REPORT OF FINDINGS
WITH SITE CLOSURE REQUEST

FOR

FC 40-3
MARINE CORPS BASE
CAMP LEJEUNE, NORTH CAROLINA

FACILITY ID#: E-002740
NCDENR UST INCIDENT NO. 24222
LAND USE CLASSIFICATION: INDUSTRIAL
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

TABLE OF CONTENTS

A. SITE IDENTIFICATION

DATE OF REPORT: October 31, 2007
Facility ID: E-002740 UST Incident Number (if known): 24222
Land Use Classification: Industrial Risk Classification: Low
Site Name: FC 40-3
Site Location: Building FC 40, Sneads Ferry Rd. 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) 451-9017

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: Combat Engineers Battalion, 2nd Marine Division

Address: Building 1800, Lewis Road Phone: (910) 451-9660

Consultant/Contractor: CATLIN Engineers and Scientists

Address: 220 Old Dairy Road, Wilmington, North Carolina 28405 Phone: (910) 452-5861

Release Information

Date Discovered: April 16, 2002
Longitude: W 77° 18' 55" **Latitude:** N 34° 39' 25"
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:

1,000-gallon Used Oil

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

On April 3, 2002 J.A. Jones Environmental Services Company (J.A. Jones) of Charlotte, North Carolina performed Underground Storage Tank (UST) excavation operations and removed one 1,000-gallon, double wall fiberglass UST from the site. The UST was reportedly utilized to store used oil generated during vehicle maintenance activities conducted at Building FC40. Two of six soil samples obtained from the tank basin during removal were indicative of a release. Samples FC-40-2 and FC-40-3 revealed concentrations of Total Petroleum Hydrocarbons (TPH) – Diesel Range Organics (DRO) of 92 mg/Kg and 120 mg/Kg, respectively both of which were above the State Action Level. To address these exceedances of the State Action Level, a soil sample was collected at each location and the samples were analyzed per EPA Method 8260, 8270 and MADEP VPH/EPH. The analytical results from the resampling event revealed no EPA Method 8260 or 8270 compounds above the laboratory detection limits. The C_{19}-C_{36} Aliphatics and C_9-C_{22} Aromatics hydrocarbon fractions per MADEP VPH/EPH were detected in both samples, however no concentrations exceeded the Residential Maximum Soil Contaminant Concentrations (MSCCs). Based on the results of the UST closure activities the North Carolina Department of Environment and Natural Resources (NCDENR) requested further investigation.

In March 2003, CATLIN Engineers and Scientists (CATLIN) conducted field work and sampling required by the NCDENR for a Phase I Limited Site Assessment (LSA). One soil sample and one groundwater sample were collected for laboratory analysis from a temporary boring/well. The soil sample was collected from beneath the former product line location. The soil sample results did not reveal any concentrations above the laboratory Practical Quantitation Limits (PQLs) except Lead and Chromium; however, Lead and Chromium concentrations were below the lowest Maximum Soil Contaminant Concentrations (MSCCs). The groundwater sample was collected from a temporary well in the former UST basin area. Groundwater sample analytical results revealed Bis(2-ethylhexyl)phthalate and C_9-C_{22} Aromatics above the North Carolina Administrative Code (NCAC) T15A:02L Groundwater Quality Standards (2L GWQS). Additionally, 0.5 µg/L of 4-Isopropyltoluene was identified in the groundwater sample collected from USTFC40-03-TW01. There is no current 2L GWQS, Gross Contaminant Level (GCL), or Interim GWQS (IGWQS) for this compound. The Phase I LSA Report dated June 20, 2003 concluded the site may be considered for No Further Action (NFA) status.

The NCDENR determined that the site met the criteria for Low Risk and Industrial Land Use. Further, based on historical soil and groundwater sample results, the site was eligible for NFA status with issuance of a Notice of Residual Petroleum (NRP) or Land Use Restriction (LUR) for the groundwater only.

In November 2004, CATLIN reassessed groundwater conditions at the site by collecting a groundwater sample using Direct Push Technology (DPT). Groundwater results were reviewed to determine if previously identified contaminant levels had attenuated to below the 2L GWQS. Bis(2-ethylhexlyl)phthalate and

MADEP hydrocarbon fractions concentrations, however, remained above standards. The purpose of the current investigation was to resample the site's groundwater to assess current groundwater conditions.

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 DPT boring advancement using an AMS PowerProbe™ 9600D (PowerProbe) on July 27, 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 USTFC40-3-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 27, 2007 utilizing a peristaltic pump and new polyethylene tubing. The groundwater sample was labeled USTFC40-3-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 procedures. A copy of the Chain-of-Custody (COC) is provided following the complete 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 per EPA Method 625 and MADEP VPH/EPH.

D. RESULTS

Field observations noted during soil boring advancement indicate site geology comprised of sand with gravel to approximately nine feet below land surface (BLS) and silty sand with some clay to 16 feet BLS. 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 USTFC40-3-DPT01 on July 27, 2007 was approximately 12 feet BLS.

Analytical results for the groundwater sample collected are included in Appendix C (Please note the sample from this site was included on the Chain-of-Custody with additional sites and therefore only the applicable pages from the lab report are included, and page numbers are not consecutive). The analytical results are summarized as follows:

EPA Method 625 +TICS

As indicated in Table 1 and illustrated on Figure 2, Bis(2-ethylhexyl)phthalate was detected at an estimated concentration of 3.6 ug/L in the USTFC40-3-DPT01 groundwater sample which is above the 2L GWQS of 2.5 ug/L. Diphenylamine and Naphthalene were detected at estimated concentrations of 1.9 ug/L and 5 ug/L, respectively. There is no established 2L GWQS or GCL for Diphenylamine and the 2L GWQS for Naphthalene is 21 ug/L. Diphenylamine is used as a fungicide and is an aromatic amine with the structural formula $(C_6H_5)_2NH$ and molecular formula $C_{12}H_{11}N$. A standards comparison can be made with the C_9-C_{22} Aromatic fraction class since both structures are based on the aromatic Benzene ring. When compared to the C_9-C_{22} Aromatic 2L GWQS of 210 µg/L, the detected Diphenylamine concentration is well below the 2L GWQS. No other EPA Method 625 compounds were detected above the laboratory Method Detection Limits (MDLs).

There were ten Tentatively Identified Compounds (TICs) identified in sample USTFC40-3-DPT01. TICs are 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 using a computerized library search of electron impact mass spectral data and evaluation of the relevant data by a mass spectral data specialist. Quantitation was accomplished by relative peak height 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 height is equal to or greater than 10% of that of the nearest internal standard. The quantitation standard provided is an estimate. For all TICs identified, there are no established standards. Compounds found in the library search are located in the laboratory reports included in Appendix C.

MADEP VPH/EPH

As indicated in Table 2 and illustrated on Figure 2, the C_{19}-C_{36} Aliphatics were detected at a concentration of 5,000 ug/L which is below the 2L GWQS of 42,000

ug/L. No other MADEP VPH/EPH compounds were detected above the laboratory MDLs.

E. CONCLUSIONS AND RECOMMENDATIONS

The groundwater analytical results from the current sampling event revealed Bis(2-ethylhexyl)phthalate at an estimated concentration slightly above the 2L GWQS. However, it should be noted that Bis(2-ethylhexyl)phthalate is not a petroleum-related compound. This compound is commonly used in plastics as a plasticizing agent. The occurrence of this compound is likely the result of sampling/laboratory artifact, resulting from the use of plastic sampling equipment and/or analytical instrument tubing. No other contaminants were detected at concentrations above any established 2L GWQS. Therefore, CATLIN recommends NFA status for this site without LUR.

F. REFERENCES

CATLIN Engineers and Scientists, *LUST Phase I Limited Site Assessment Report for FC 40-3, MCB Camp Lejeune, NC,* June 20, 2003.

CATLIN Engineers and Scientists, *Groundwater Sampling Report of Findings for FC 40-3, Marine Corps Base Camp Lejeune, North Carolina,* May 10, 2005.

J.A. Jones Environmental Services Company. *Underground Storage Tank Closure Report, UST FC40-3, MCB Camp Lejeune, NC,* June 6, 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
EPA METHOD 625

FC40-3, MCB Camp Lejeune

Well ID	Contaminant of Concern →		Bis(2-ethylhexyl)phthalate	Diphenylamine	Naphthalene	All Other EPA Method 625 Compounds
	Sample ID	Date Collected				
GCL (µg/L)			2,500	NE	15,500	Varies
2L GWQS (µg/L)			2.5	NE	21	Varies
USTFC40-3-DPT01	USTFC40-3-DPT01	7/27/2007	**3.60 J**	1.90 J	5.00 J	BMDL

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

BMDL = Below Method Detection Limit

NE = None Established

J = Estimated concentration, below calibration range and above MDL

Bold results indicate concentrations above 2L GWQS or GCL

GCL = Gross Contaminant Level

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

TABLE 2
SUMMARY OF GROUNDWATER LABORATORY RESULTS
MADEP VPH/EPH

FC40-3, MCB Camp Lejeune

Well ID	Contaminant of Concern →		C5-C8 Aliphatics	C9-C18 Aliphatics	C19-C36 Aliphatics	C9-C22 Aromatics
	Sample ID	Date Collected				
GCL (µg/L) 2L GWQS (µg/L)			NE 420	NE 4,200	NE 42,000	NE 210
USTFC40-3-DPT01	USTFC40-3-DPT01	7/27/2007	<100	<200	5,000	<200

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

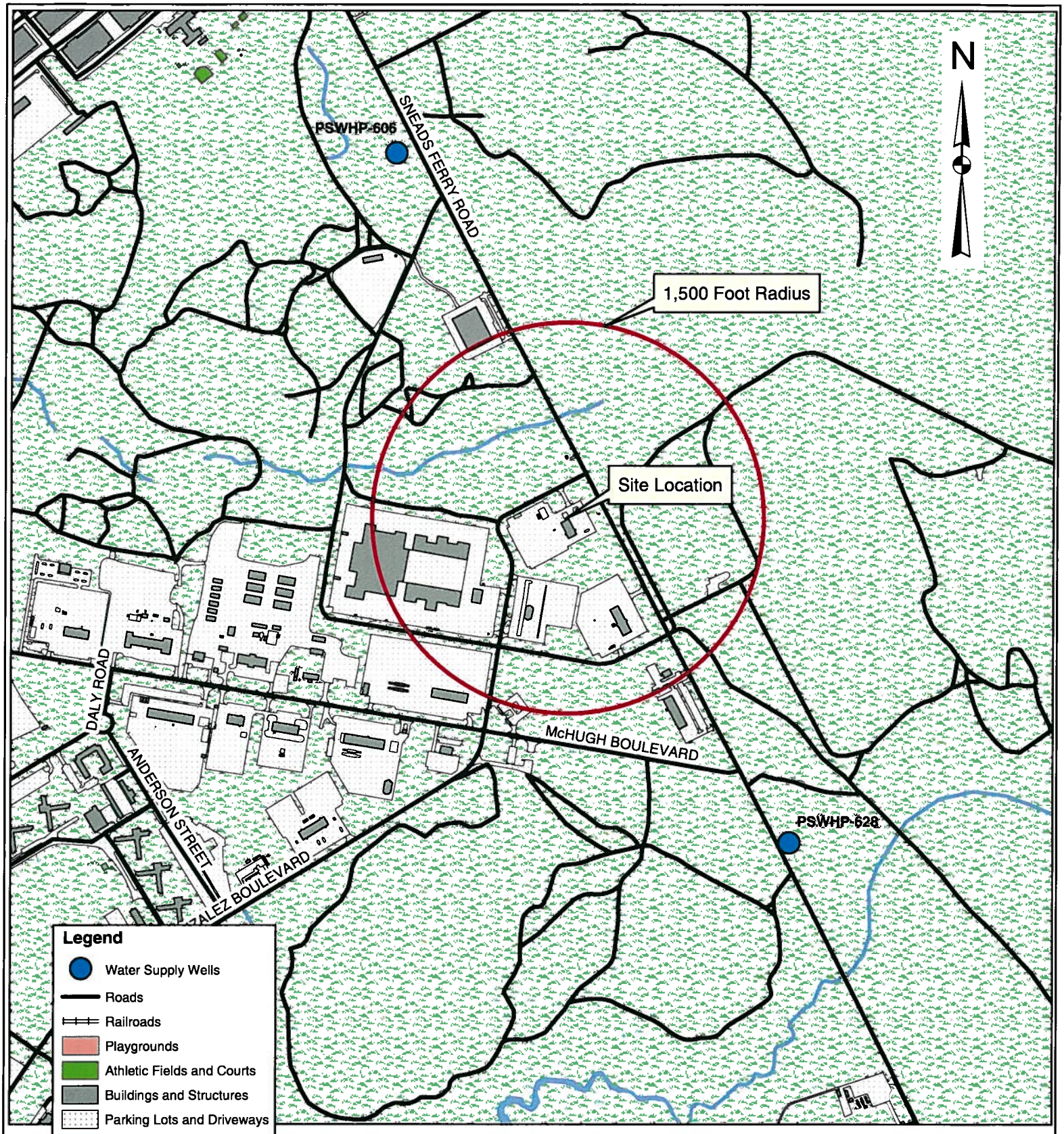
NE = None Established

GCL = Gross Contaminant Level

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

< = Less than method detection limit

FIGURES



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

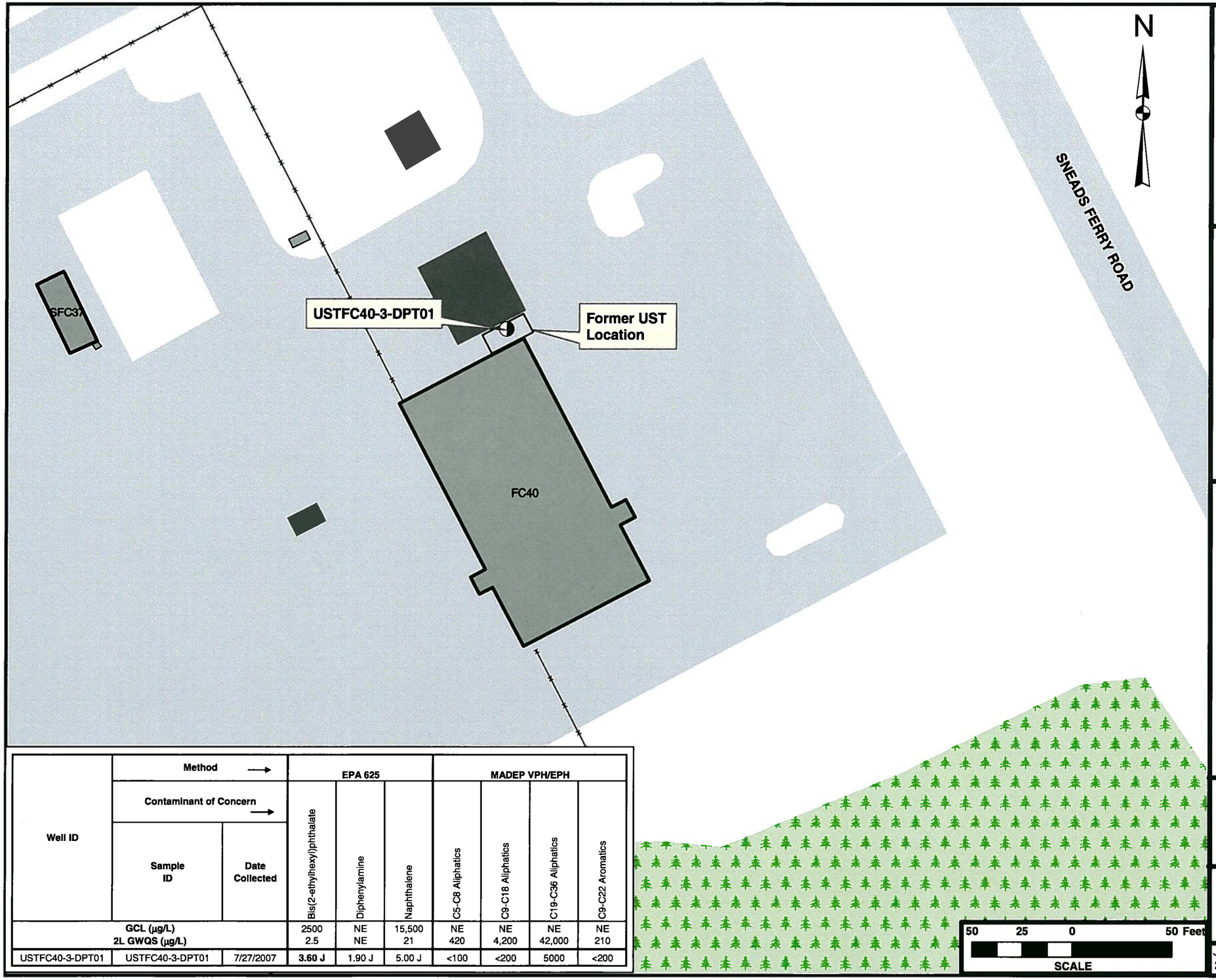
CATLIN ENGINEERS and SCIENTISTS

PROJECT	TITLE	FIGURE
REPORT OF FINDINGS WITH SITE CLOSURE REQUEST SITE FC40-3 MARINE CORPS BASE CAMP LEJEUNE, NC	SITE LOCATION MAP	1

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

REPORT OF FINDINGS WITH SITE CLOSURE REQUEST SITE FC40-3 MCB CAMP LEJEUNE, NC

NAVFAC Naval Facilities Engineering Command



LEGEND

- DPT Well Location
- 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)

BMDL = Below Method Detection Limit

NE = None Established

J = Estimated concentration, below calibration range and above MDL

< = Less than MDL

Bold results indicate concentration above 2L GWQS or GCL

GCL = Gross Contaminant Level

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

Well ID	Method →		EPA 625			MADEP VPH/EPH			
	Contaminant of Concern →		Bis(2-ethylhexyl)phthalate	Diphenylamine	Naphthalene	C5-C8 Aliphatics	C9-C18 Aliphatics	C19-C36 Aliphatics	C9-C22 Aromatics
	Sample ID	Date Collected							
GCL (µg/L)			2500	NE	15,500	NE	NE	NE	NE
2L GWQS (µg/L)			2.5	NE	21	420	4,200	42,000	210
USTFC40-3-DPT01	USTFC40-3-DPT01	7/27/2007	**3.60 J**	1.90 J	5.00 J	<100	<200	5000	<200

CATLIN ENGINEERS and SCIENTISTS

SITE MAP WITH SUMMARY OF GROUNDWATER LABORATORY RESULTS

FIGURE 2

Job No.:	Date:	Scale:	Drawn By:	Checked By:
205-077	SEPT 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

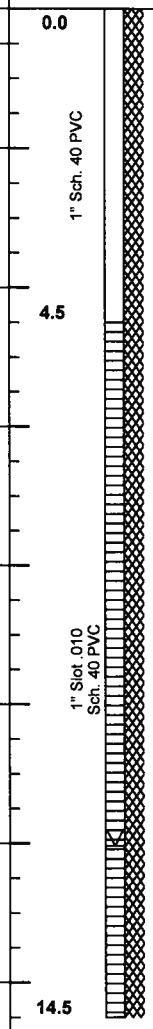
CATLIN ENGINEERS and SCIENTISTS
205-077
Wilmington, NC

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: USTFC40-3-DPT01
	DRILLER: Bobbie D. Fowler		
NORTHING: 3837432.4	EASTING: 287816.9	CREW: T Stetler	
SYSTEM: UTM NAD83 (m)	BORING LOCATION: B/w wall and gas pump		T.O.C. ELEV.:
DRILL MACHINE: Power Probe	METHOD: Direct Push	0 HOUR DTW: 12.0	TOTAL DEPTH: 16.0
START DATE: 7/27/07	FINISH DATE: 7/27/07	24 HOUR DTW: NM	WELL DEPTH: 14.5

DEPTH	BLOW COUNT 6in 6in 6in 6in	OVA (ppm)	LAB.	USCS	LOG	DEPTH	SOIL AND ROCK DESCRIPTION
						0.0	LAND SURFACE
0.0		0.0		GW		0.5	Asphalt 6"
				GW		2.0	Brown fine to coarse SAND. Dry.
2.0		0.0		SW		4.0	S.A.A. w/ trace CLAY.
4.0		0.0		SW		6.0	Brown fine SAND w/ large gravel. GRAVELLY SAND
6.0		0.0		SW		8.0	S.A.A.
8.0		1.5		SW/ SC		10.0	S.A.A. for 12" then grades into gray CLAYEY SAND. Organic odor. Wet @9.0'
10.0		36.6		SM		12.0	Gray SILTY SAND w/ few CLAY. Similar odor but stronger. Wet.
12.0		28.4		SM		14.0	S.A.A. but saturated.
14.0		0.0		SM		16.0	Tan SILTY SAND. Uniform. Medium dense. Saturated.
							Boring Terminated at Depth 16.0 ft SILTY SAND.

WELL DETAIL



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.

Results for Semivolatiles by GCMS 625

Client Sample ID: USTFC40-3-DPT01
Client Project ID: Lejuene LUR Sites
Lab Sample ID: G128-1993-1F
Lab Project ID: G128-1993

Analyzed By: EAW
Date Collected: 7/27/2007 13:00
Date Received: 7/27/2007
Date Extracted: 7/31/2007
Matrix: Water

Compound	Result ug/L	RL ug/L	MDL ug/L	Dilution Factor	Date Analyzed	Flag
Acenaphthene	BQL	10.0	1.22	1	8/3/2007	
Acenaphthylene	BQL	10.0	1.12	1	8/3/2007	
Anthracene	BQL	10.0	1.75	1	8/3/2007	
Benzo[a]anthracene	BQL	10.0	1.36	1	8/3/2007	
Benzo[a]pyrene	BQL	10.0	1.27	1	8/3/2007	
Benzo[b]fluoranthene	BQL	10.0	1.43	1	8/3/2007	
Benzo[g,h,i]perylene	BQL	10.0	4.57	1	8/3/2007	
Benzo[k]fluoranthene	BQL	10.0	1.09	1	8/3/2007	
Bis(2-chloroethoxy)methane	BQL	10.0	1.11	1	8/3/2007	
Bis(2-chloroethyl)ether	BQL	10.0	1.09	1	8/3/2007	
Bis(2-chloroisopropyl)ether	BQL	10.0	1.57	1	8/3/2007	
Bis(2-ethylhexyl)phthalate	**3.60**	10.0	1.33	1	8/3/2007	J
4-bromophenyl phenyl ether	BQL	10.0	1.99	1	8/3/2007	
Butylbenzylphthalate	BQL	10.0	1.53	1	8/3/2007	
2-Chloronaphthalene	BQL	10.0	1.25	1	8/3/2007	
2-Chlorophenol	BQL	10.0	4.22	1	8/3/2007	
4-Chloro-3-methylphenol	BQL	10.0	3.26	1	8/3/2007	
4-Chlorophenyl phenyl ether	BQL	10.0	1.42	1	8/3/2007	
Chrysene	BQL	10.0	1.11	1	8/3/2007	
Dibenzo[a,h]anthracene	BQL	10.0	4.87	1	8/3/2007	
Di-n-Butylphthalate	BQL	10.0	1.65	1	8/3/2007	
3,3'-Dichlorobenzidine	BQL	20.0	4.10	1	8/3/2007	
2,4-Dichlorophenol	BQL	10.0	3.75	1	8/3/2007	
Diethylphthalate	BQL	10.0	1.48	1	8/3/2007	
Dimethylphthalate	BQL	10.0	1.04	1	8/3/2007	
2,4-Dimethylphenol	BQL	10.0	9.25	1	8/3/2007	
Di-n-octylphthalate	BQL	10.0	1.16	1	8/3/2007	
4,6-Dinitro-2-methylphenol	BQL	50.0	3.71	1	8/3/2007	
2,4-Dinitrophenol	BQL	50.0	4.20	1	8/3/2007	
2,4-Dinitrotoluene	BQL	10.0	1.52	1	8/3/2007	
2,6-Dinitrotoluene	BQL	10.0	1.41	1	8/3/2007	
Diphenylamine *	**1.90**	10.0	1.53	1	8/3/2007	J
Fluoranthene	BQL	10.0	1.41	1	8/3/2007	
Fluorene	BQL	10.0	1.22	1	8/3/2007	
Hexachlorobenzene	BQL	10.0	1.22	1	8/3/2007	
Hexachlorobutadiene	BQL	10.0	1.58	1	8/3/2007	
Hexachlorocyclopentadiene	BQL	20.0	20.0	1	8/3/2007	
Hexachloroethane	BQL	10.0	1.58	1	8/3/2007	
Indeno(1,2,3-c,d)pyrene	BQL	10.0	4.57	1	8/3/2007	
Isophorone	BQL	10.0	1.27	1	8/3/2007	
Naphthalene	**5.00**	10.0	1.08	1	8/3/2007	J
Nitrobenzene	BQL	10.0	1.32	1	8/3/2007	
2-Nitrophenol	BQL	10.0	3.52	1	8/3/2007	
4-Nitrophenol	BQL	50.0	3.17	1	8/3/2007	
N-Nitrosodi-n-propylamine	BQL	10.0	1.87	1	8/3/2007	
Pentachlorophenol	BQL	50.0	2.83	1	8/3/2007	
Phenanthrene	BQL	10.0	1.38	1	8/3/2007	

Results for Semivolatiles
by GCMS 625

Client Sample ID: USTFC40-3-DPT01
Client Project ID: Lejuene LUR Sites
Lab Sample ID: G128-1993-1F
Lab Project ID: G128-1993

Analyzed By: EAW
Date Collected: 7/27/2007 13:00
Date Received: 7/27/2007
Date Extracted: 7/31/2007
Matrix: Water

Compound	Result ug/L	RL ug/L	MDL ug/L	Dilution Factor	Date Analyzed	Flag
Phenol	BQL	10.0	3.38	1	8/3/2007	
Pyrene	BQL	10.0	2.08	1	8/3/2007	
1,2,4-Trichlorobenzene	BQL	10.0	1.33	1	8/3/2007	
2,4,6-Trichlorophenol	BQL	10.0	2.92	1	8/3/2007	

	Spike Added	Spike Result	Percent Recovered
2-Fluorobiphenyl	10	6.6	66
2-Fluorophenol	10	7.3	73
Nitrobenzene-d5	10	7.6	76
Phenol-d6	10	7.6	76
2,4,6-Tribromophenol	10	9.6	96
4-Terphenyl-d14	10	4.5	45

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

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

Reviewed By: _____

SGS ENVIRONMENTAL SERVICES, INC.

Results of Library Search for Semivolatile Compounds

by GCMS

Client Sample ID: USTFC40-3-DPT01
Client Project ID: Lejuene LUR Sites
Lab Sample ID: G128-1993-1F
Lab Project ID: G128-1993
Sample Wt/Vol: 500 ML
Dilution: 1

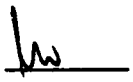
Analyzed By: EAW
Date Collected: 7/27/2007 13:00
Date Received: 7/27/2007
Date Extracted: 7/31/2007
Date Analyzed: 8/6/2007
Matrix: Water

No.	Compound	Retention Time	CAS#	Match Probability	Result (ug/L)
1	Unknown	11.47			48.7
2	Unknown	7.14			42
3	Unknown	11.25			37.7
4	Unknown	12.26			26.3
5	Unknown	9.50			19
6	1-Heptanol, 6-methyl-	6.70	001653-40-3	90	17.7
7	Unknown	11.12			16.9
8	Ester, Unknown	12.87			15.3
9	Pentadecane	14.70	000629-62-9	93	15
10	Eicosane	15.36	000112-95-8	98	14.6

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: 

Results for Semivolatiles by GCMS 625

Client Sample ID: Method Blank
Client Project ID:
Lab Sample ID: PB8762
Lab Project ID:

Analyzed By: EAW
Date Collected:
Date Received:
Date Extracted: 7/31/2007
Matrix: WATER

Compound	Result ug/L	RL ug/L	MDL ug/L	Dilution Factor	Date Analyzed	Flag
Acenaphthene	BQL	10.0	1.22	1	8/2/2007	
Acenaphthylene	BQL	10.0	1.12	1	8/2/2007	
Anthracene	BQL	10.0	1.75	1	8/2/2007	
Benzo[a]anthracene	BQL	10.0	1.36	1	8/2/2007	
Benzo[a]pyrene	BQL	10.0	1.27	1	8/2/2007	
Benzo[b]fluoranthene	BQL	10.0	1.43	1	8/2/2007	
Benzo[g,h,i]perylene	BQL	10.0	4.57	1	8/2/2007	
Benzo[k]fluoranthene	BQL	10.0	1.09	1	8/2/2007	
Bis(2-chloroethoxy)methane	BQL	10.0	1.11	1	8/2/2007	
Bis(2-chloroethyl)ether	BQL	10.0	1.09	1	8/2/2007	
Bis(2-chloroisopropyl)ether	BQL	10.0	1.57	1	8/2/2007	
Bis(2-ethylhexyl)phthalate	BQL	10.0	1.33	1	8/2/2007	
4-bromophenyl phenyl ether	BQL	10.0	1.99	1	8/2/2007	
Butylbenzylphthalate	BQL	10.0	1.53	1	8/2/2007	
2-Chloronaphthalene	BQL	10.0	1.25	1	8/2/2007	
2-Chlorophenol	BQL	10.0	4.22	1	8/2/2007	
4-Chloro-3-methylphenol	BQL	10.0	3.26	1	8/2/2007	
4-Chlorophenyl phenyl ether	BQL	10.0	1.42	1	8/2/2007	
Chrysene	BQL	10.0	1.11	1	8/2/2007	
Dibenzo[a,h]anthracene	BQL	10.0	4.87	1	8/2/2007	
Di-n-Butylphthalate	BQL	10.0	1.65	1	8/2/2007	
3,3'-Dichlorobenzidine	BQL	20.0	4.10	1	8/2/2007	
2,4-Dichlorophenol	BQL	10.0	3.75	1	8/2/2007	
Diethylphthalate	BQL	10.0	1.48	1	8/2/2007	
Dimethylphthalate	BQL	10.0	1.04	1	8/2/2007	
2,4-Dimethylphenol	BQL	10.0	9.25	1	8/2/2007	
Di-n-octylphthalate	BQL	10.0	1.16	1	8/2/2007	
4,6-Dinitro-2-methylphenol	BQL	50.0	3.71	1	8/2/2007	
2,4-Dinitrophenol	BQL	50.0	4.20	1	8/2/2007	
2,4-Dinitrotoluene	BQL	10.0	1.52	1	8/2/2007	
2,6-Dinitrotoluene	BQL	10.0	1.41	1	8/2/2007	
Diphenylamine *	BQL	10.0	1.53	1	8/2/2007	
Fluoranthene	BQL	10.0	1.41	1	8/2/2007	
Fluorene	BQL	10.0	1.22	1	8/2/2007	
Hexachlorobenzene	BQL	10.0	1.22	1	8/2/2007	
Hexachlorobutadiene	BQL	10.0	1.58	1	8/2/2007	
Hexachlorocyclopentadiene	BQL	20.0	20.0	1	8/2/2007	
Hexachloroethane	BQL	10.0	1.58	1	8/2/2007	
Indeno(1,2,3-c,d)pyrene	BQL	10.0	4.57	1	8/2/2007	
Isophorone	BQL	10.0	1.27	1	8/2/2007	
Naphthalene	BQL	10.0	1.08	1	8/2/2007	
Nitrobenzene	BQL	10.0	1.32	1	8/2/2007	
2-Nitrophenol	BQL	10.0	3.52	1	8/2/2007	
4-Nitrophenol	BQL	50.0	3.17	1	8/2/2007	
N-Nitrosodi-n-propylamine	BQL	10.0	1.87	1	8/2/2007	
Pentachlorophenol	BQL	50.0	2.83	1	8/2/2007	
Phenanthrene	BQL	10.0	1.38	1	8/2/2007	

Results for Semivolatiles
by GCMS 625

Client Sample ID: Method Blank
Client Project ID:
Lab Sample ID: PB8762
Lab Project ID:

Analyzed By: EAW
Date Collected:
Date Received:
Date Extracted: 7/31/2007
Matrix: WATER

Compound	Result ug/L	RL ug/L	MDL ug/L	Dilution Factor	Date Analyzed	Flag
Phenol	BQL	10.0	3.38	1	8/2/2007	
Pyrene	BQL	10.0	2.08	1	8/2/2007	
1,2,4-Trichlorobenzene	BQL	10.0	1.33	1	8/2/2007	
2,4,6-Trichlorophenol	BQL	10.0	2.92	1	8/2/2007	

	Spike Added	Spike Result	Percent Recovered
2-Fluorobiphenyl	10	7.6	76
2-Fluorophenol	10	7.2	73
Nitrobenzene-d5	10	7.8	78
Phenol-d6	10	7.8	78
2,4,6-Tribromophenol	10	8.2	82
4-Terphenyl-d14	10	9.2	92

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

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

Reviewed By:

EPH (Aliphatics/Aromatics) Results

by MDEP-EPH

Client Name: Richard Catlin & Associates

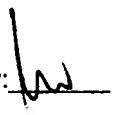
Project Name: Lejuene LUR Sites

Sample Information and Analytical Results	
Sample Identification	USTFC40-3-DPT01
Sample Matrix	Water
Date Collected	07/27/07
Date Received	07/27/07
Date Extracted	07/31/07
Date Analyzed	08/02/07
Dry Weight	
Dilution Factor	2:1
C_9-C_{18} Aliphatics*	< 200 (ug/L)
C_{19}-C_{36} Aliphatics*	5000 (ug/L)
C_{11}-C_{22} Aromatics*	< 100 (ug/L)
Aliphatic Surrogate % Recovery	66
Aromatic Surrogate % Recovery	65
Fractionation Surrogate 1 % Recovery	42

Comments:

* = Excludes any surrogates or internal standards.

Lab info: G128-1993-1E

Reviewed By: 

VPH (Aliphatics/Aromatics) Laboratory Reporting Form

Client Name: Richard Catlin & Associates

Project Name: Lejuene LUR Sites

Sample Information	
Sample Identification	USTFC40-3-DPT01
Sample Matrix	Water
Collection Option (for Soil)*	NA
Date Collected	07/27/07
Date Received	07/27/07
Date Extracted	08/02/07 16:27 - 08/02/07 16:27
Date Analyzed	08/02/07 16:27 - 08/02/07 16:27
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	108		70	130
Surrogate % Recovery - FID	100		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: g128-1993-1b	Lab Info: g128-1993-1b
FID Info: VP080207/016F0101.D	PID Info: VP080207/016R0101.D

Reviewed By:

SGS

CHAIN OF CUSTODY RECORD
SGS Environmental Services Inc.

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

www.us.sgs.com

078474

SGS ENVIRONMENTAL SERVICES, INC.

N.C. CERTIFICATION #481

(1)
CLIENT: Catlin
CONTACT: Shane Chasteen PHONE NO:(910) 452-5861
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					Summary + 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 Yates	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 5.4°
Special Deliverable Requirements:
Chain of Custody Seal: (Circle)
INTACT BROKEN ABSENT
Special Instructions:
Requested Turnaround Time:
☐ RUSH _____ Date Needed ☑ STD

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

SGS

CHAIN OF CUSTODY RECORD
SGS Environmental Services Inc.

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

www.us.sgs.com

078473

SGS ENVIRONMENTAL SERVICES, INC.

N.C. CERTIFICATION #481

(1)
CLIENT: Catlin
CONTACT: Shane Chasteen PHONE NO:(910) 452.5861
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:

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 Hotes	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: 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

SGS

☐ 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