GROUNDWATER SAMPLING
REPORT OF FINDINGS

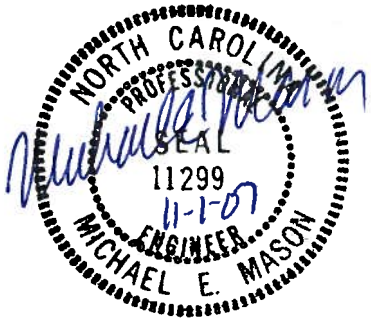
FOR

PP-3343
MARINE CORPS BASE
CAMP LEJEUNE, NORTH CAROLINA

NCDENR UST INCIDENT NO. 24013
LAND USE CLASSIFICATION: RESIDENTIAL
RISK CLASSIFICATION: LOW

OCTOBER 31, 2007

CONTRACT NO. N62470-05-D-6200
DELIVERY ORDER NO. 0016
CATLIN PROJECT NO. 205-077



PREPARED BY:

CATLIN ENGINEERS AND SCIENTISTS
P. O. BOX 10279
WILMINGTON, NORTH CAROLINA 28404-0279
(910) 452-5861

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A. SITE IDENTIFICATION

DATE OF REPORT: October 31, 2007
Facility ID: E-002740 UST Incident Number (if known): 24013
Land Use Classification: Residential Risk Classification: Low
Site Name: PP-3343
Site Location: 3343 Onslow Drive, Marine Corps Base (MCB), Camp Lejeune (See Figure 1)
Nearest City/Town: Jacksonville County: Onslow

UST Owner: Commanding Officer – MCB Camp Lejeune
I&E/EMD/EQB
Address: PSC 20004
MCB Camp Lejeune, NC 28542 Phone: (910) 451-5068

UST Operator: Same as above
Address: Same as above Phone: Same as above

Property Owner: Same as above
Address: Same as above Phone: Same as above

Property Occupant: Military personnel and family
Address: 3343 Onslow Dr., MCB, Camp Lejeune, Jacksonville, NC Phone: Unknown

Consultant/Contractor: CATLIN Engineers and Scientists
Address: 220 Old Dairy Road, Wilmington, North Carolina 28405 Phone: (910) 452-5861

Release Information

Date Discovered: September 17, 2001
Longitude: 77.3689 W **Latitude:** 34.6851 N
Estimated Quantity of Release: Unknown
Cause of Release: Unknown
Source of Release (e.g. Piping/UST):
Possible leaking UST and/or associated piping

Sizes and contents of UST system(s) from which the release occurred:
Non-regulated, non-commercial, 285-gallon fuel oil UST used for heating a single-family residence

I, **Michael E. Mason** a Professional Engineer/Licensed Geologist **(circle one)** for CATLIN Engineers and Scientists, do certify that the information contained in this report is correct and accurate to the best of my knowledge.

(Please Affix Seal and Signature)

B. BACKGROUND AND PURPOSE

The project is located at Building PP-3343 aboard Marine Corps Base (MCB) Camp Lejeune, North Carolina. Building PP-3343 is located in the Paradise Point Housing Area and was heated using heating oil from a 285-gallon underground storage tank (UST). The former tank was located adjacent to the single family residence and was within several feet of the foundation.

On September 17, 2001, J.A. Jones Environmental Services Company (J.A. Jones) of Charlotte, North Carolina performed UST excavation operations and removed one 285-gallon, non-regulated, non-commercial fuel oil UST from the site (see Figure 2). The fuel oil tank was utilized strictly for heating purposes of the single-family residence. Soil samples were obtained from the UST basin during tank removal. Laboratory analytical results revealed total petroleum hydrocarbon (TPH) concentrations above the North Carolina Department of Environment and Natural Resources (NCDENR) Action Level of 10 mg/Kg. As a result, J.A. Jones performed additional soil excavation within the tank basin and collected risk based confirmation soil samples. Four sidewall soil samples and one soil sample from the bottom of the tank basin were obtained. Soil samples were analyzed for volatiles per EPA Method 8260, semi-volatiles per EPA Method 8270, and volatile and extractable petroleum hydrocarbons (VPH/EPH) via the Massachusetts Department of Environmental Protection (MADEP) Methods. C_9-C_{22} Aromatics were found to be present in excess of the Residential Maximum Soil Contaminant Concentration (MSCC) of 469 mg/Kg in one soil sample (CC3343-5; location nearest house at 477 mg/Kg).

In July 2002, CATLIN Engineers and Scientists (CATLIN) conducted field work and sampling required by NCDENR for a Phase I Limited Site Assessment (LSA). One groundwater sample was collected for laboratory analysis from a temporary well, and one soil sample was collected from beneath the former product line location. Soil sample results did not reveal any contaminant concentrations above any established MSCCs. A groundwater sample collected from the temporary monitoring well, USTPP3343-TW01, installed in the former UST basin area, revealed Naphthalene and C_9-C_{22} Aromatics above the corresponding 2L Groundwater Quality Standards (GWQSs). The Phase I LSA Report dated November 29, 2002 concluded the site may be considered for No Further Action (NFA), unless NCDENR felt it necessary to further investigate site soils.

Since one sidewall soil sample exhibited noncompliant contaminant concentrations, NCDENR requested that a Soil Assessment Report (SAR) be completed for the site. CATLIN performed additional soil sampling at the site in April 2003 and November 2004. Field personnel obtained a soil sample from the previously identified location (CC3343-5) during each sampling event and sent the sample for analysis via the MADEP Methods. MADEP fraction concentrations were either below Method Detection Limits (MDL) or below the Soil-to-Groundwater (STGW) and Residential MSCCs. CATLIN concluded that the C_9-C_{22} Aromatic concentrations previously detected in the soils around the former UST had naturally attenuated to below the STGW and Residential MSCC.

CATLIN also conducted groundwater sampling in conjunction with the November 2004 soil sampling event. Details and findings are summarized in *Soil and Groundwater Sampling Report of Findings (ROF) for PP-3343, Marine Corps Base, Camp Lejeune, North Carolina,* May 10, 2005. The USTPP3343-DPT01 groundwater sample exhibited C_9-C_{18} Aliphatics (<7,100 ug/L) and C_9-C_{22} Aromatics (<3,700 ug/L) in excess of their established 2L GWQSs, so NFA without a groundwater Land Use Restriction (LUR) was not achievable at the time.

MCB Camp Lejeune continues to monitor groundwater at the site to assess attenuation of contaminant concentrations. CATLIN conducted groundwater sampling in July 2007 in order to evaluate current groundwater conditions at the site.

C. METHODS

1. Field Methods

All field work was conducted in general accordance with CATLIN's Standard Procedures provided in Appendix A. CATLIN personnel gathered subsurface soil data by Direct Push Technology (DPT) boring advancement using an AMS PowerProbe™ 9600D (PowerProbe) on July 24, 2007. When using the PowerProbe, the borings are advanced to depth by static force and a 90-pound hydraulic percussion hammer. Two and one-quarter inch diameter by four-foot length steel is used as casing. Soil samples are continuously collected in one and one-half inch clear liners. Liners are removed from the casing and then cut in half longitudinally to allow for visual/manual classification by the Unified Soil Classification System (USCS) and organic vapor analysis utilizing a Photo Ionization Detector (PID). A boring log for the USTPP3343-DPT01 boring is provided in Appendix B. The boring location is illustrated on Figure 2.

Well materials were installed in an attempt to determine accurate water table measurements and facilitate groundwater sampling. The well was constructed with one inch slotted PVC well screen.

A depth to water (DTW) measurement was recorded and a grab groundwater sample was collected. The sample was collected on July 24, 2007 utilizing a peristaltic pump and new polyethylene tubing. The groundwater sample was labeled USTPP3343-DPT01.

New disposable nitrile gloves were worn during sampling activities. All samples were placed into the appropriately labeled glassware and packed on ice in an insulated cooler for transportation to the laboratory. Sample integrity was maintained by following proper Chain-of-Custody (COC) procedures. A copy of the COC is provided following the laboratory report in Appendix C.

The borehole was abandoned to the surface using three-eighth inch

bentonite chips. Bentonite and water were poured into the borehole simultaneously to facilitate hydration.

2. Analytical Methods

Samples were transported to SGS Environmental Services Inc. (NC Certification #481) in Wilmington, North Carolina. At the laboratory, the groundwater sample was analyzed for MADEP VPH/EPH.

D. RESULTS

Field observations noted during soil boring advancement indicate site geology comprised of fine sand overlying silty sand from land surface to four feet Below Land Surface (BLS). Fine sand is encountered again from four to six feet BLS, followed by silty sand from six to eight feet BLS. Sandy clay was observed from eight feet to boring termination at 12 feet BLS, with some clayey sand noted in the eight to ten feet BLS interval. A boring log for the soil boring including organic vapor screening results is included in Appendix B. Groundwater depth as measured in the temporary monitoring well USTPP3343-DPT01 on July 24, 2007 was approximately 10.2 feet BLS.

Analytical results for the groundwater sample are included in Appendix C (Please note the sample from this site was included on the COC with additional sites. As a result, only the applicable pages from the lab report are included. Page numbers are not consecutive, as multiple sites were sampled during the same event.). The analytical results are summarized as follows.

MADEP VPH/EPH

As indicated in Table 1 and illustrated Figure 2, analytical results from groundwater sample USTPP3343-DPT01 revealed the presence of MADEP fractions above the 2L GWQSs. The groundwater sample from the site exhibited increased concentrations of MADEP constituents as compared to those reported in the November 2002 LSA and May 2005 Soil and Groundwater ROF. Specifically, the C_9-C_{18} Aliphatics concentration increased from 3,570 µg/L in 2002 and <7,100 µg/L in 2005 to 26,183 µg/L as of the current investigation. The C_9-C_{22} Aromatics fraction also increased an order of magnitude from <2,000 µg/L in 2002 and <3,700 µg/L in 2005 to 11,223 µg/L.

The C_{19}-C_{36} Aliphatics fraction was not detected above the 2L GWQS of 42,000 µg/L; however, it also showed an increase in concentration from 750 µg/L (2002) to 3,500 µg/L (current investigation). There were no C_5-C_8 Aliphatics detected above the laboratory MDL.

E. CONCLUSIONS AND RECOMMENDATIONS

Noncompliant MADEP petroleum hydrocarbon fractions persist in groundwater at the site. An increase in C_9-C_{18} Aliphatics, C_{19}-C_{36} Aliphatics, and C_9-C_{22} Aromatics

concentrations was observed upon comparison of historical groundwater data (2002, 2005, and the current event). Since detected MADEP contaminant concentrations have increased by an order of magnitude, CATLIN recommends resampling in one year to monitor groundwater conditions. If contaminant levels continue to increase, additional assessment and/or remediation may be necessary.

F. REFERENCES

CATLIN Engineers and Scientists. *LUST Phase I Limited Site Assessment Report UST PP-3343, MCB Camp Lejeune, NC,* November 29, 2002.

CATLIN Engineers and Scientists. *Additional Soil Sampling Letter, PP-3343, MCB Camp Lejeune, NC,* May 28, 2003.

CATLIN Engineers and Scientists. *Soil and Groundwater Sampling Report of Findings for PP-3343, MCB Camp Lejeune, NC,* May 10, 2005.

J.A. Jones Environmental Services Company. *Underground Storage Tank Closure Report Marine Corps Base Building CC-3343, MCB Camp Lejeune, NC,* January 24, 2002.

North Carolina Department of Environment and Natural Resources, *Guidelines for Assessment and Corrective Action, North Carolina Underground Storage Tank Section* (Effective July 1, 2001).

TABLES

TABLE 1
SUMMARY OF GROUNDWATER LABORATORY RESULTS
MADEP VPH/EPH

PP-3343, MCB Camp Lejeune

Well ID	Contaminant of Concern →		C_5-C_8 Aliphatics	C_9-C_{18} Aliphatics	C_{19}-C_{36} Aliphatics	C_9-C_{22} Aromatics
	Sample ID	Date Collected				
GCL (µg/L) **2L GWQS (µg/L)**			NE 420	NE 4,200	NE 42,000	NE 210
USTPP3343-DPT01	USTPP3343-DPT01	7/24/2007	<100	**26,183**	3,500	**11,223**

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

NE = None Established

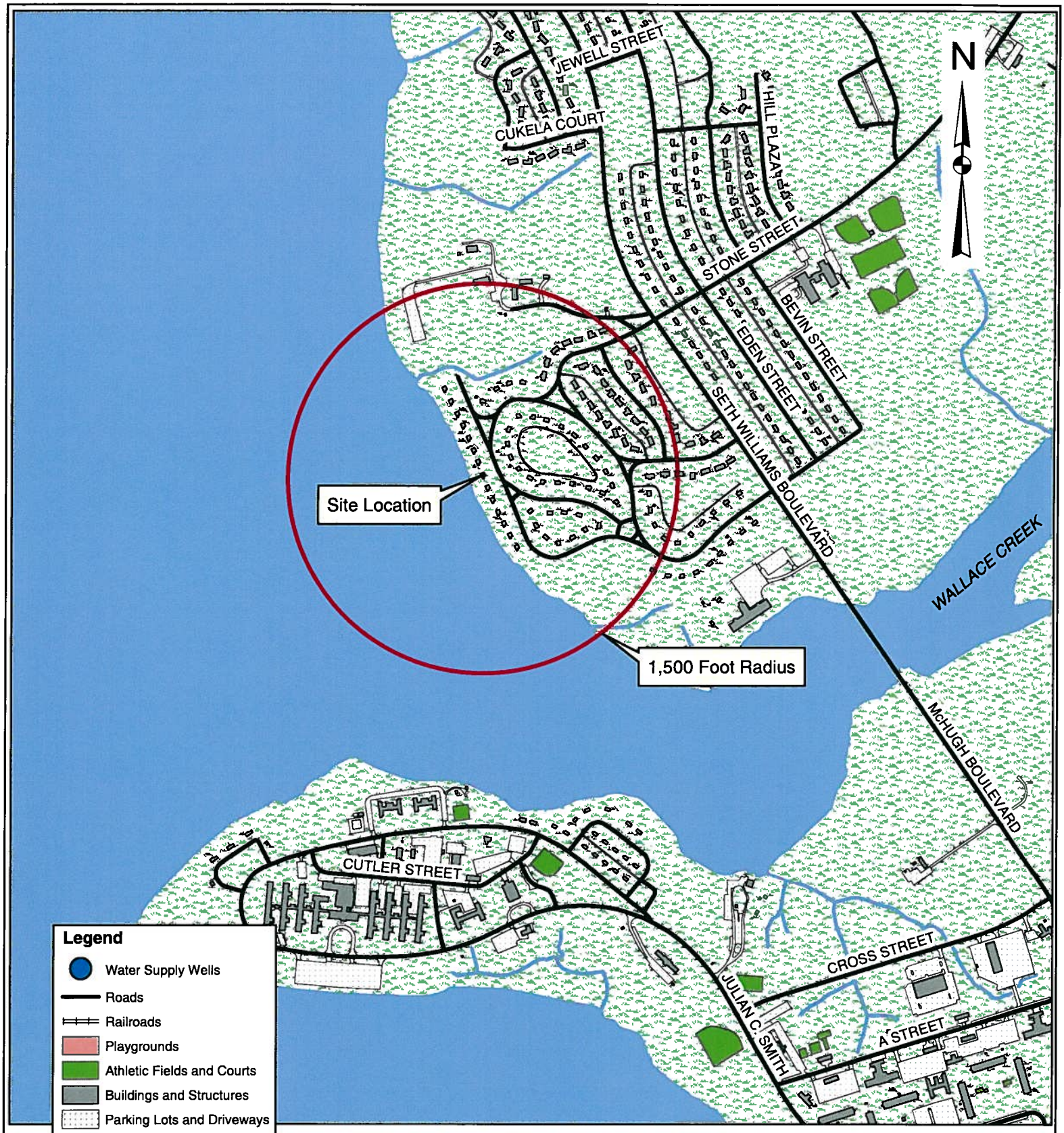
< = Less than method detection limit (MDL)

Bold results indicate concentrations above 2L GWQS or GCL

GCL = Gross Contaminant Level

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

FIGURES



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

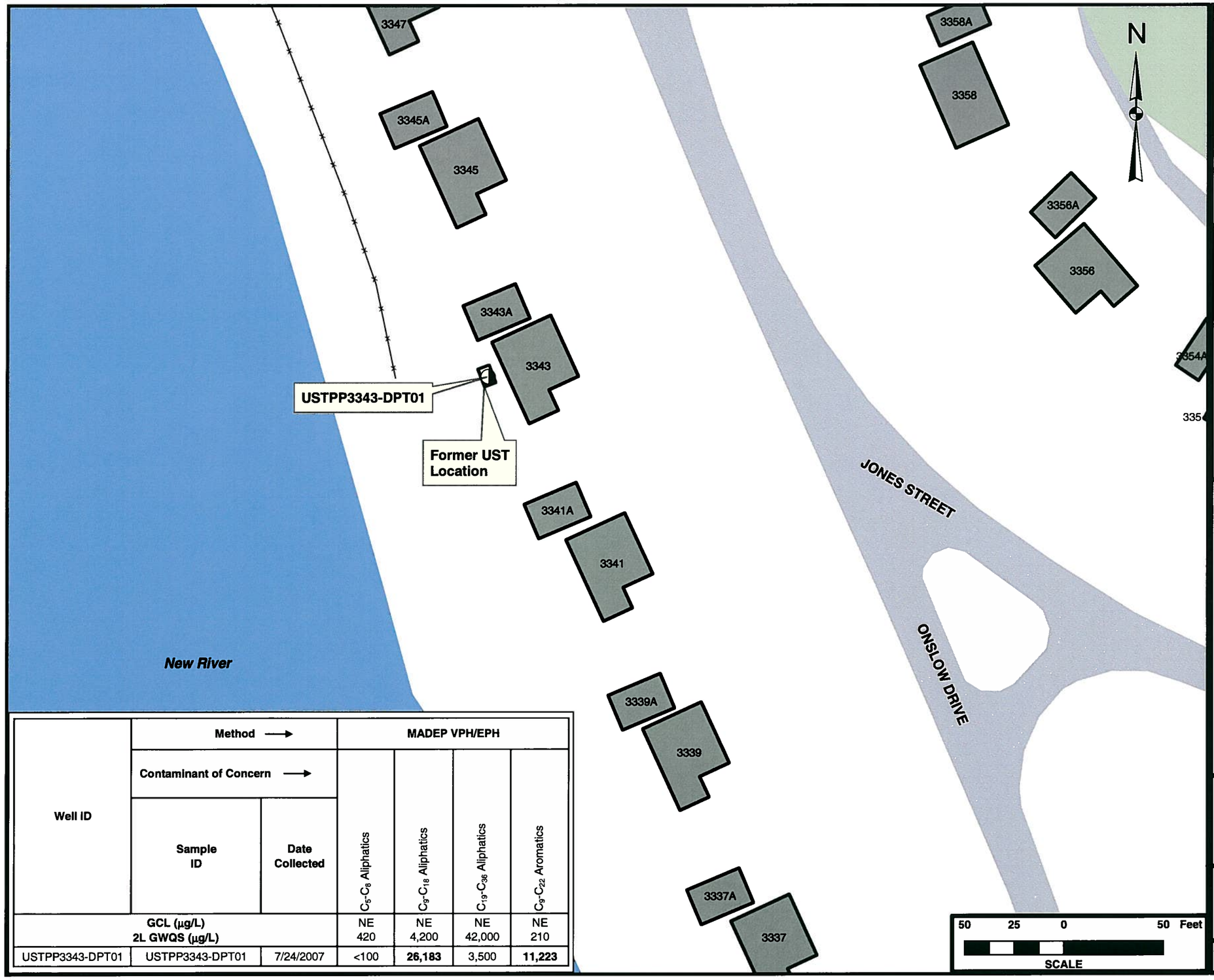
CATLIN ENGINEERS and SCIENTISTS

PROJECT	TITLE	FIGURE
GROUNDWATER SAMPLING REPORT OF FINDINGS SITE PP-3343 MARINE CORPS BASE CAMP LEJEUNE, NC	SITE LOCATION MAP	1

JOB NO.	DATE	SCALE	DRAWN BY	CHECKED BY
205-077	OCT 2007	AS SHOWN	SAC	MEM

GROUNDWATER SAMPLING REPORT OF FINDINGS SITE PP-3343 MCB CAMP LEJEUNE, NC

NAVFAC Naval Facilities Engineering Command



LEGEND

- DPT Well
- Water Supply Wells
- Above Ground Storage Tank
- Underground Storage Tank
- Railroad Tracks

Walls and Fences
- FENCE
- GATE
- WALL

- Buildings and Structures
- Demolished Structures
- Oil/Water Separators
- Slabs
- Roads
- Driveways
- Parking Lots
- Surface Water Bodies
- Creeks and Streams

Vegetation Cover
- Forestland
- Scrubland
- Wetland

Airfield Pavement
- HELIPAD
- RAMP
- RUNWAY
- SHLDR_OVERRUN
- TAXIWAY

NOTES

GIS data layers provided by the MCB Camp Lejeune GIS Department.

All results in micrograms per liter (ug/L)

NE = None Established

< = less than method detection limit

Bold results indicate concentration above 2L GWQS or GCL

GCL = Gross Contaminant Level

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

Well ID	Method →		MADEP VPH/EPH			
	Contaminant of Concern →		C_5-C_8 Aliphatics	C_9-C_{18} Aliphatics	C_{19}-C_{36} Aliphatics	C_9-C_{22} Aromatics
	Sample ID	Date Collected				
GCL (µg/L)			NE	NE	NE	NE
2L GWQS (µg/L)			420	4,200	42,000	210
USTPP3343-DPT01	USTPP3343-DPT01	7/24/2007	<100	**26,183**	3,500	**11,223**

CATLIN ENGINEERS and SCIENTISTS

SITE MAP WITH SUMMARY OF GROUNDWATER LABORATORY RESULTS

FIGURE 2

Job No.:	Date:	Scale:	Drawn By:	Checked By:
205-077	OCT 2007	AS SHOWN	SAC	MEM

APPENDICES

APPENDIX A

STANDARD PROCEDURES

CATLIN STANDARD METHODS OF INVESTIGATION

(REVISED APRIL 2002)

1.0 DATA COLLECTION

1.1 BACKGROUND DATA

Background data and history information relevant to the site investigation is generated through numerous sources. These sources may include, but are not limited to, the following:

- Conversations with the client and regulatory officials involved with the incident.
- Review of pertinent regulatory correspondence.
- Review of previous and existing reports and other technical data.
- Review of available historical records.

1.2 SURVEYS AND POTENTIAL RECEPTOR DATA

Physical survey and potential receptor data are collected in accordance with the intended level of investigation. In general, the purpose is to collect sufficient information for site assessment and corrective action planning.

Individual receptors are identified and evaluated in the context of their potential for contaminant impact. Potential receptors of contamination can include surface water bodies, groundwater supply wells, wellhead protection areas, and subsurface building structures.

1.2.1 Horizontal Survey

Horizontal survey data are generated using either accepted general field surveying techniques, or existing survey maps; or by using a combination of existing data and field generated information. The survey area generally extends to a point at least 50 feet beyond suspected plume boundaries. A receptor scale survey of a larger area surrounding a site will be made if appropriate and necessary.

1.2.2 Vertical Survey

A vertical survey is conducted at the site typically within an accuracy of 0.01 foot. The datum plane is generally assumed unless otherwise noted. Assumed temporary benchmarks (TBM) are selected near ground level. The vertical survey includes such points as top of all well casings, selected ground shots, important utility inverts, utility fluid levels, important surface water levels, and other items determined to be significant.

1.3 *DRILLING AND MONITORING WELL/PIEZOMETER INSTALLATION*

Necessary permits are applied for and obtained in accordance with federal, state, and local requirements prior to drilling or well construction activities. Additionally, the well locations are scanned for underground utilities prior to conducting intrusive subsurface activities. Wells are installed under applicable licensing requirements, and are designed and constructed in accordance with accepted standards and practices. Any wells purposely installed at off-site locations are permitted through appropriate right-of-entry agreements with all necessary property owners and/or their agents.

1.3.1 Drilling Methods and Subsurface Data Collection

Drilling is accomplished utilizing one or more of the following methods:

Auger Drilling

Auger drilling is the preferred, most often used method of subsurface investigation and is accomplished using a vehicle or trailer mounted drill rig. Continuous flight auger types used vary upon the site and situation; ranging from the 4-inch outside diameter solid stem to the 12-inch outside diameter hollow stem. Auger type is selected based upon appropriateness and/or site-specific requirements.

Hand Augering

Hand augering is utilized when economically and scientifically feasible, or when no other method is suitable. Hand augers typically produce three-inch diameter holes and are generally limited to depths of less than 15 feet.

Direct Push

Direct push methods of subsurface investigation are used generally for soil screening purposes or collection of groundwater samples where permanent wells are not viable.

Other Methods

Other drilling methods, such as mud and air rotary, rock coring, cable tool, and large bucket augering are used when site conditions or project requirements dictate.

Regardless of the drilling method used, the drill rig(s) and all drilling tools are thoroughly cleaned between boreholes to prevent cross introduction of contaminants. Split spoon samples are collected and field-described at intervals of five feet or less, and cuttings are continuously monitored for organic vapors. Drill cuttings are containerized for off-site disposal or are spread on the ground surface in proximity to the well or boring in accordance with North Carolina Department of Environment and Natural Resources (NCDENR) requirements. A geologist or engineer, trained in using visual/manual techniques, is always present during drilling and is

responsible for subsurface contaminant and geologic data collection. Soils are classified in general agreement with the Unified Soils Classification System (USCS).

1.3.2 Hydropunch Installation

Hydropunch penetrometers (Hydropunches) are used to delineate the spatial extent of dissolved and free phase plumes. Soil borings are advanced to the appropriate depth and then the Hydropunch is advanced through the soil boring into undisturbed material. Groundwater samples are collected by pulling back on the body of the Hydropunch and allowing the groundwater to enter the screened portion of the sample chamber. Samples are retrieved using a decontaminated Teflon bailer or peristaltic pump.

1.3.3 Well Installation

Wells are typically constructed of threaded PVC casing and screen. No glues or cements are used in joining PVC components. Well diameter, slot sizes, and protective covers vary depending upon site-specific conditions or situation-specific requirements.

1.3.4 Well Development

Wells are developed by over-pumping or surging using appropriate pumps, blocks, or bailers. Through development, unwanted fine materials are removed from the natural formation surrounding the well. Well development will be performed no sooner than 24-hours after grouting is completed for the Type III wells. Water generated during development is containerized and properly disposed or is discharged onto the ground in proximity of the well in accordance with NCDENR requirements.

1.4 HYDROGEOLOGIC DATA COLLECTION

Data used to help characterize hydrogeologic conditions at a site are obtained through various procedures including, but not necessarily limited to, those described below:

1.4.1 Regional Geology

Information pertaining to the regional geologic framework is compiled from existing publications, maps, and scientific papers.

1.4.2 Site Geology

Shallow site geology is generally determined from field descriptions and borehole samples. Interpretations with regard to hydrogeologically important contacts, zones, fractures, faults, cleavage, and facies changes are made when possible.

1.4.3 Groundwater Occurrence and Characteristics

Groundwater data is obtained utilizing a number of methods and procedures, not limited to the general list below:

Well Water Levels

After well development, wells are allowed to stabilize for a minimum of 24 hours prior to measuring. Water level and free product thickness (where applicable) measurements are performed using an electronic interface probe or steel tape with water/product finding pastes.

The specific gravity of any accumulated product is determined and used to calculate true hydraulic grade from measured water levels. This information is combined with vertical survey data to determine relative potentiometric surface elevations for all wells.

Aquifer Testing

Various aquifer tests may be used to make determinations of hydraulic conductivity. Slug or pumping tests are often used to characterize site hydrogeologic conditions and to develop remedial action alternatives utilizing appropriate pumping technologies.

Other Methods

Other methods may be deemed appropriate for determining various groundwater characteristics. These other methods may include nested well configurations and/or clustered piezometer installations; sieve or pipette analysis; fracture trace analysis; computer modeling; and geophysical logging.

1.5 PETROLEUM HYDROCARBON DATA COLLECTION

1.5.1 Collection Methods

Petroleum hydrocarbon data is obtained through various methods including, but not limited to, the following:

Field Analysis

- Direct thickness measurement of phase separated components using tapes and/or probes.
- Manual vapor analysis using a photoionization detector (PID) or flame ionization detector (FID).
- Detectable odor and visual observation.

Laboratory Analysis

- Laboratory analysis of phase-separated products.

- Laboratory vapor, soil, and groundwater analysis using appropriate EPA Methods.

1.5.2 Field Sampling

Field sampling procedures are performed in accordance with recommended protocol, accepted industry standards, and under appropriate chain-of-custody procedures. Generally, sampling procedures are as follows:

Product Samples

Product samples are obtained using clean equipment and containers. Each is shipped to the analytical laboratory in protective containers.

Vapor Samples

PID/FID readings are measured from soil sample headspace using containerized samples that have been brought to ambient temperature.

Carbon tubes are utilized in conjunction with a laboratory-calibrated vacuum pump to obtain vapor samples. The carbon tubes are sealed and refrigerated for shipment to the analytical laboratory (This method is known as the Carbon Adsorption Method).

Soil Samples

Soil samples are immediately packed into clean containers, and refrigerated for shipment to the analytical laboratory.

Groundwater Samples

Groundwater samples are collected in accordance with the following procedures:

- Creeks/Lakes/Etc.

  Grab samples are obtained.

- Domestic Wells

  Wells are pumped for a time sufficient to completely purge the well and any pressure or holding tanks prior to sampling.

- Monitoring Wells

  Water level measurements are made and well volumes calculated for each well.

  Three well volumes are removed from each well using a thoroughly cleaned Teflon bailer or appropriate purging pump. If it is not possible to

remove three volumes, due to very low yields, a minimum of one volume is removed prior to obtaining a sample.

Where analysis for metals is required, wells are typically sampled utilizing low flow techniques, which reduce turbidity and the potential for matrix interference.

Samples are collected and containerized in a manner that minimizes agitation and contact with the air.

Sampling records are field prepared.

Samples are labeled and proper Chain-of-Custody documents are maintained.

Samples are promptly protectively packed, refrigerated, and shipped to the analytical laboratory for analysis.

2.0 DATA EVALUATION

Data obtained as a result of the site investigation is compiled and evaluated and a report is prepared for client review and distribution to the appropriate agencies. Generally, specific data are evaluated as follows:

- Background data are evaluated in context with the suspected or confirmed problem.
- Survey data are utilized to develop site maps and to evaluate contaminant receptors.
- Well construction records are compiled and presented as part of the report. As-built information is used in combination with other data to evaluate subsurface conditions and monitoring well screen settings as they relate to the investigation.
- Subsurface drilling logs are used to develop geologic cross-sections, fence diagrams, isopaths, structure contours, or other constructions. Regional geologic data are used to obtain an overall framework.
- Hydrogeologic data are used to develop contour maps, flow nets and other constructions. The data is also used to calculate various hydrogeologic parameters that describe aquifer characteristics.
- Hydrocarbon data are utilized to develop various plume geometry and isoconcentration maps.
- All data are compiled and utilized for making specific recommendations with regard to remedial action alternatives.

APPENDIX B

BORING LOG

WELL LOG

CATLIN ENGINEERS and SCIENTISTS
205-077
Wilmington, NC

SHEET 1 OF 1

PROJECT NO.: 205-077	STATE: NC	COUNTY: Onslow	LOCATION: Jacksonville
PROJECT NAME: Lejuene LUR Sites	LOGGED BY: J Heter		WELL ID: USTPP3343-DPT01
	DRILLER: Bobbie D. Fowler		
NORTHING: 3840680.0	EASTING: 282982.8	CREW: T Stetler	
SYSTEM: UTM NAD83 (m)	BORING LOCATION: House #3343 backyard		T.O.C. ELEV.:
DRILL MACHINE: Hand Auger	METHOD: Hand Auger	0 HOUR DTW: 10.2	TOTAL DEPTH: 13.0
START DATE: 7/24/07	FINISH DATE: 7/24/07	24 HOUR DTW: NM	WELL DEPTH: 13.0

DEPTH	BLOW COUNT 6in / 6in / 6in / 6in	OVA (ppm)	LAB.	USCS	LOG	SOIL AND ROCK DESCRIPTION	WELL DETAIL
						0.0 LAND SURFACE	0.0
0.0		3.2		SP		Grass/organics. Brown fine SAND. Uniform. Loose. No odor. Moist.	0.0
2.0		0.0		SM		Light brown fine SAND overlying reddish-brown SILTY SAND. Loose.	
4.0		0.2		SP		Brown fine SAND. Medium dense. No odor. Moist.	1" Sch. 40 PVC
6.0		31.5		SM		Light brown SILTY SAND. Slight HCO odor.	
8.0		215.0		SC/CL		Brown SILTY SAND w/ gray SANDY CLAY to CLAYEY SAND. Strong HCO odor. Wet.	8.0
10.0		154.0		SP/CL		Brown to reddish-brown SANDY CLAY. HCO odor. Grading into reddish-brown fine SAND. Saturated @ 11.0'	1" Slot .010 Sch. 40 PVC
						12.0	13.0
						Boring Terminated at Depth 13.0 ft Fine SAND.	13.0

Bentonite Pellets

CATLIN BORING LOG 205-077 LEJUENE LUR SITES.GPJ TEST.GDT 8/20/07

APPENDIX C

LABORATORY ANALYTICAL REPORT AND CHAIN OF CUSTODY DOCUMENTATION

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

Report Number: G128-1993

Client Project: Lejuene LUR Sites

Dear Mr. 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 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/Paradigm at (910) 350-1903. We will be happy to answer any questions or concerns which you may have.

Thank you for using SGS/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,
SGS/Paradigm Analytical Laboratories, Inc.

8/10/2007

Laboratory Director — Date
J. Patrick Weaver

List of Reporting Abbreviations and Data Qualifiers

B = Compound also detected in batch blank

BQL = Below Quantitation 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 = 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.

EPH (Aliphatics/Aromatics) Results

by MDEP-EPH

Client Name: Richard Catlin & Associates

Project Name: Lejuene LUR Sites

Sample Information and Analytical Results	
Sample Identification	USTPP3343-DPT01
Sample Matrix	Water
Date Collected	07/24/07
Date Received	07/27/07
Date Extracted	07/31/07
Date Analyzed	08/03/07
Dry Weight	
Dilution Factor	10:1
C_9-C_{18} Aliphatics*	26000 (ug/L)
C_{19}-C_{36} Aliphatics*	3500 (ug/L)
C_{11}-C_{22} Aromatics*	11000 (ug/L)
Aliphatic Surrogate % Recovery	NA
Aromatic Surrogate % Recovery	92
Fractionation Surrogate 1 % Recovery	79

Comments:

* = Excludes any surrogates or internal standards.

NA = Non-applicable, surrogate diluted out.

Lab info: G128-1993-8D

Reviewed By:

VPH (Aliphatics/Aromatics) Laboratory Reporting Form

Client Name: Richard Catlin & Associates

Project Name: Lejuene LUR Sites

Sample Information	
Sample Identification	USTPP3343-DPT01
Sample Matrix	Water
Collection Option (for Soil)*	NA
Date Collected	07/24/07
Date Received	07/27/07
Date Extracted	08/02/07 19:16 - 08/02/07 19:16
Date Analyzed	08/02/07 19:16 - 08/02/07 19:16
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**	183	100	
C_9-C_{10} Aromatics**	223	100	

	Percent Recovery	Flags	Limits Lower	Limits Upper
Surrogate % Recovery - PID	108		70	130
Surrogate % Recovery - FID	105		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: g128-1993-8b	Lab Info: g128-1993-8b
FID Info: VP080207/022F0101.D	PID Info: VP080207/022R0101.D

Reviewed By:

SGS

CHAIN OF CUSTODY RECORD
SGS Environmental Services Inc.

Locations Nationwide
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- Hawaii
- Ohio
- Maryland
- New Jersey
- North Carolina
- West Virginia

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SGS ENVIRONMENTAL SERVICES, INC.

N.C. CERTIFICATION #481

(1) CLIENT: Catlin

CONTACT: Shane Chasteen PHONE NO:(910) 452-5801

PROJECT: Lejeune LUR sites SITE/PWSID#: 205-077

REPORTS TO: Shane Chasteen E-MAIL: FAX NO.:( )

INVOICE TO: Sheila Smith QUOTE # DOD 101 P.O. NUMBER 270726-1

SGS Reference: G128-1993

PAGE 1 OF 2

(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)	602 (add Naphthalene)	625 B/N/A + TICS	610	EPH	VPH					
	USTFC40-3-DPT01	7/27/07	1300	W	3	G		1			1	1					* Results in
	USTPP3311-DPT01	7/24/07	1430		5		3				1	1					Simmary + Lejeune
	USTPP3322-DPT01	7/27/07	1015		5		3				1	1					EDD format
	USTPP3326-DPT01	7/26/07	1045		3					1	1	1					
	USTPP3330-DPT01	7/26/07	1145		3					1	1	1					
	USTPP3332-DPT01	7/26/07	1225		3					1	1	1					
	USTPP3340-DPT01	7/27/07	1100		2						1	1					
	USTPP3343-DPT01	7/24/07	1330		2						1	1					
	USTPP3350-DPT01	7/26/07	1400		3					1	1	1					
	USTPP3354-DPT01	7/26/07	1445		5		3				1	1					

(5)

Collected/Relinquished By:(1)	Date	Time	Received By:	Date	Time
Justin Peters	7/27/07	1600		7/27/07	1600
Relinquished By: (2)	Date	Time	Received By:	Date	Time
Relinquished By: (3)	Date	Time	Received By:	Date	Time
Relinquished By: (4)	Date	Time	Received By:	Date	Time

(4)

Shipping Carrier:

Shipping Ticket No:

Samples Received Cold? (Circle) YES NO

Temperature °C: on ice 5.8, 5.6, 5.8°C

Special Deliverable Requirements:

Chain of Custody Seal: (Circle)

INTACT BROKEN ABSENT

Special Instructions:

Requested Turnaround Time:

☐ RUSH _____ Date Needed ☑ STD

☐ 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
☐ 1270 Greenbrier Street Charleston, WV 25311 Tel: (304) 346-0725 Fax: (304) 346-0761

White - Retained by Lab
Yellow - Returned with Report
Pink - Retained by Sampler

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SGS ENVIRONMENTAL SERVICES, INC.

N.C. CERTIFICATION #481

(1)

CLIENT: Catlin

CONTACT: Shane Chasteen PHONE NO:(910) 452.5861

PROJECT: Lejeune LU2 sites SITE/PWSID#: 205-077

REPORTS TO: Shane Chasteen E-MAIL:

FAX NO.:( )

INVOICE TO: Sheila Smith QUOTE # DOD 101

P.O. NUMBER 270726-1

SGS Reference:

PAGE 2 OF 2

(2)

LAB NO.	SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	No CONTAINERS	SAMPLE TYPE (C=COMP G=GRAB)	Preservatives Used	HCl	—	MeOH	HCl						REMARKS
							Analysis Required (3)	602 (add Naphthalene)	EPH	VPH	VPH						
	USTPP3354-DPT02	7/24/07	1230	S	3	G			1	2							* Results in
	Duplicate	7/27/07	1100	W	5	G	3				2						summary &
																	Lejeune EDD
																	format

(5)

Collected/Relinquished By:(1)	Date	Time	Received By:	Date	Time
Justin Hatcher	7/27/07	1600		7/27/07	1600
Relinquished By: (2)	Date	Time	Received By:	Date	Time
Relinquished By: (3)	Date	Time	Received By:	Date	Time
Relinquished By: (4)	Date	Time	Received By:	Date	Time

(4)

Shipping Carrier:

Shipping Ticket No:

Samples Received Cold? (Circle) YES NO

Temperature °C: ambient 5.8, 5.6, 5.9°C

Special Deliverable Requirements:

Chain of Custody Seal: (Circle)

INTACT BROKEN ABSENT

Special Instructions:

Requested Turnaround Time:

☐ RUSH _____ Date Needed ☑ STD

☐ 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
☐ 1270 Greenbrier Street Charleston, WV 25311 Tel: (304) 346-0725 Fax: (304) 346-0761

White - Retained by Lab
Yellow - Returned with Report
Pink - Retained by Sampler