONTAINERS	SAMPLE TYPE C= COMP G= GRAB MI= Multi Incremental Samples	Preservatives Used	Analysis Required (3) EPA METH 602	EPA METH. 625+TICs	MADEP VPH	MADEP EPH	REMARKS/ LOC ID
	TT3026-TW01	2-12-09	1200	GW	9	3 VOA		✓	✓	✓	✓	① SUMMARY EDD FORMAT ② PLS. REPORT LOW RLs

(5)

Collected/Relinquished By:(1)	Date	Time	Received By:
Bob Jones	2-13-09		Michael D. Mason
Relinquished By: (2) Michael D. Mason	Date 2/13/09	Time 8:25	Received By: Jack Jones
Relinquished By: (3)	Date	Time	Received By:
Relinquished By: (4)	Date	Time	Received For Laboratory By:

(4)

DOD Project? (YES) NO

Cooler ID _____

Special Deliverable Requirements:

Requested Turnaround Time and-or Special Instructions:

Samples Received Cold? (YES) NO

Cooler TB

Temperature °C: 2.3°C

Chain of Custody Seal: (Circle)

INTACT BROKEN (ABSENT)

N.C. Certification #481

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