

PHASE I LIMITED SITE ASSESSMENT REPORT

FOR

**BUILDING A-13/SA-2
MAINTENANCE SHED
MARINE CORPS BASE
CAMP LEJEUNE, NORTH CAROLINA**

**NCDENR UST INCIDENT NO. 22822
LAND USE CLASSIFICATION: PENDING
RISK CLASSIFICATION: PENDING**

JANUARY 18, 2008

**CONTRACT NO. N62470-05-D-6200
DELIVERY ORDER NO. 0049
CATLIN PROJECT NO. 207-048**



PREPARED BY:

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

TABLE OF CONTENTS

	<u>PAGE</u>
LIST OF ACRONYMS	i
PURPOSE OF INVESTIGATION	iv
A. SITE IDENTIFICATION	1
B. RISK CHARACTERIZATION	2
C. RECEPTOR INFORMATION	6
D. SITE GEOLOGY AND HYDROGEOLOGY	8
E. SAMPLING RESULTS	9
F. CONCLUSIONS AND RECOMMENDATIONS	13
G. REFERENCES	16

TABLES

TABLE 1	UST SYSTEM INFORMATION
TABLE 2	UST OWNER/OPERATOR INFORMATION
TABLE 3	WELL CONSTRUCTION INFORMATION
TABLE 4A	SUMMARY OF SOIL LABORATORY RESULTS – EPA METHOD 8260 + IPE + MTBE
TABLE 4B	SUMMARY OF SOIL LABORATORY RESULTS – EPA METHOD 8270 + TICS
TABLE 4C	SUMMARY OF SOIL LABORATORY RESULTS – MADEP VPH/EPH
TABLE 4D	SUMMARY OF SOIL LABORATORY RESULTS – MADEP VPH/EPH AS COMPARED TO NCDENR MSCCs
TABLE 4E	SUMMARY OF SOIL LABORATORY RESULTS – STANDARD METHOD 3030C
TABLE 5A	SUMMARY OF GROUNDWATER LABORATORY RESULTS – STANDARD METHOD 6210D
TABLE 5B	SUMMARY OF GROUNDWATER LABORATORY RESULTS – EPA METHOD 625 + TICS
TABLE 5C	SUMMARY OF GROUNDWATER LABORATORY RESULTS – MADEP VPH/EPH
TABLE 5D	SUMMARY OF GROUNDWATER LABORATORY RESULTS – MADEP VPH/EPH AS COMPARED TO NCDENR 2L GWQS
TABLE 5E	SUMMARY OF GROUNDWATER LABORATORY RESULTS – STANDARD METHOD 3030C

TABLE OF CONTENTS (continued)

FIGURES

FIGURE 1	1500 FT RADIUS WITH WATER SUPPLY WELL SURVEY AND PLACES OF PUBLIC ASSEMBLY
FIGURE 2	SITE PLAN WITH SITE UTILITIES AND BORING/MONITORING WELL LOCATION
FIGURE 3A	SITE PLAN WITH SOIL LABORATORY RESULTS - EPA METHOD 8260 + IPE + MTBE
FIGURE 3B	SITE PLAN WITH SOIL LABORATORY RESULTS - EPA METHOD 8270 + TICS
FIGURE 3C	SITE PLAN WITH SOIL LABORATORY RESULTS - MADEP VPH/EPH
FIGURE 3D	SITE PLAN WITH SOIL LABORATORY RESULTS - STANDARD METHOD 3030C
FIGURE 4A	SITE PLAN WITH GROUNDWATER LABORATORY RESULTS - STANDARD METHOD 6210D
FIGURE 4B	SITE PLAN WITH GROUNDWATER LABORATORY RESULTS - EPA METHOD 625 + TICS
FIGURE 4C	SITE PLAN WITH GROUNDWATER LABORATORY RESULTS - MADEP VPH/EPH
FIGURE 4D	SITE PLAN WITH GROUNDWATER LABORATORY RESULTS - STANDARD METHOD 3030C

APPENDICES

APPENDIX A	BORING LOGS, MONITORING WELL AS-BUILTS, AND NORTH CAROLINA WELL CONSTRUCTION RECORDS
APPENDIX B	CATLIN STANDARD METHODS OF INVESTIGATION
APPENDIX C	SAMPLING FIELD DATA WORKSHEET
APPENDIX D	LABORATORY REPORTS AND CHAIN-OF-CUSTODY DOCUMENTATION

LIST OF ACRONYMS

2000 Guidelines	Groundwater Section Guidelines for Investigation and Remediation of Soil and Groundwater
2001 Guidelines	Guidelines for Assessment and Corrective Action, North Carolina Underground Storage Tank Section (Effective July 1, 2001)
2L GWQS	NCAC T15A:02L Groundwater Quality Standards
ARO	Asheville Regional Office
AS	Air Sparge
AST	Aboveground Storage Tank
BDL	Below Detection Limit
BN	Base/Neutral (extractables)
BNA	Base/Neutral/Acid (extractables)
BQL	Below Quantitation Limit
BLS	Below Land Surface
BTEX	Benzene, Toluene, Ethylbenzene, Xylenes
CAP	Corrective Action Plan
CATLIN	CATLIN Engineers and Scientists (Formerly RC&A)
CFR	Code of Federal Regulations
Cr	Chromium
CSA	Comprehensive Site Assessment
CNP	Carbon Nitrogen Phosphorous
CPT	Cone Penetrometer Test
DEM	Division of Environmental Management
DIPE	Diisopropyl Ether
DO	Dissolved Oxygen
DOD	Department of Defense
DPT	Direct Push Technology
DWQ	Division of Water Quality
DWM	Division of Waste Management
DTW	Depth to Water
EAD	Environmental Affairs Department
EDB	Ethylene di-bromide
EMD	Environmental Management Division
EPA	Environmental Protection Agency
EPH	Extractable Petroleum Hydrocarbons
EQB	Environmental Quality Branch
Fe	Iron
FID	Flame Ionization Detector
FOD	Foreign Object Debris
FRO	Fayetteville Regional Office
FT	Feet
GCL	Gross Contaminant Level
GIS	Geographic Information System
GPS	Global Positioning System

Guidelines Vol. I	Groundwater Section Guidelines for Investigation and Remediation of Soil and Groundwater, Volume I, Sources Other Than Petroleum Underground Storage Tanks (May 1998)
Guidelines Vol. II	Groundwater Section Guidelines for Investigation and Remediation of Soil and Groundwater, Volume II, Petroleum Underground Storage Tanks (January 2, 1998)
HDPE	High Density Polyethylene
I/C	Industrial/Commercial
ID	Identification
I&E	Installations and Environment Department
IGWQS	Interim Groundwater Quality Standards
IPE	Isopropyl Ether
LANTDIV	Atlantic Division
LSA	Limited Site Assessment
LUST	Leaking Underground Storage Tank
m-	meta
m	meter
MADEP	Massachusetts Department of Environmental Protection
MCALF	Marine Corps Auxiliary Landing Field
MCAS	Marine Corps Air Station
MCB	Marine Corps Base
MCOLF	Marine Corps Outlying Landing Field
MDL	Method Detection Limit
mg/Kg	Milligrams per Kilogram
mg/L	Milligrams per Litre
MRO	Mooresville Regional Office
MSCC	Maximum Soil Contaminant Concentration
MSL	Mean Sea Level
MTBE	Methyl tertiary butyl ether
NA	Not Analyzed
N/A	Not Applicable
NC	North Carolina
NCAC	North Carolina Administrative Code
NCDENR	North Carolina Department of Environment and Natural Resources
NCDOC	North Carolina Department of Corrections
NCDOT	North Carolina Department of Transportation
NCSP	North Carolina State Plane
NCSPA	North Carolina State Ports Authority
NE	None Established
NM	Not Measured
NMT	No Measurable Thickness
NS	Not Sampled
o-	ortho
OVA	Organic Vapor Analyzer
p-	para
PAH	Polynuclear Aromatic Hydrocarbons
Pb	Lead
PPB	Parts Per Billion
PPM	Parts Per Million
PID	Photo Ionization Detector
PQL	Practical Quantitation Limit

PVC	Polyvinyl chloride
RBCA	Risk-Based Corrective Action
RCRA	Resource Conservation and Recovery Act
Res	Residential
ROI	Radius of Influence
RRO	Raleigh Regional Office
SOW	Scope of Work
STGW	Soil-to-Groundwater
SVE	Soil Vapor Extraction
SVOC	Semi Volatile Organic Compound
TDHF	Toxicologically Defined Hydrocarbons Fractions
TCLP	Toxicity Characteristic Leaching Procedure
TIC	Tentatively Identified Compound
TKN	Total Kjeldahl Nitrogen
TOC	Top of Casing
TPH	Total Petroleum Hydrocarbons
US	United States
USCS	Unified Soil Classification System
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
UST	Underground Storage Tank
VOC	Volatile Organic Compounds
VPH	Volatile Petroleum Hydrocarbons
WaRO	Washington Regional Office
WiRO	Wilmington Regional Office
WSRO	Winston-Salem Regional Office

PHASE I LIMITED SITE ASSESSMENT REPORT

FOR

**BUILDING A-13/SA-2
MAINTENANCE SHED
MARINE CORPS BASE
CAMP LEJEUNE, NORTH CAROLINA**

NCDENR UST INCIDENT NO. 22822

JANUARY 18, 2008

PURPOSE OF INVESTIGATION

The purpose of this Phase I Limited Site Assessment (LSA) is to provide the necessary information for the North Carolina Department of Environment and Natural Resources (NCDENR) to classify the level of risk to human health and the environment resulting from a suspected petroleum release at the Building A-13 project site. CATLIN Engineers and Scientists (CATLIN) was authorized to perform this Phase I Limited Site Assessment (LSA) by the NAVFAC Mid-Atlantic in accordance with the Order of Supplies Contract Number N62470-05-D-6200, Delivery Order Number 0049. The project site is located within the Amphibious Vehicle Maintenance Facility in the Courthouse Bay area of Marine Corps Base (MCB) Camp Lejeune, North Carolina. Figure 1 illustrates the general site location within the local USGS topographic quadrangle map.

Building A-13/SA-2

The area of investigation is in the vicinity of the former 500 gallon Underground Storage Tank (UST) basin, which was located adjacent to former Building A-13. On July 23, 1993, Peele's Pump and Tank Company removed one 500 gallon used oil tank associated with the A-13 Field Maintenance Shed. Three soil samples were collected upon tank removal at a depth of approximately nine feet. Laboratory analysis of the samples indicated the presence of petroleum hydrocarbons as Diesel and Oil and Grease at levels which were indicative of a release. Based on the suspected discharge from the UST system at the site, NCDENR requested MCB Camp Lejeune to conduct a Phase I LSA.

This document provides data to fulfill the initial site assessment and risk characterization requirements in accordance with 15A NCAC 2L .0405. Accordingly, this LSA document has been formatted to conform with the Guidelines for Assessment and Corrective Action effective July 1, 2001 (*2001 Guidelines*).

PHASE I LIMITED SITE ASSESSMENT REPORT

A. SITE IDENTIFICATION

DATE OF REPORT: January 18, 2008
Facility ID: E-002740 UST Incident Number (if known): 22822
Site Name: Building A-13/SA-2, Maintenance Shed
Site Location: MCB Camp Lejeune
Nearest City/Town: Jacksonville County: Onslow

UST Owner: Commanding Officer - MCB Camp Lejeune
Address: I&E/EMD/EQB
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: Amphibious Vehicle Maintenance Facility
Address: Building A-10, Courthouse Base Phone:

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

Release Information

Date Discovered: July 23, 1993
Northing: 3,830,012.2 Easting: 282,441.3
Estimated Quantity of Release: Unknown
Cause of Release: Unknown
Source of Release (e.g. Piping/UST): UST is suspected.

Sizes and contents of UST system(s) from which the release occurred:

One 500-gallon Used Oil UST.

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. RISK CHARACTERIZATION

Limited Site Assessment Risk Classification and Land Use Form

Part I - Groundwater/Surface Water/Vapor Impacts

High Risk

1. *Has the release contaminated any water supply well including any used for non-drinking purposes?* YES NO

According to I&E/EMD/EQB, MCB Camp Lejeune samples the raw water supply wells on a semi-annual basis. CATLIN has reviewed the latest water supply well sampling data from February and July 2007. The information provided indicates that no water supply well has been contaminated as a result of the release from the Building A-13/SA-2 source area.

2. *Is a water supply well used for drinking water located within 1,000 feet of the source area of the discharge or release?* YES NO

There is no water supply well located within 1,000 feet of the source area of the release (refer to Figure 1).

3. *Is a water supply well not used for drinking water (e.g., irrigation, washing cars, industrial cooling water, filling swimming pools) located within 250 feet of the source area of the release?* YES NO

There is no water supply well located within 250 feet of the source area of the release (refer to Figure 1).

4. *Does groundwater within 500 feet of the source area of the release have the potential for future use (there is no other source of water supply other than the groundwater)?* YES NO

Currently MCB Camp Lejeune has several locations for potential water supply well locations that are greater than 500 feet from the potential source area.

5. *Do vapors from the release pose a threat of explosion because of accumulation of the vapors in a confined space or pose any other serious threat to public health, public safety or the environment?
If YES describe.* YES NO

No evidence of vapor accumulations has been reported.

6. *Are there any other factors that would cause the discharge or release to pose an imminent danger to public health, public safety, or the environment?* YES NO
If YES describe.

A review of data collected during this investigation does not provide evidence to suggest other factors that would cause the discharge or release to pose an imminent danger to public health, public safety, or the environment.

Intermediate Risk

7. *Is a surface water body located within 500 feet of the source area of the discharge or release?* YES NO

The nearest mapped surface water body is located approximately 120 feet towards the Southeast (see Figure 1).

If YES, does the maximum groundwater contaminant concentration exceed the surface water quality standards and criteria found in 15A NCAC 2B.0200 by a factor of 10? YES NO

8. *Is the source area of the discharge or release located within an approved or planned wellhead protection area as defined in 42 USC 300h-7(e)?* YES NO
If YES describe.

Wellhead protection areas defined by 42 USC 300h-7(e) have not, as of this time, been designated by the State. However, MCB Camp Lejeune has identified wellhead protection areas on the base. Based on the most recent Wellhead Protection Plan – 2002 Update, the potential source area is not located within a proposed wellhead protection area.

9. *Is the release located in the Coastal Plain Physiographic Region as designated on a map entitled "Geology of North Carolina" published by the Department in 1985?* YES NO

As identified in the Geologic Map of North Carolina (North Carolina Department of Natural Resources and Community Development 1985), the subject site lies within the Coastal Plain Physiographic Province.

If YES, is the source area of the release located in an area in which there is recharge to an unconfined or semi-confined deeper aquifer that is being used or may be used as a source of drinking water?

YES NO

If YES describe

The potential source area is located just above an apparent unconfined surficial groundwater aquifer. While there is the potential for recharge by rainfall to the unconfined surficial aquifer at the Base, the surficial aquifer is not used for water supply aboard MCB, Camp Lejeune. Groundwater obtained from the Castle Hayne Aquifer is the raw water source for MCB Camp Lejeune potable water treatment facilities. An estimated 5 feet of Upper Tertiary Confining Unit, 27 feet of Upper Tertiary Aquifer, and 40 feet of Castle Hayne Confining Unit separate the Castle Hayne aquifer from the surficial aquifer. Data regarding hydrogeologic units below the subject site are discussed in greater detail in Section C.5.

10. *Do the levels of groundwater contamination for any contaminant exceed the gross contamination levels (GCLs) established by the Department?* YES NO

A review of laboratory analysis results indicates no subject analyte concentrations were detected in excess of applicable GCLs. These findings are discussed in greater detail in Section E of this report.

Part II - Land Use

Property Containing Source Area of Release

The questions below pertain to the property containing the source area of the release.

1. *Does the property contain one or more primary or secondary residences (permanent or temporary)?* YES NO
Describe.

MCB Camp Lejeune does contain primary and secondary residences; however, they are more than 1,500 feet from the potential source area.

2. *Does the property contain a school, daycare center, hospital, playground, park, recreation area, church, nursing home, or other place of public assembly?* YES NO
Describe.

MCB Camp Lejeune does contain above described places of public assembly; however, they are more than 1,500 feet from the potential source area.

3. *Does the property contain a commercial (e.g., retail, warehouse, office/business space, etc.) or industrial (e.g., manufacturing, utilities, industrial research and development, chemical/petroleum bulk storage, etc.) enterprise, an inactive commercial or industrial enterprise, or is the land undeveloped?* YES NO
Describe.

The project site is located within the Amphibious Vehicle Maintenance Facility in the Courthouse Bay area of MCB Camp Lejeune.

4. *Do children visit the property?* YES NO
Explain.

Under normal circumstances, children are not expected to visit the property.

- Is access to the property reliably restricted consistent with its use (e.g., by fences, security personnel or both)?* YES NO
Explain.

The A-13/SA-2 project site is located along Courthouse Road aboard MCB Camp Lejeune which is restricted to base personnel.

5. *Do pavement, buildings, or other structures cap the contaminated soil?* YES NO
Describe.

The area of investigation at the A-13/SA-2 project site is partly grass, gravel and concrete driveway.

If YES, what mechanisms are in place or can be put into place to ensure that the contaminated soil will remain capped in the foreseeable future?

The current site use is not expected to change in the near future.

6. *What is the zoning status of the property?*

MCB Camp Lejeune is not subject to local or county-zoning requirements; however, the project site is located within an Industrial/Commercial area.

7. *Is the use of the property likely to change in the next 20 years?* YES NO
Explain.

The current use of the local MCB Camp Lejeune area is not likely to change in the near future.

Property Surrounding Source Area of Release

The questions below pertain to the area within 1,500 feet of the source area of the release (excludes property containing source area of the release): See Figure 1

1. *What is the distance from the source area of the release to the **nearest** primary or secondary residence (permanent or temporary)?*

The A-13/SA-2 project site is located more than 1,500 feet from the nearest primary residence.

2. *What is the distance from the source area of the release to the **nearest** school, daycare center, hospital, playground, park, recreation area, church, nursing home or other place of public assembly?*

The nearest place of public assembly is a recreational sports field, which is approximately 2,200 feet (southeast) of the A-13/SA-2 site.

3. *What is the zoning status of properties in the surrounding area?*

As previously stated, MCB Camp Lejeune is not subject to local or county-zoning requirements; however, the use of the project site is considered Industrial/Commercial in nature.

4. *Briefly characterize the use and activities of the land in the surrounding area.*

The Courthouse Bay area of MCB Camp Lejeune is home to the Marine Corps Engineer School and the 2d Assault Amphibian (AA) Battalion. The Amphibious Vehicle Maintenance Facility is occupied by 2d AA Battalion and is their base from which to operate and perform maintenance activities to support their training.

C. RECEPTOR INFORMATION

1. Water Supply Wells

No active potable water wells are located within 1,500 feet of the project site as illustrated on Figure 1.

2. Public Water Supplies

Are public water supplies available within 1,500 feet of the source area of the release?

YES NO

If YES, where is the location of the nearest public water lines and the source(s) of the public water supply. Describe.

Public water is provided to the subject site, as well as other buildings within 1,500 feet of the potential source area by water mains, which carry treated potable water. Potable water is supplied to the site and surrounding areas by the MCB Camp Lejeune water supply system. Groundwater obtained from the Castle Hayne Aquifer is the raw water source for the MCB Camp Lejeune potable water treatment facilities.

3. Surface Water

As stated previously, the nearest mapped surface water body is approximately 120 feet southeast of the A-13/SA-2 project site.

4. Wellhead Protection Areas

As stated previously, MCB Camp Lejeune has identified wellhead protection areas on the base. Based on the most recent Wellhead Protection Plan – 2002 Update, the potential source area is not located within a proposed wellhead protection area.

5. Deep Aquifers in the Coastal Plain Physiographic Region

To determine deep aquifers underlying the subject site, the area was profiled in the “Visual Hydrogeologic Framework” database provided in the NCDENR Division of Water Resources website (VHF website) on January 23, 2006. This is a database of well and soil boring log data from numerous locations across the North Carolina Coastal Plain. The program uses data from the three locations closest to the point of interest to provide a cross-section of commonly identified hydrogeologic units likely to be present below the subject site.

Including the Surficial aquifer there are eleven identified aquifers (seven principal aquifers and four minor aquifers) within the North Carolina Coastal Plain Physiographic Region. The January 23, 2006 program results regarding deep aquifers below the subject site can be summarized as follows:

Hydrogeologic Units	Approximate Depth (feet)
Surficial Aquifer	0-32
Upper Tertiary Confining Unit	32-37
Upper Tertiary Aquifer	37-64
Castle Hayne Confining Unit	64-104
Castle Hayne Aquifer	104-254
Pee Dee Confining Unit	254-+280

6. Subsurface Structures

Numerous underground utilities are present throughout MCB Camp Lejeune. Most of these utilities are reportedly located above the surficial groundwater table (\pm 7 feet Below Land Surface (BLS)) and therefore, are not considered potential receptors.

7. Property Owners and Occupants

The subject site is owned and operated by the Commanding Officer – Marine Corps Base, Camp Lejeune. Refer to Table 2.

D. SITE GEOLOGY AND HYDROGEOLOGY

D.1 Site Geology

The following site geology description is based on visual description of the soil split spoon samples obtained while installing the borehole for the site groundwater monitoring well USTA13-MW01. Fine sands with some silts were observed at the site. A summary of site soils follows:

Building A-13/SA-2 (USTA13-MW01)		
Depth in feet BLS	Soil Description	USCS
0-1	Sand and Gravel Fill Material	GW
1-2	Tan fine sand with some silts. Dry.	SM
2-3.5	Brown fine sand with organic silt. Dry.	SM
3.5-5	Olive fine sand with some silt. Medium dense. Moist.	SM
5-8.5	No split spoon sample.	
8.5-10	Black fine sand with some organic silt. Loose. Wet.	SM
10-12	No split spoon sample.	
12-13.5	Gray clayey sands Moderate plasticity. Medium stiff. Wet.	SC

The soils described above are consistent with undivided surficial deposits typically encountered within the area Coastal Plain Physiographic Province. A copy of the USTA13-MW01 boring log including organic vapor screening results, monitoring well as-builts, and North Carolina Well Construction Records have been provided in Appendix A.

D.2 Site Hydrogeology

During the October 31, 2007 site visit, CATLIN personnel obtained depth to water data from site monitoring well USTA13-MW01. Depth to surficial groundwater at well USTA13-MW01 was 5.0 feet below top of casing. Depth to surficial groundwater in the well after 24 hours on November 1, 2007 was 4.2 feet below top of casing. Review of the data generated during this investigation, indicates the surficial groundwater encountered below the potential source area is part of an unconfined surficial aquifer. Site monitoring well details and the groundwater gauging data has been summarized on Table 3. The location of the monitoring well has been illustrated on Figure 2.

E. SAMPLING RESULTS

Initially, the 1993 tank closure report indicated the site was a potential area of concern due to the presence of TPH as Diesel and Oil and Grease in closure soil samples. The project site was subsequently transferred to the Installation Restoration Program (IRP) in April 1994 due to its location within IR Site 73 boundaries. Limited soil and groundwater data was collected for the site as part of the various IRP investigations; therefore, more refined soil and groundwater sampling is being conducted to assess the site. A permanent Type II monitoring well (USTA13-MW01) was installed at the location of the former tank basin in order to assess current soil and groundwater conditions. All soil and groundwater assessment fieldwork methods were conducted in general accordance with CATLIN's Standard Methods of Investigation. A copy of the CATLIN Standard Methods of Investigation has been provided in Appendix B.

E.1 Soil Sampling

A-13/SA-2 UST Closure

The tank closure report indicates that there were no signs of leakage from the tank. Soil samples were obtained from a depth of nine feet BLS and analyzed for TPH – Oil and Grease, Metals, and TPH – Diesel. Oil and Grease was reported with a result of 0.10%, and TPH – Diesel was reported at a concentration of 11,000 ppm. All metals were reported as Below Method Detection Level (BMDL), with the exception of Chromium at a concentration of 0.08 ppm.

A-13/SA-2 LSA Investigation

CATLIN personnel installed one Type II monitoring well USTA13-MW01 on October 31, 2007. During the installation of the Type II monitoring well, CATLIN collected one soil sample for laboratory analysis as part of the LSA investigation. The soil sample was labeled as USTA13-MW01(3.5-5) and was collected from the 2-3 feet BLS during the installation of monitoring well USTA13-MW01. (Note that a mistake was made on the Chain-of-Custody (COC) in the USTA13-MW01 soil sample ID. The interval 3.5-5 was written within the COC, when it should have been 2-3 as indicated on the well log in Appendix A.) A duplicate soil sample USTA13-DW01 (3.5-5) was collected from the same representative interval as soil sample USTA13-MW01 and analyzed for Volatile Organic Compounds (VOCs) only.

The samples were transported to SGS Environmental Services, Inc. (NC Certification #481) in Wilmington, North Carolina. At the laboratory, soil sample USTA13-MW01 was analyzed for VOCs using EPA Method 8260 (including IPE and MTBE), Semivolatile Organic Compounds (SVOCs) via EPA Method 8270 (+ 10 largest non-target peaks), Volatile and Extractable Petroleum Hydrocarbons (VPH/EPH) using the Massachusetts Department of

Environmental Protection (MADEP) Methods, and Chromium and Lead using Standard Method 3030C. As previously mentioned, duplicate soil sample USTA13-DW01 (3.5-5) was analyzed for VOCs per EPA Method 8260 (including IPE and MTBE).

A copy of the laboratory analytical report and proper COC is provided in Appendix D. Analysis of the soil samples submitted for laboratory analysis can be summarized as follows:

EPA METHOD 8260 + IPE + MTBE

Laboratory analysis detected seven VOCs in soil sample USTA13-MW01(3.5-5). Each detection was below the applicable Soil-To-Groundwater (STGW) Maximum Soil Contaminant Concentration (MSCC), with the exception of 4-Isopropyltoluene. There are no established MSCCs for 4-Isopropyltoluene, so any detection is reportable. 4-Isopropyltoluene, also known as Cymene (or *p*-Cymene), is a naturally occurring Aromatic organic compound with the molecular formula C₁₀H₁₄. A standards comparison can be made with the C₉-C₂₂ Aromatic fraction class since both structures are based on the Aromatic Benzene ring. When compared to the C₉-C₂₂ Aromatics STGW MSCC of 34 mg/kg, the detected 4-Isopropyltoluene concentration (0.228 mg/kg) is well below the lowest MSCC value. All other 8260 compounds in soil sample USTA13-MW01(3.5-5) were reported as BMDL.

There were nine 8260 compounds detected in the duplicate soil sample USTA13-DW01(3.5-5). (Note that a mistake was made on the Chain-of-Custody (COC) in the USTA13-DW01 soil sample ID. The interval 3.5-5 was written within the COC, when it should have been 2-3 and was collected from the same representative sample interval as soil sample USTA13-MW01(3.5-5). Two of the nine compounds were detected in the duplicate soil sample above the applicable STGW MSCCs, where established. First, the sample displayed a 4-Isopropyltoluene concentration of 0.195 mg/kg. There are no established MSCCs for 4-Isopropyltoluene, so any detection is reportable. A standards comparison against the C₉-C₂₂ Aromatic fraction class, shows the detected 4-Isopropyltoluene concentration (0.195 mg/kg) is well below the lowest MSCC value (STGW MSCC) of 34 mg/kg. Laboratory analysis detected the second compound, Methylene Chloride, at an estimated concentration of 0.0813 mg/kg. This concentration is above the STGW MSCC of 0.02 mg/kg, and less than the Residential MSCC of 85 mg/kg. All other 8260 compound concentrations in soil sample USTA13-DW01(3.5-5) were reported as being less than STGW MSCCs or BMDL.

EPA METHOD 8270 (+ TICs)

Laboratory analysis of soil sample USTA13-MW01(3.5-5) did not detect any 8270 target analyte concentrations above established STGW MSCCs. Acenaphthene, Bis(2-ethylhexyl)phthalate, Chrysene, Dibenzofuran, Fluoranthene, Fluorene, 2-Methylnaphthalene, Phenanthrene, and Pyrene were detected at concentrations less than the STGW MSCCs. All other 8270 target analytes were reported as BMDL.

In accordance with the *2001 Guidelines* EPA Method 8270 sample(s) are also analyzed for the ten (10) largest (peak area) non-target compounds, or Tentatively Identified Compounds (TICs). TICs refer to detected compounds, which are not present in the EPA Method 8270 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. There are no established MSCCs for any TIC. Laboratory analysis detected six unknown compounds in soil sample USTA13-MW01(3.5-5). Two other compounds, Pentadecane and 2,6,10,14-Tetramethyl Pentadecane, were detected at concentrations of 2.940 mg/kg and 2.770 mg/kg, respectively.

MADEP VPH/EPH

There were no C₅-C₈ Aliphatics detected in soil sample USTA13-MW01(3.5-5). However, laboratory analysis detected C₉-C₁₂ Aliphatics, C₉-C₁₀ Aromatics, C₉-C₁₈ Aliphatics, C₁₉-C₃₆ Aliphatics and C₁₁-C₂₂ Aromatics concentrations of 31.5 mg/kg, 21.3 mg/kg, 77.8 mg/kg, 3310 mg/kg and 104 mg/kg, respectively. When results were combined and compared to the NCDENR MSCCs, C₉-C₁₈ Aliphatics (109.3 mg/kg) and C₁₉-C₃₆ Aliphatics (3,310 mg/kg) were both below the lowest established MSCCs. However, C₉-C₂₂ Aromatics concentrations were detected at a concentration of 125 mg/kg, which is greater than the STGW MSCC of 34 mg/kg and less than the Residential MSCC of 469 mg/kg.

SM 3030C

Chromium and Lead were detected in soil sample USTA13-MW01(3.5-5) at concentrations well below the STGW MSCCs. Chromium was detected at 9.05 mg/kg; however, there was also Chromium detected in the laboratory batch blank. Lead was detected in the soil sample at a concentration of 68.7 mg/kg, as compared to the STGW MSCC of 270 mg/kg.

Tables 4A through 4E and Figures 3A through 3D summarize the soil laboratory data, as well as depict it in relation to the site map.

E.2 Groundwater Sampling

A-13/SA-2 UST Closure

Groundwater samples were not collected during tank closure activities.

A-13/SA-2 LSA Investigation

CATLIN personnel installed one Type II monitoring well USTA13-MW01 on October 31, 2007. The groundwater was allowed to equilibrate and the well was gauged to determine depth to water, the potential free-phase product thickness, and well volume. CATLIN purged a minimum of three well volumes from each monitoring well prior to collecting representative groundwater samples. One groundwater sample was obtained from monitoring well USTA13-MW01. A duplicate sample, labeled USTA13-DW01, was analyzed for only VOCs via Standard Method 6210D. The groundwater samples were placed directly into laboratory provided glassware, properly labeled, and placed in an iced cooler prior to delivering to the laboratory. A copy of the Sampling Field Data Worksheet has been provided in Appendix C.

Samples were transported to SGS Environmental Services, Inc. (North Carolina Certification #481) in Wilmington, North Carolina where they were analyzed for petroleum contamination per Standard Method 6210D, EPA Method 625 (+ 10 largest non-target peaks), MADEP VPH/EPH, and Standard Method 3030C.

A copy of the resulting groundwater sample laboratory analytical report and proper COC has been provided in Appendix D. For regulatory compliance, the resulting laboratory analysis data has been compared to established 2L Groundwater Quality Standards (GWQSs) and Gross Contaminant Levels (GCLs). Analysis of the groundwater sample submitted for laboratory analysis can be summarized as follows:

STANDARD METHOD 6210D

Only tert-Butylbenzene was detected in groundwater sample USTA13-MW01 at an estimated concentration of 0.130 µg/L as compared to the 2L GWQS of 70 µg/L. All other 6210D compounds were reported as BMDL. In addition, there were no 6210D target analytes detected in duplicate groundwater sample USTA13-DW01.

EPA METHOD 625 (+ TICS)

Laboratory analysis did not detect any EPA Method 625 compounds in the groundwater sample from monitoring well USTA13-MW01.

In accordance with the 2001 Guidelines EPA Method 625 sample(s) are also analyzed for the ten (10) largest (peak area) non-target compounds, or TICs. TICs refer to detected compounds, which are not present in the EPA Method 625 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. There are no established 2L GWQS or GCL Standards for any TIC. Laboratory analysis revealed one unknown TIC in the USTA13-MW01 groundwater sample at a concentration of 16.1 µg/L.

MADEP VPH/EPH

Laboratory analysis did not detect any MADEP constituents in groundwater sample USTA13-MW01.

SM 3030C

Only Chromium was detected in the groundwater sample from USTA13-MW01 at a concentration of 0.00508 µg/L as compared to the 2L GWQS of 50 µg/L. The lab report also indicated that Chromium was also detected in the laboratory batch blank, so the reported concentration should be considered compromised. Lead was not detected in the groundwater sample.

Tables 5A through 5E and Figures 4A through 4D summarize the groundwater laboratory data, as well as depict it in relation to the site map.

E.3 Free-Phase Product

No measurable thickness of free-phase product was detected in the site groundwater monitoring well USTA13-MW01 during this Phase I LSA.

F. CONCLUSIONS AND RECOMMENDATIONS

F.1 Conclusions

LSA field and laboratory findings can be summarized as follows:

- Based on the field and laboratory findings of this Phase I LSA, CATLIN concludes that the project sites meet the criteria for Industrial/Commercial Land Use and Low Risk classification.
- No free-phase product was measured at the site groundwater monitoring wells.

A-13/SA-2 FORMER UST

- Soil sample USTA13-MW01(3.5-5) was obtained from the 2-3 feet BLS interval, as indicated on the well log in Appendix A.

- Soil sample USTA13-MW01(3.5-5) was analyzed using EPA Method 8260 (including IPE and MTBE), EPA Method 8270 (+ 10 largest non-target peaks), MADEP VPH/EPH, and Standard Method 3030C. 4-Isopropyltoluene, which has no established MSCCs, was detected in the soil sample at a concentration of 0.228 mg/kg. For comparison, this concentration is well below the C₉-C₂₂ Aromatics STGW MSCC of 34 mg/kg. The soil sample also exhibited C₉-C₂₂ Aromatics (125.3 mg/kg) at a concentration greater than the STGW MSCC, but less than the Residential MSCC (469 mg/kg). All other compound concentrations in soil sample USTA13-MW01(3.5-5) were reported as being less than STGW MSCCs or BMDL.
- A duplicate soil sample USTA13-DW01(3.5-5) was analyzed for VOCs only using EPA Method 8260 (including IPE and MTBE). The duplicate soil sample displayed a 4-Isopropyltoluene concentration of 0.195 mg/kg. There are no established MSCCs for 4-Isopropyltoluene, so any detection is reportable. Additionally, Methylene Chloride was detected in the duplicate sample at an estimated concentration of 0.0813 mg/kg, which is above the STGW MSCC of 0.02 mg/kg and less than the Residential MSCC of 85 mg/kg. All other 8260 compound concentrations in USTA13-DW01(3.5-5) were reported as being less than STGW MSCCs or BMDL.
- The monitoring well USTA13-MW01 groundwater sample was analyzed per Standard Method 6210D, EPA Method 625 (+ 10 largest non-target peaks), MADEP VPH/EPH, and Standard Method 3030C. Laboratory analyses revealed that all target analyte concentrations were either below Method Detection Limits or below applicable 2L GWQS and GCLs.

F.2 Recommendations

Ultimately, NCDENR Division of Waste Management UST Section personnel determine the risk classification for the incident at the subject site. Any additional assessment and/or remediation activities would be based on the pending risk classification. The following recommendations are based on CATLIN personnel evaluating site findings in accordance with the 2001 Guidelines.

Two soil compounds, 4-Isopropyltoluene and C₉-C₂₂ Aromatics, were detected in soil sample USTA13-MW01(3.5-5). By comparison, 4-Isopropyltoluene was detected at a concentration less than the C₉-C₂₂ Aromatics STGW MSCC. In addition, the detected C₉-C₂₂ Aromatics concentration was above the STGW MSCC, but below the Residential MSCC.

Groundwater at the site did not exhibit any contaminants above 2L GWQSs or GCLs. As a result, CATLIN recommends that the site be considered for No Further Action.

A copy of this report should be forwarded to the NCDENR at the following address:

North Carolina Department of Environment and Natural Resources
Division of Waste Management
UST Section
Attention: Mr. Bruce Reed
127 Cardinal Drive Extension
Wilmington, North Carolina 28405

G. REFERENCES

AH Environmental Consultants, Wellhead Protection Plan – 2002 Update, Marine Corp Base, Camp Lejeune, North Carolina, August 2002.

North Carolina Department of Natural Resources and Community Development. *Geology Map of North Carolina* 1985.

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

North Carolina Department of Environment and Natural Resources (NCDENR), Division of Water Resources, Hydrogeology Framework Database.
http://www.ehnr.state.nc.us/Data_and_Modeling/Ground_Water_Databases/framesetnew.php.

Peele's Pump And Tank Company, *Initial Site Assessment Report, UST Closure by Removal, 1-500 Gallon Used Oil Tank, Building A-13, Camp Lejeune, Jacksonville, North Carolina*, Undated – approximately July 1993.

TABLES

TABLE 1

UST SYSTEM INFORMATION

**PHASE I LIMITED SITE ASSESSMENT
BUILDING A-13/SA-2 MAINTENANCE SHED**

**MARINE CORPS BASE
CAMP LEJEUNE, NORTH CAROLINA**

UST ID Number	Product (gasoline, diesel, jet fuel, etc.)	Capacity (gallons)	Date Installed (m/dd/yy)	Date Permanently Closed (P), or Still in Use* (C) (m/dd/yy)	Was Release Associated With UST System? (Yes / No)
Unknown	Used Oil	500	Unknown	(P) 7/13/1993	Yes

TABLE 2

UST OWNER/OPERATOR INFORMATION

**PHASE I LIMITED SITE ASSESSMENT
BUILDING A-13/SA-2 MAINTENANCE SHED**

**MARINE CORPS BASE
CAMP LEJEUNE, NORTH CAROLINA**

UST ID Number	Name of Owner or Operator	Dates of Ownership/Operation (m/dd/yy) to (m/dd/yy)	Address	Telephone Number
Unknown	Commanding General Marine Corps Base Camp Lejeune, NC	Unknown to 7/13/1993	PSC BOX 20004 Marine Corps Base Camp Lejeune, NC 28542	(910) 451-5068

TABLE 3

WELL CONSTRUCTION INFORMATION

**PHASE I LIMITED SITE ASSESSMENT
BUILDING A-13/SA-2 MAINTENANCE SHED**

**MARINE CORPS BASE
CAMP LEJEUNE, NORTH CAROLINA**

Well ID	Date Installed (m/dd/yy)	Date Water Level Measured (m/dd/yy)	Well Casing Depth (ft. BLS)	Screened Interval (x to y ft. BLS)	Bottom of Well (ft. BLS)	Top of Casing Elevation (ft.)	Depth to Water from Top of Casing (ft.)	Free Product Thickness (ft.)	Ground Water Elevation (ft.)	Comments
USTA13-MW01	10/31/2007	11/1/2007	2	2-12	12	Not Measured	4.2	0.00	Not Measured	Monitoring

ft BLS = feet below land surface

**TABLE 4A
SUMMARY OF SOIL LABORATORY RESULTS
EPA METHOD 8260 + IPE + MTBE**

A-13/SA-2 Maintenance Shed

Sample ID	Contaminant of Concern →		n-Butylbenzene	sec-Butylbenzene	tert-Butylbenzene	Isopropylbenzene	4-Isopropyltoluene	Methylene Chloride	Naphthalene	n-Propylbenzene	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	Total Xylenes	All Other 8260 Compounds
	Date Collected	Sample Depth (ft. BLS)												
Residential MSCC (mg/kg)			626	626	626	1,564	NE	85	313	626	782	782	3,129	Varies
Industrial/Commercial MSCC (mg/kg)			16,350	16,350	16,350	40,880	NE	763	8,176	16,350	20,440	20,440	81,760	Varies
Soil to Groundwater MSCC (mg/kg)			4.3	3.3	3.4	1.7	NE	0.02	0.58	1.7	7.5	7.3	5	Varies
USTA13-MW01(3.5-5)	10/31/2007	2-3	0.65	<0.103	<0.103	0.156	0.228	<0.514	0.136	0.495	1.92	0.656	<0.309	BMDL
USTA13-DW01(3.5-5)	10/31/2007	3.5-5	<0.0956	0.170	0.0363J	0.137	0.195	0.0813J	0.0832J	0.383	1.50	0.526	0.0449J	BMDL

Soil sample USTA13-DW01(3.5-5) is a duplicate sample of USTA13-MW01(3.5-5); analyzed for VOCs only.

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

BMDL = Below Method Detection Limit

MSCC = Maximum Soil Contaminant Concentration

Bold results indicate concentrations above the lowest MSCC

ft. BLS = Feet Below Land Surface

J = Estimated concentration, below calibration range and above Method Detection Limit.

< = Less than Method Detection Limit

**TABLE 4B
SUMMARY OF SOIL LABORATORY RESULTS
EPA METHOD 8270 + TICs**

A-13/SA-2 Maintenance Shed

Sample ID	Contaminant of Concern →		Acenaphthene	Bis(2-ethylhexyl)phthalate	Chrysene	Dibenzofuran	Fluoranthene	Fluorene	2-Methylnaphthalene	Phenanthrene	Pyrene	All Other 8270 Compounds
	Date Collected	Sample Depth (ft. BLS)										
Residential MSCC (mg/Kg)			940	46	88	62	620	620	63	469	469	Varies
Industrial/Commercial MSCC (mg/Kg)			24,000	410	780	1,635	16,400	16,400	1,635	12,264	12,264	Varies
STGW MSCC (mg/Kg)			8.2	5.6	38	4.7	280	44	1.7	60	290	Varies
USTA13-MW01(3.5-5)	10/31/2007	2-3	0.705J	0.302J	0.285J	0.437J	0.487J	0.537J	0.554J	0.672J	0.521J	BMDL

All results in milligrams perKilogram (mg/Kg)

BMDL = Below Method Detection Limit

MSCC = Maximum Soil Contaminant Concentrations

ft. BLS = Feet Below Land Surface

J = Estimated concentration, below calibration range and above Method Detection Limit.

**TABLE 4C
SUMMARY OF SOIL LABORATORY RESULTS
MADEP Methods VPH/EPH**

A-13/SA-2 Maintenance Shed

Sample ID	Contaminant of Concern →		C ₅ -C ₈ Aliphatics	C ₉ -C ₁₂ Aliphatics	C ₉ -C ₁₀ Aromatics	C ₉ -C ₁₈ Aliphatics	C ₁₉ -C ₃₆ Aliphatics	C ₁₁ -C ₂₂ Aromatics
	Date Collected	Sample Depth (ft. BLS)						
USTA13-MW01(3.5-5)	10/31/2007	2-3	<10.0	31.5	21.3	77.8	3310	104

All results in milligrams per kilogram (mg/kg)

< = Less than reporting limit

BLS = Below Land Surface

TABLE 4D
SUMMARY OF SOIL LABORATORY RESULTS
MADEP VPH/EPH as compared to NCDENR MSCCs

A-13/SA-2 Maintenance Shed

Sample ID	Contaminant of Concern →		C ₅ -C ₈ Aliphatics	C ₉ -C ₁₈ Aliphatics	C ₁₉ -C ₃₆ Aliphatics	C ₉ -C ₂₂ Aromatics
	Date Collected	Sample Depth (ft. BGS)				
Residential MSCC (mg/kg)			939	9,386	93,860	469
Industrial/Commercial MSCC (mg/kg)			24,528	245,280	#	12,264
Soil to Groundwater MSCC (mg/kg)			72	3300	##	34
USTA13-MW01(3.5-5)	10/31/2007	2-3	<10.0	109.3	3,310	125.3

All results in milligram per kilogram (mg/kg)

Health based level > 100%

Considered immobile

MSCC = Maximum Soil Contaminant Concentration

Bold results indicate concentrations above lowest MSCC

ft. BLS = Feet Below Land Surface

< = Less than reporting limit

**TABLE 4E
SUMMARY OF SOIL LABORATORY RESULTS
STANDARD METHOD 3030C**

A-13/SA-2 Maintenance Shed

Sample ID	Contaminant of Concern →		Chromium	Lead
	Date Collected	Sample Depth (ft. BLS)		
Residential MSCC (mg/kg)			47	400
Industrial/Commercial MSCC (mg/kg)			1,226	400
Soil to Groundwater MSCC (mg/kg)			27	270
USTA13-MW01(3.5-5)	10/31/2007	2-3	9.05B	68.7

All results in milligram per kilogram (mg/kg)

BMDL = Below Method Detection Limit

MSCC = Maximum Soil Contaminant Concentrations

ft. BLS = Feet Below Land Surface

J = Estimated concentration, below calibration range and above Method Detection Limit

B = Compound also detected in laboratory batch blank.

**TABLE 5A
SUMMARY OF GROUNDWATER LABORATORY RESULTS
STANDARD Method 6210D**

A-13/SA-2 Maintenance Shed

Well ID	Contaminant of Concern →		tert-Butylbenzene	All Other Standard Method 6210D Compounds
	Sample ID	Date Collected		
GCL (µg/L)			15,000	Varies
2L GWQS (µg/L)			70	Varies
USTA13-MW01	USTA13-MW01	11/1/2007	0.130J	BMDL
USTA13-DW01	USTA13-DW01	11/1/2007	<0.128	BMDL

Groundwater sample USTA13-DW01 is a duplicate sample of USTA13-MW01; analyzed for VOCs only.

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

< = Less than Method Detection Limit (MDL)

J = Estimated concentration, below calibration range and above Method Detection Limit

**TABLE 5B
SUMMARY OF GROUNDWATER LABORATORY RESULTS
EPA METHOD 625 + TICs**

A-13/SA-2 Maintenance Shed

Well ID	Contaminant of Concern →		All EPA Method 625 Compounds
	Sample ID	Date Collected	
GCL (µg/L) 2L GWQS (µg/L)			Varies Varies
USTA13-MW01	USTA13-MW01	11/1/2007	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

**TABLE 5C
SUMMARY OF GROUNDWATER LABORATORY RESULTS
MADEP VPH/EPH**

A-13/SA-2 Maintenance Shed

Well ID	Contaminant of Concern →		C ₅ -C ₈ Aliphatics	C ₉ -C ₁₂ Aliphatics	C ₉ -C ₁₀ Aromatics	C ₉ -C ₁₈ Aliphatics	C ₁₉ -C ₃₆ Aliphatics	C ₁₁ -C ₂₂ Aromatics
	Sample ID	Date Collected						
USTA13-MW01	USTA13-MW01	11/1/2007	<100	<100	<100	<100	<100	<100

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

< = Less than reporting limit

**TABLE 5D
SUMMARY OF GROUNDWATER LABORATORY RESULTS
MADEP VPH/EPH as compared to NCDENR 2L GWQS**

A-13/SA-2 Maintenance Shed

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)			NE	NE	NE	NE
2L GWQS (µg/L)			420	4,200	42,000	210
USTA13-MW01	USTA13-MW01	11/1/2007	<100	<200	<100	<200

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

NE = None Established

< = Less than reporting limit

GCL = Gross Contaminant Level

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

**TABLE 5E
SUMMARY OF GROUNDWATER LABORATORY RESULTS
STANDARD METHOD 3030C**

A-13/SA-2 Maintenance Shed

Well ID	Contaminant of Concern →		Chromium	Lead
	Sample ID	Date Collected		
GCL (µg/L)			50,000	15,000
2L GWQS (µg/L)			50	15
USTA13-MW01	USTA13-MW01	11/7/2007	0.00508B	<0.000617

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

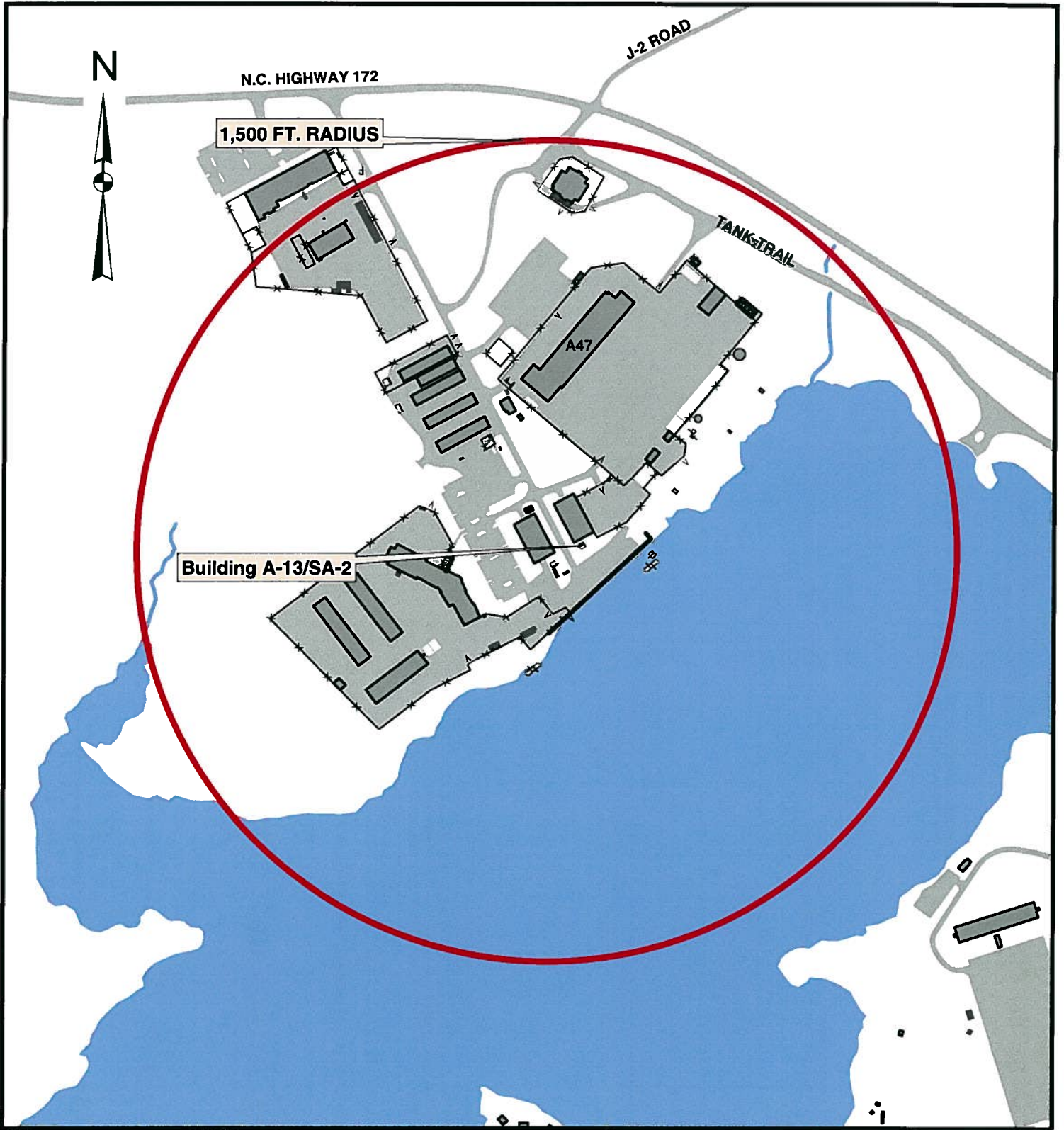
GCL = Gross Contaminant Level

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


< = Less than the Method Detection Limit (MDL)

B = Compound also detected in laboratory batch blank.

FIGURES



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

	PROJECT PHASE I LIMITED SITE ASSESSMENT FOR BUILDING A-13/SA-2 MAINTENANCE SHED MARINE CORPS BASE CAMP LEJEUNE, NC		TITLE 1,500 FT. RADIUS WITH WATER SUPPLY WELL SURVEY AND PLACES OF PUBLIC ASSEMBLY		FIGURE
	JOB NO: 207-048	DATE: DEC 2007	SCALE: AS SHOWN	DRAWN BY: KAWS	CHECKED BY: MEM

**PHASE I LIMITED SITE
ASSESSMENT FOR BUILDING
A-13/SA-2 MAINTENANCE SHED
MARINE CORPS BASE
CAMP LEJEUNE, NC**



LEGEND

EXISTING	NEW	DESCRIPTION
⊗	⊕	Type II Monitoring Well
⊗		Unknown Well Type
▭		Buildings and Structures
▭		Demolished Structures
▭		Oil/Water Separators
▭		Slabs
▭		Roads, Driveways and Parking Lots
▭		Forestland
▭		Above Ground Storage Tank
⊗		Fence
⊗		Gate
—		Electrical Cable
—		Storm Sewer Line
—		Open Storm Sewer
—		Wastewater Line
—		Water Line

NOTES

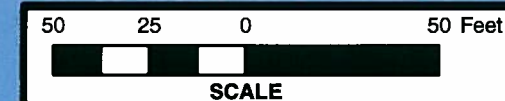
MAP ADAPTED FROM CAMP LEJEUNE
GIS DATA BASE.



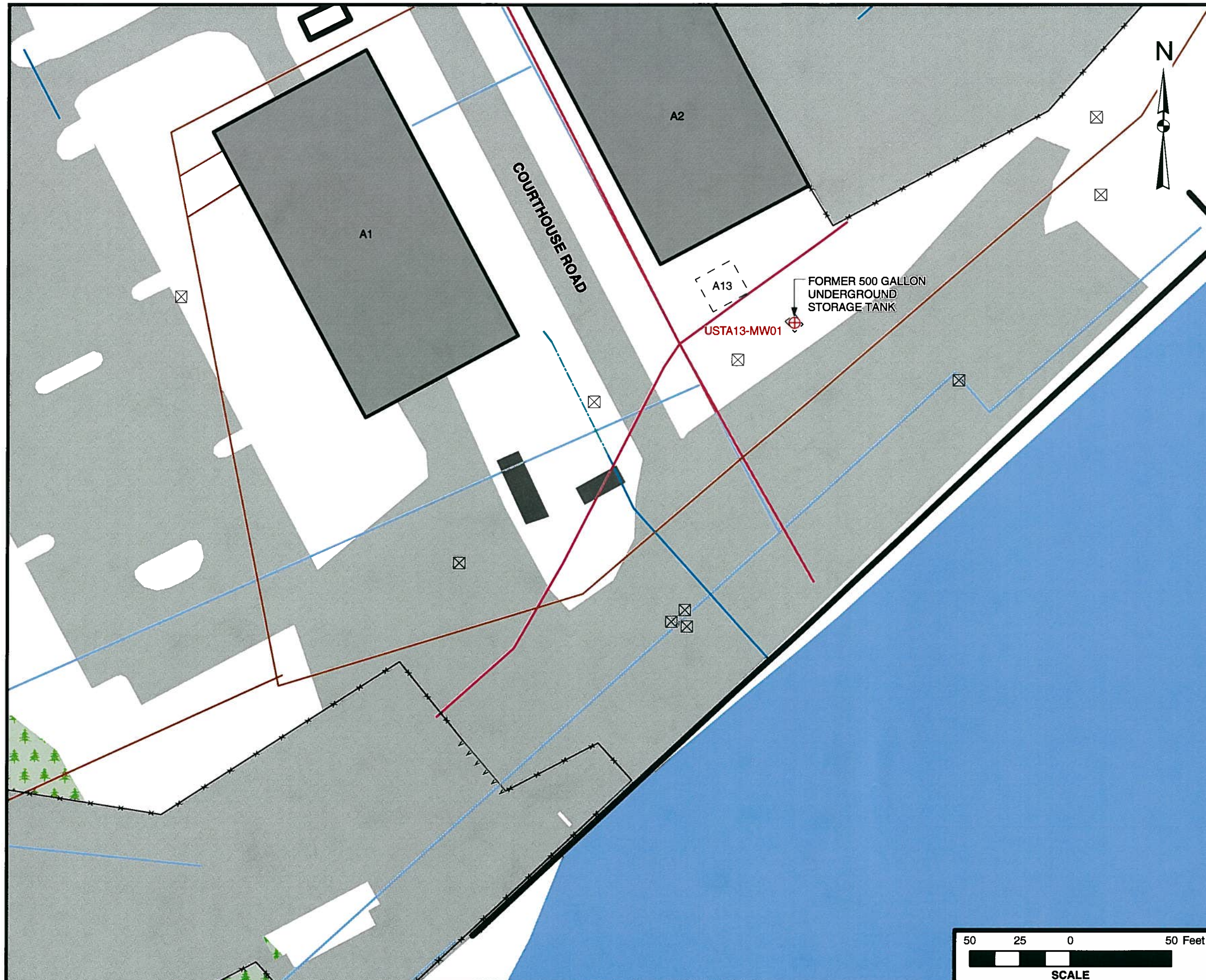
SITE PLAN WITH SITE UTILITIES
AND BORING/MONITORING
WELL LOCATION

FIGURE

2



Job No.: 207-048	Date: DEC 2007	Scale: AS SHOWN	Drawn By: KAWS	Checked By: MEM
---------------------	-------------------	--------------------	-------------------	--------------------



PHASE I LIMITED SITE ASSESSMENT FOR BUILDING A-13/SA-2 MAINTENANCE SHED MARINE CORPS BASE CAMP LEJEUNE, NC

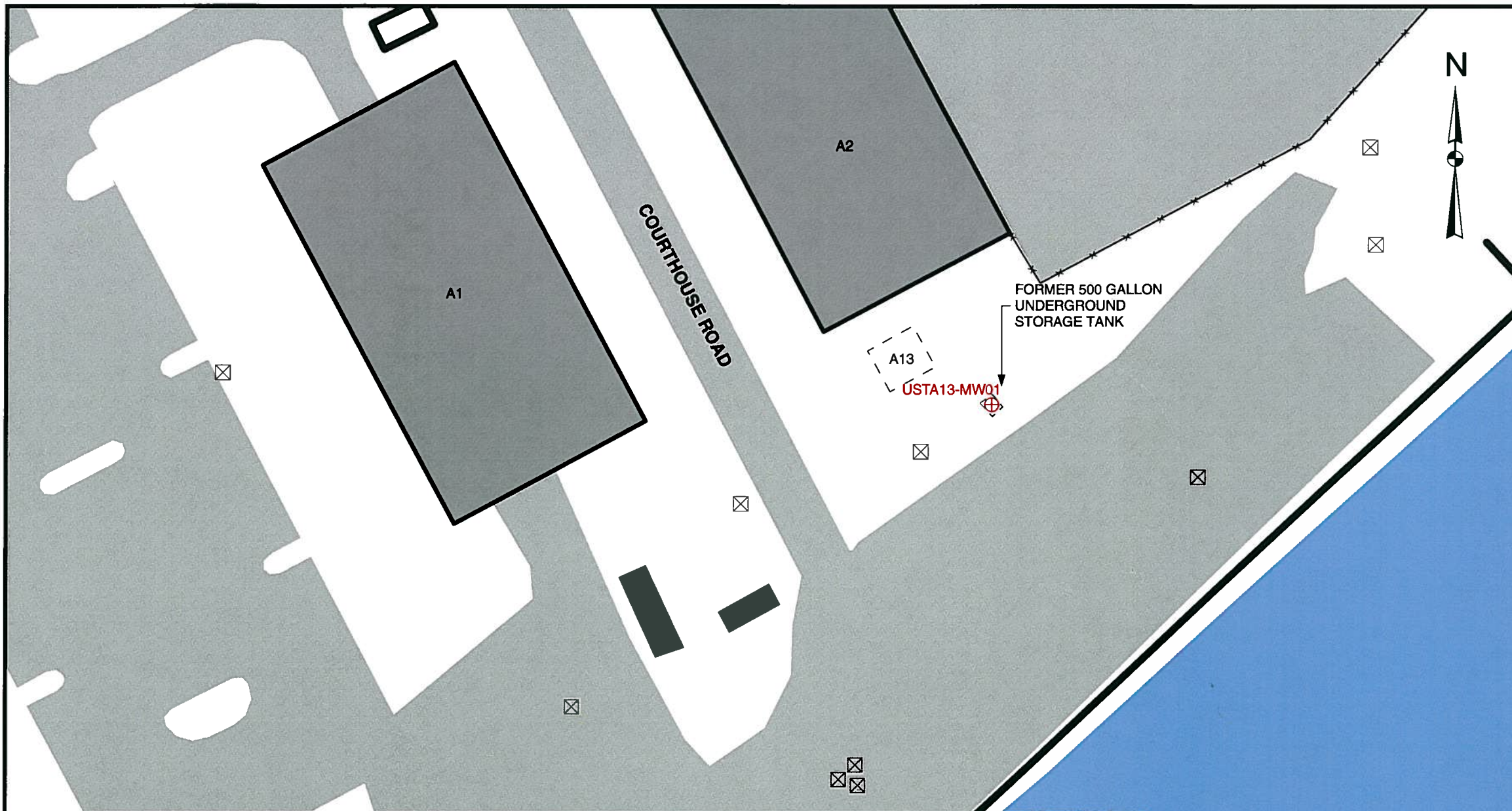


LEGEND

EXISTING	NEW	DESCRIPTION
⊗	⊕	Type II Monitoring Well
⊗		Unknown Well Type
▭		Buildings and Structures
▭		Demolished Structures
▭		Oil/Water Separators
▭		Slabs
▭		Roads, Driveways and Parking Lots
▭		Forestland
▭		Above Ground Storage Tank
⊗		Fence
⊗		Gate

NOTES

MAP ADAPTED FROM CAMP LEJEUNE GIS DATA BASE.



Sample ID	Contaminant of Concern →		n-Butylbenzene	sec-Butylbenzene	tert-Butylbenzene	Isopropylbenzene	4-Isopropyltoluene	Methylene Chloride	Naphthalene	n-Propylbenzene	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	Total Xylenes	All Other 8260 Compounds
	Date Collected	Sample Depth (ft. BLS)												
Residential MSCC (mg/kg)			626	626	626	1,564	NE	85	313	626	782	782	3,129	Varies
Industrial/Commercial MSCC (mg/kg)			16,350	16,350	16,350	40,880	NE	763	8,176	16,350	20,440	20,440	81,760	Varies
Soil to Groundwater MSCC (mg/kg)			4.3	3.3	3.4	1.7	NE	0.02	0.58	1.7	7.5	7.3	5	Varies
USTA13-MW01(3.5-5)	10/31/2007	2-3	0.65	<0.103	<0.103	0.156	0.228	<0.514	0.136	0.495	1.92	0.656	<0.309	BMDL
USTA13-DW01(3.5-5)	10/31/2007	3.5-5	<0.0956	0.170	0.0363J	0.137	0.195	0.0813J	0.0832J	0.383	1.50	0.526	0.0449J	BMDL

Soil sample USTA13-DW01(3.5-5) is a duplicate sample of USTA13-MW01(3.5-5); analyzed for VOCs only.

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

BMDL = Below Method Detection Limit

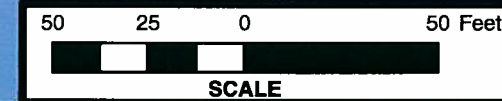
MSCC = Maximum Soil Contaminant Concentration

Bold results indicate concentrations above the lowest MSCC

ft. BLS = Feet Below Land Surface

J = Estimated concentration, below calibration range and above Method Detection Limit.

< = Less than Method Detection Limit



SITE PLAN WITH SOIL LABORATORY RESULTS - EPA METHOD 8260 + IPE + MTBE

FIGURE

3A

Job No.: 207-048	Date: DEC 2007	Scale: AS SHOWN	Drawn By: KAWS	Checked By: MEM
------------------	----------------	-----------------	----------------	-----------------

PHASE I LIMITED SITE ASSESSMENT FOR BUILDING A-13/SA-2 MAINTENANCE SHED MARINE CORPS BASE CAMP LEJEUNE, NC



LEGEND

EXISTING	NEW	DESCRIPTION
⊗	⊕	Type II Monitoring Well
⊗		Unknown Well Type
▭		Buildings and Structures
▭		Demolished Structures
▭		Oil/Water Separators
▭		Slabs
▭		Roads, Driveways and Parking Lots
▭		Forestland
□		Above Ground Storage Tank
—x—		Fence
△△		Gate

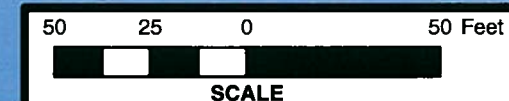
NOTES

MAP ADAPTED FROM CAMP LEJEUNE GIS DATA BASE.



Sample ID	Contaminant of Concern →		Acenaphthene	Bis(2-ethylhexyl)phthalate	Chrysene	Dibenzofuran	Fluoranthene	Fluorene	2-Methylnaphthalene	Phenanthrene	Pyrene	All Other 8270 Compounds
	Date Collected	Sample Depth (ft. BLS)										
Residential MSCC (mg/Kg)			940	46	88	62	620	620	63	469	469	Varies
Industrial/Commercial MSCC (mg/Kg)			24,000	410	780	1,635	16,400	16,400	1,635	12,264	12,264	Varies
STGW MSCC (mg/Kg)			8.2	5.6	38	4.7	280	44	1.7	60	290	Varies
USTA13-MW01(3.5-5)	10/31/2007	2-3	0.705J	0.302J	0.285J	0.437J	0.487J	0.537J	0.554J	0.672J	0.521J	BMDL

All results in milligrams perKilogram (mg/Kg)
 BMDL = Below Method Detection Limit
 MSCC = Maximum Soil Contaminant Concentrations
 ft. BLS = Feet Below Land Surface
 J = Estimated concentration, below calibration range and above Method Detection Limit.



SITE PLAN WITH SOIL LABORATORY RESULTS - EPA METHOD 8270 + TIC

FIGURE

3B

Job No.: 207-048	Date: DEC 2007	Scale: AS SHOWN	Drawn By: KAWS	Checked By: MEM
------------------	----------------	-----------------	----------------	-----------------

PHASE I LIMITED SITE ASSESSMENT FOR BUILDING A-13/SA-2 MAINTENANCE SHED MARINE CORPS BASE CAMP LEJEUNE, NC

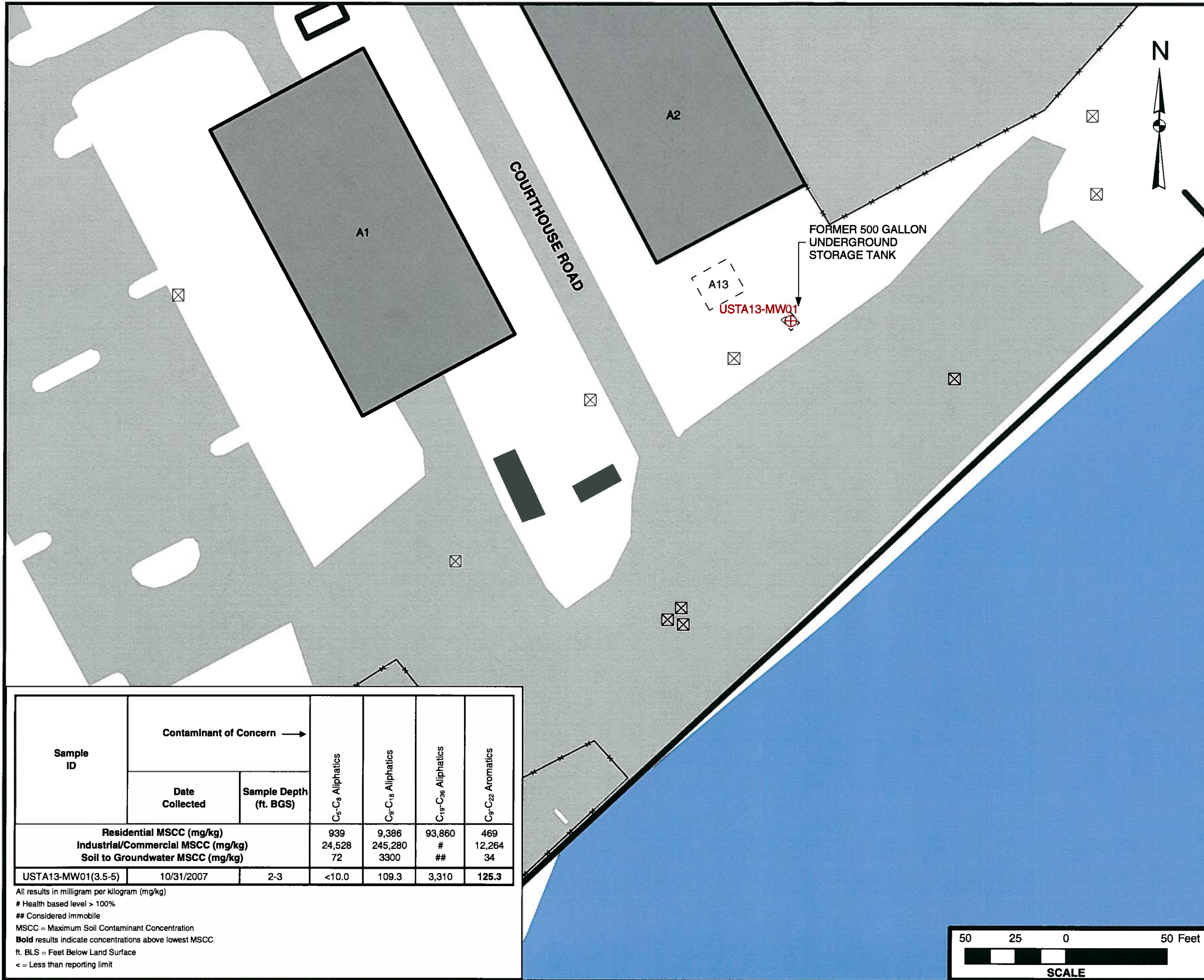


LEGEND

EXISTING	NEW	DESCRIPTION
⊗	⊕	Type II Monitoring Well
⊗		Unknown Well Type
▭		Buildings and Structures
- - -		Demolished Structures
▭		Oil/Water Separators
▭		Slabs
▭		Roads, Driveways and Parking Lots
🌳		Forestland
□		Above Ground Storage Tank
⊗		Fence
△△		Gate

NOTES

MAP ADAPTED FROM CAMP LEJEUNE GIS DATA BASE.



Sample ID	Contaminant of Concern →		C ₅ -C ₈ Aliphatics	C ₉ -C ₁₆ Aliphatics	C ₁₉ -C ₃₆ Aliphatics	C ₉ -C ₂₂ Aromatics
	Date Collected	Sample Depth (ft. BGS)				
Residential MSCC (mg/kg)			939	9,386	93,860	469
Industrial/Commercial MSCC (mg/kg)			24,528	245,280	#	12,264
Soil to Groundwater MSCC (mg/kg)			72	3300	##	34
USTA13-MW01(3.5-5)	10/31/2007	2-3	<10.0	109.3	3,310	125.3

All results in milligram per kilogram (mg/kg)
 # Health based level > 100%
 ## Considered immobile
 MSCC = Maximum Soil Contaminant Concentration
Bold results indicate concentrations above lowest MSCC
 ft. BLS = Feet Below Land Surface
 < = Less than reporting limit



SITE PLAN WITH SOIL LABORATORY RESULTS - MADEP VPH/EPH		FIGURE
		3C
Job No.: 207-048	Date: DEC 2007	Scale: AS SHOWN
Drawn By: KAWS	Checked By: MEM	

**PHASE I LIMITED SITE ASSESSMENT FOR BUILDING A-13/SA-2 MAINTENANCE SHED
MARINE CORPS BASE
CAMP LEJEUNE, NC**



LEGEND

EXISTING	NEW	DESCRIPTION
⊗	⊕	Type II Monitoring Well
⊗		Unknown Well Type
▭		Buildings and Structures
▭		Demolished Structures
▭		Oil/Water Separators
▭		Slabs
▭		Roads, Driveways and Parking Lots
▭		Forestland
□		Above Ground Storage Tank
—		Fence
△		Gate

NOTES

MAP ADAPTED FROM CAMP LEJEUNE GIS DATA BASE.

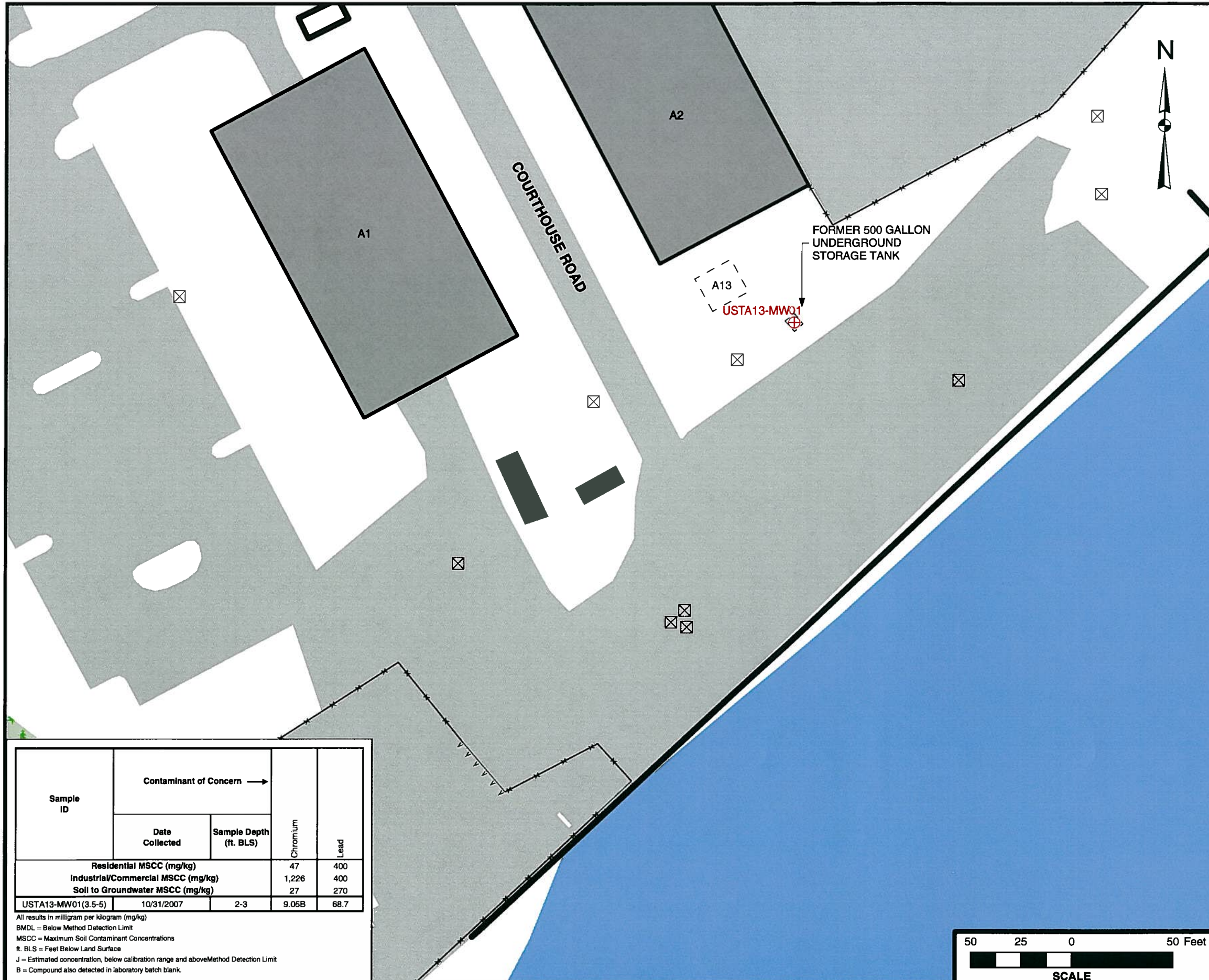


SITE PLAN WITH SOIL LABORATORY RESULTS - STANDARD METHOD 3030C

FIGURE

3D

Job No.: 207-048	Date: DEC 2007	Scale: AS SHOWN	Drawn By: KAWS	Checked By: MEM
---------------------	-------------------	--------------------	-------------------	--------------------



Sample ID	Contaminant of Concern →		Chromium	Lead
	Date Collected	Sample Depth (ft. BLS)		
Residential MSCC (mg/kg)			47	400
Industrial/Commercial MSCC (mg/kg)			1,226	400
Soil to Groundwater MSCC (mg/kg)			27	270
USTA13-MW01(3.5-5)	10/31/2007	2-3	9.05B	68.7

All results in milligram per kilogram (mg/kg)
 BMDL = Below Method Detection Limit
 MSCC = Maximum Soil Contaminant Concentrations
 ft. BLS = Feet Below Land Surface
 J = Estimated concentration, below calibration range and above Method Detection Limit
 B = Compound also detected in laboratory batch blank

PHASE I LIMITED SITE ASSESSMENT FOR BUILDING A-13/SA-2 MAINTENANCE SHED MARINE CORPS BASE CAMP LEJEUNE, NC

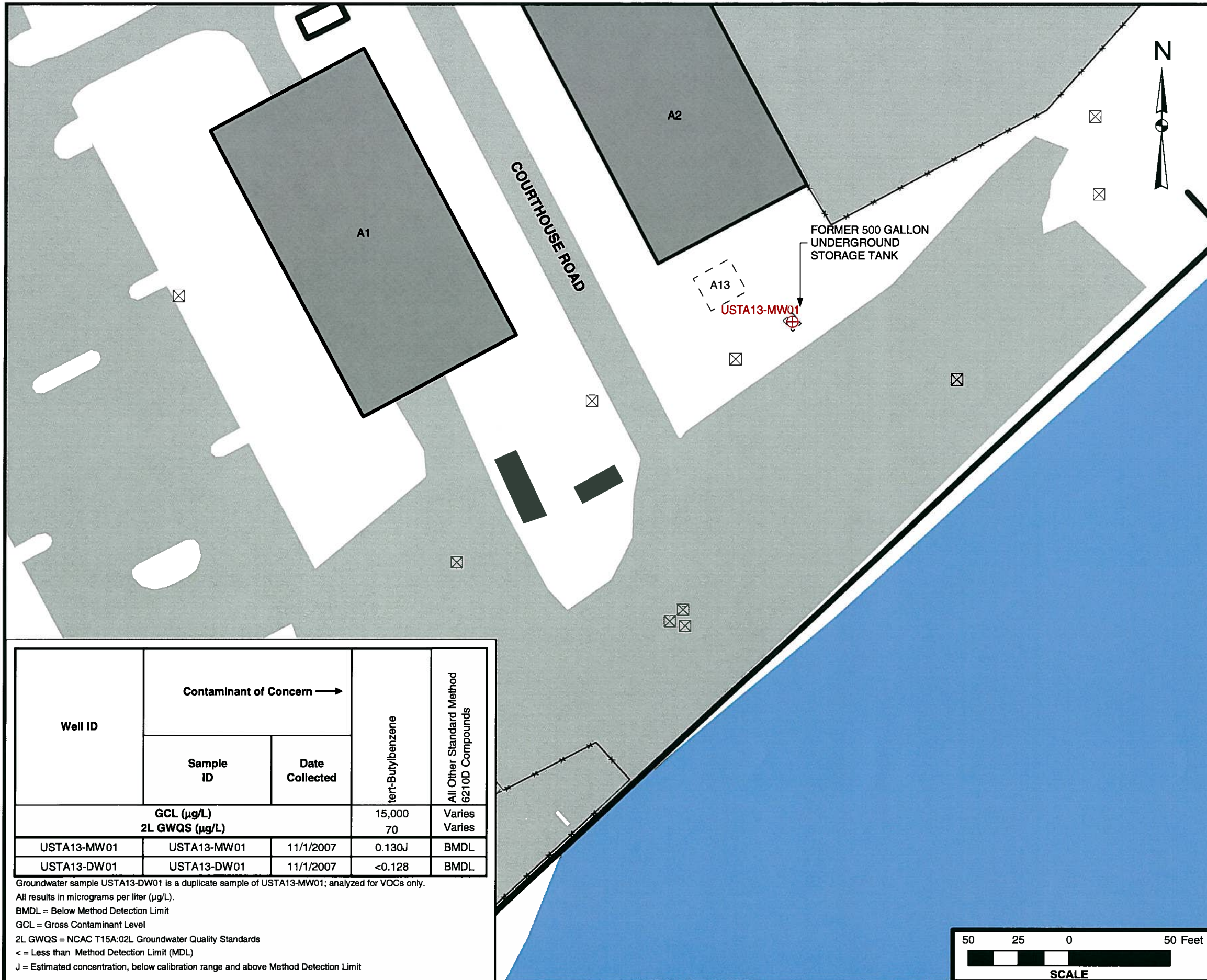


LEGEND

EXISTING	NEW	DESCRIPTION
⊗	⊕	Type II Monitoring Well
⊗		Unknown Well Type
▭		Buildings and Structures
▭		Demolished Structures
▭		Oil/Water Separators
▭		Slabs
▭		Roads, Driveways and Parking Lots
▭		Forestland
▭		Above Ground Storage Tank
⊗		Fence
△		Gate

NOTES

MAP ADAPTED FROM CAMP LEJEUNE GIS DATA BASE.



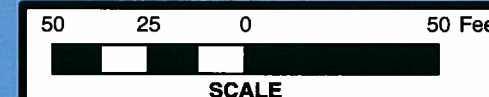
Well ID	Contaminant of Concern →		tert-Butylbenzene	All Other Standard Method 6210D Compounds
	Sample ID	Date Collected		
	GCL (µg/L)		15,000	Varies
	2L GWQS (µg/L)		70	Varies
USTA13-MW01	USTA13-MW01	11/1/2007	0.130J	BMDL
USTA13-DW01	USTA13-DW01	11/1/2007	<0.128	BMDL

Groundwater sample USTA13-DW01 is a duplicate sample of USTA13-MW01; analyzed for VOCs only.
 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
 < = Less than Method Detection Limit (MDL)
 J = Estimated concentration, below calibration range and above Method Detection Limit



SITE PLAN WITH GROUNDWATER LABORATORY RESULTS - STANDARD METHOD 6210D

FIGURE 4A



Job No.: 207-048	Date: DEC 2007	Scale: AS SHOWN	Drawn By: KAWS	Checked By: MEM
------------------	----------------	-----------------	----------------	-----------------

**PHASE I LIMITED SITE ASSESSMENT FOR BUILDING A-13/SA-2 MAINTENANCE SHED
MARINE CORPS BASE
CAMP LEJEUNE, NC**

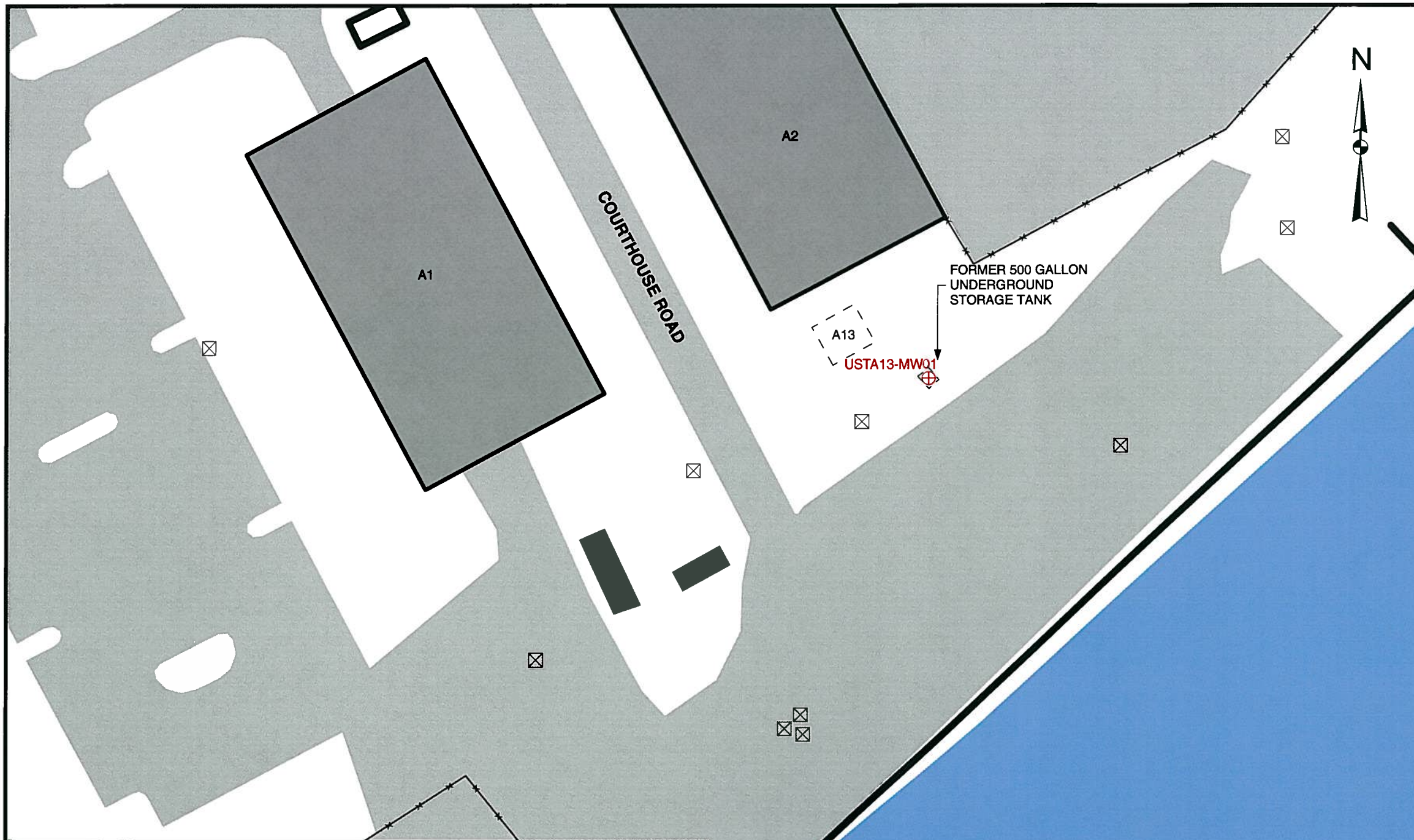


LEGEND

EXISTING	NEW	DESCRIPTION
⊗	⊕	Type II Monitoring Well
⊗		Unknown Well Type
▭		Buildings and Structures
▭		Demolished Structures
▭		Oil/Water Separators
▭		Slabs
▭		Roads, Driveways and Parking Lots
▭		Forestland
▭		Above Ground Storage Tank
⊗		Fence
△△		Gate

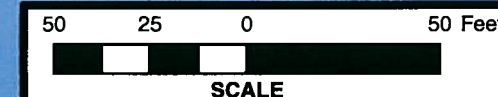
NOTES

MAP ADAPTED FROM CAMP LEJEUNE GIS DATA BASE.



Well ID	Contaminant of Concern →		C ₂ -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
USTA13-MW01	USTA13-MW01	11/1/2007	<100	<200	<100	<200

All results in micrograms per liter (µg/L).
 NE = None Established
 < = Less than reporting limit
 GCL = Gross Contaminant Level
 2L GWQS = NCAC T15A:02L Groundwater Quality Standards



SITE PLAN WITH GROUNDWATER LABORATORY RESULTS - MADEP VPH/EPH				FIGURE 4C
Job No.: 207-048	Date: DEC 2007	Scale: AS SHOWN	Drawn By: KAWS	Checked By: MEM

PHASE I LIMITED SITE ASSESSMENT FOR BUILDING A-13/SA-2 MAINTENANCE SHED MARINE CORPS BASE CAMP LEJEUNE, NC



LEGEND

EXISTING	NEW	DESCRIPTION
⊗	⊕	Type II Monitoring Well
⊗		Unknown Well Type
▭		Buildings and Structures
▭		Demolished Structures
▭		Oil/Water Separators
▭		Slabs
▭		Roads, Driveways and Parking Lots
▭		Forestland
▭		Above Ground Storage Tank
⊗		Fence
△		Gate

NOTES

MAP ADAPTED FROM CAMP LEJEUNE GIS DATA BASE.

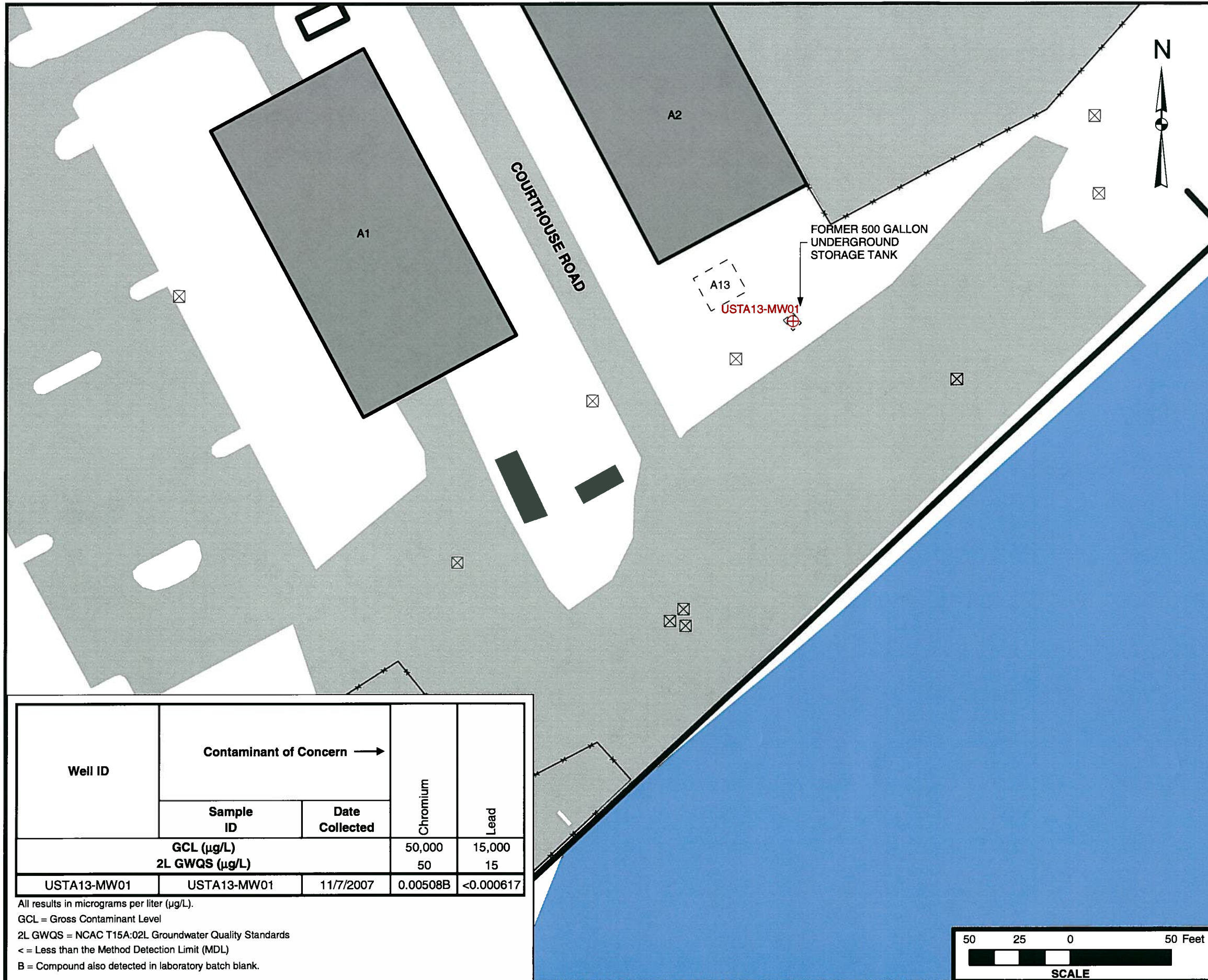


SITE PLAN WITH GROUNDWATER LABORATORY RESULTS -STANDARD METHOD 3030C

FIGURE

4D

Job No.: 207-048	Date: DEC 2007	Scale: AS SHOWN	Drawn By: KAWS	Checked By: MEM
------------------	----------------	-----------------	----------------	-----------------



Well ID	Contaminant of Concern →		Chromium	Lead
	Sample ID	Date Collected		
	GCL (µg/L)		50,000	15,000
	2L GWQS (µg/L)		50	15
USTA13-MW01	USTA13-MW01	11/7/2007	0.00508B	<0.000617

All results in micrograms per liter (µg/L).
 GCL = Gross Contaminant Level
 2L GWQS = NCAC T15A:02L Groundwater Quality Standards
 < = Less than the Method Detection Limit (MDL)
 B = Compound also detected in laboratory batch blank.

APPENDICES

APPENDIX A

**BORING LOGS, MONITORING WELL AS-BUILTS, AND NORTH CAROLINA WELL
CONSTRUCTION RECORDS**

WELL LOG



CATLIN
ENGINEERS and SCIENTISTS
207-048
Wilmington, NC

SHEET 1 OF 1

PROJECT NO.: 207-048	STATE: NC	COUNTY: Onslow	LOCATION: Camp Lejuene
PROJECT NAME: Former CERCLA Site USTA13	LOGGED BY: Steve Tyler	WELL ID: USTA13-MW01	
NORTHING: 3830012.2	EASTING: 282441.3	DRILLER: John Wood	
SYSTEM: UTM NAD83 (m)	BORING LOCATION: Bldg. A13	CREW: Bill Miller	T.O.C. ELEV.:
DRILL MACHINE: D-50	METHOD: H.S. Augers	0 HOUR DTW: 5.0	TOTAL DEPTH: 13.5
START DATE: 10/31/07	FINISH DATE: 10/31/07	24 HOUR DTW: 4.2	WELL DEPTH: 12.0

DEPTH	BLOW COUNT				OVA (ppm)	LAB.	LOG	SOIL AND ROCK DESCRIPTION	WELL DETAIL
	6in	6in	6in	6in					
0.0							0.0 LAND SURFACE	0.0	
1.0	P	U	S	H	NA	GW	SAND/GRAVEL crush-n-run material.	0.0	
2.0	P	U	S	H	3.5	SM	Tan fine SAND w/ some SILTS. Dry.	1.0	
3.5	P	U	S	H	94.3	(2-3') SM	Brown fine SAND w/ organic SILT. Dry.	2.0	
5.0	7	11	17		4.8	SM	Olive fine SAND w/ some SILT. Medium dense. Moist.	3.5	
8.5	3	6	3		0.8	SM	Black fine SAND w/ some organic SILT. Loose. Wet.	5.0	
12.0	2	4	4		1.4	SC	Gray CLAYEY SANDS. Moderate plasticity. Medium stiff. Wet.	8.5	
							Boring Terminated at Depth 13.5 ft CLAYEY SAND	10.0	
								12.0	

CATLIN BORING LOG 207-048 LEJUENE LSAS USTA-13 GP1 TEST GDT 12/11/07

 Portland Cement
  #2 Medium Sand

APPENDIX B
CATLIN STANDARD METHODS OF INVESTIGATION

CATLIN STANDARD METHODS OF INVESTIGATION

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 C
SAMPLING FIELD DATA WORKSHEET



MONITORING WELL SAMPLING RECORD

CATLIN PROJECT:	Former CERCLA Sites	LOGGED BY:	Johli Davis
	A-13/SA-2	DATE:	11/7/2007
CATLIN PROJECT # :	207-048	DAY:	Wednesday
CLIENT'S NAME:	MCB Camp Lejeune	WEATHER:	Clear, 50's

WELL NO.	USTA10-MW01				
TIME SAMPLED	1550				
WELL DIAMETER	2"				
WELL DEPTH - A	13				
DEPTH TO WATER - B	4.05				
(A-B) FT. WATER IN WELL - C	8.95				
GALLONS/FT. - D	0.163				
(CXD) ONE VOLUME - E	1.45				
(EX3) THREE VOLUMES - F	4.37				
VOLUME OF BAILER - G*	0.24				
(F/G) NO. BAILS REQUIRED - H*	18.2 bails				
NO. BAILS REMOVED - I*	4.55 gal				
VOLUME REMOVED	5 gal				
TURBIDITY	Slight - tan				
COMMENTS	pumped - low flow				

VOLUMES:

1" WELL = 0.045 GAL/FT.
2" WELL = 0.163 GAL/FT.
4" WELL = 0.661 GAL/FT.
6" WELL = 1.501 GAL/FT.

NOTES: AIR TEMP = ~ 75°

3' X 1.5" BAILER = 0.24 GAL/BAIL
4' X 1.5" BAILER = 0.37 GAL/BAIL

TURBIDITY - Indicate clear, slight, moderate or high.
* - An entry of PUMP indicates that bailers were not used to develop/purge the well and that a pump was used to remove the volume indicated.

APPENDIX D

LABORATORY REPORTS
AND
CHAIN-OF-CUSTODY DOCUMENTATION



Mr. Jason Cook
Richard Catlin & Associates
P.O. Box 10279
Wilmington NC 28404-0279

Report Number: G128-2057

Client Project: USTA 13

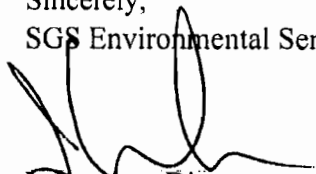
Dear Mr. Cook:

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 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.



Laboratory Director
J. Patrick Weaver

11/15/2007
Date



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

% solids = Percent Solids

Special Notes:

- 1) Metals and mercury samples are digested with a hot block, see the standard operating procedure document for details.
- 2) Uncertainty for all reported data is less than or equal to 30 percent.

**Results for Volatiles
by GCMS 8260B/5035**

Client Sample ID: USTA13 MW01 (3.5-5)
Client Project ID: USTA 13
Lab Sample ID: G128-2057-1E
Lab Project ID: G128-2057
Report Basis: Dry Weight

Analyzed By: MJC
Date Collected: 10/31/2007 14:20
Date Received: 11/1/2007
Matrix: Soil
Sample Amount: 5.3 g
%Solids: 91.7

Compound	Result MG/KG	Quantitation Limit MG/KG	Dilution Factor	Date Analyzed
Acetone	BQL	2.57	100	11/13/2007
Benzene	BQL	0.103	100	11/13/2007
Bromobenzene	BQL	0.103	100	11/13/2007
Bromochloromethane	BQL	0.103	100	11/13/2007
Bromodichloromethane	BQL	0.103	100	11/13/2007
Bromoform	BQL	0.103	100	11/13/2007
Bromomethane	BQL	0.103	100	11/13/2007
2-Butanone	BQL	2.57	100	11/13/2007
n-Butylbenzene	0.650	0.103	100	11/13/2007
sec-Butylbenzene	BQL	0.103	100	11/13/2007
tert-Butylbenzene	BQL	0.103	100	11/13/2007
Carbon disulfide	BQL	0.103	100	11/13/2007
Carbon tetrachloride	BQL	0.103	100	11/13/2007
Chlorobenzene	BQL	0.103	100	11/13/2007
Chloroethane	BQL	0.103	100	11/13/2007
Chloroform	BQL	0.103	100	11/13/2007
Chloromethane	BQL	0.103	100	11/13/2007
2-Chlorotoluene	BQL	0.103	100	11/13/2007
4-Chlorotoluene	BQL	0.103	100	11/13/2007
Dibromochloromethane	BQL	0.103	100	11/13/2007
1,2-Dibromo-3-chloropropane	BQL	0.514	100	11/13/2007
Dibromomethane	BQL	0.103	100	11/13/2007
1,2-Dibromoethane (EDB)	BQL	0.103	100	11/13/2007
1,2-Dichlorobenzene	BQL	0.103	100	11/13/2007
1,3-Dichlorobenzene	BQL	0.103	100	11/13/2007
1,4-Dichlorobenzene	BQL	0.103	100	11/13/2007
trans-1,4-Dichloro-2-butene	BQL	0.514	100	11/13/2007
1,1-Dichloroethane	BQL	0.103	100	11/13/2007
1,1-Dichloroethene	BQL	0.103	100	11/13/2007
1,2-Dichloroethane	BQL	0.103	100	11/13/2007
cis-1,2-Dichloroethene	BQL	0.103	100	11/13/2007
trans-1,2-dichloroethene	BQL	0.103	100	11/13/2007
1,2-Dichloropropane	BQL	0.103	100	11/13/2007
1,3-Dichloropropane	BQL	0.103	100	11/13/2007
2,2-Dichloropropane	BQL	0.103	100	11/13/2007
1,1-Dichloropropene	BQL	0.103	100	11/13/2007
cis-1,3-Dichloropropene	BQL	0.103	100	11/13/2007
trans-1,3-Dichloropropene	BQL	0.103	100	11/13/2007
Dichlorodifluoromethane	BQL	0.514	100	11/13/2007
Diisopropyl ether (DIPE)	BQL	0.103	100	11/13/2007
Ethylbenzene	BQL	0.103	100	11/13/2007
Hexachlorobutadiene	BQL	0.103	100	11/13/2007



**Results for Volatiles
by GCMS 8260B/5035**

Client Sample ID: USTA13 MW01 (3.5-5)
 Client Project ID: USTA 13
 Lab Sample ID: G128-2057-1E
 Lab Project ID: G128-2057
 Report Basis: Dry Weight

Analyzed By: MJC
 Date Collected: 10/31/2007 14:20
 Date Received: 11/1/2007
 Matrix: Soil
 Sample Amount: 5.3 g
 %Solids: 91.7

Compound	Result MG/KG	Quantitation Limit MG/KG	Dilution Factor	Date Analyzed
2-Hexanone	BQL	0.514	100	11/13/2007
Iodomethane	BQL	0.103	100	11/13/2007
Isopropylbenzene	0.156	0.103	100	11/13/2007
4-Isopropyltoluene	0.228	0.103	100	11/13/2007
Methylene chloride	BQL	0.514	100	11/13/2007
4-Methyl-2-pentanone	BQL	0.514	100	11/13/2007
Methyl-tert-butyl ether (MTBE)	BQL	0.103	100	11/13/2007
Naphthalene	0.136	0.103	100	11/13/2007
n-Propyl benzene	0.495	0.103	100	11/13/2007
Styrene	BQL	0.103	100	11/13/2007
1,1,1,2-Tetrachloroethane	BQL	0.103	100	11/13/2007
1,1,2,2-Tetrachloroethane	BQL	0.103	100	11/13/2007
Tetrachloroethene	BQL	0.103	100	11/13/2007
Toluene	BQL	0.103	100	11/13/2007
1,2,3-Trichlorobenzene	BQL	0.103	100	11/13/2007
1,2,4-Trichlorobenzene	BQL	0.103	100	11/13/2007
Trichloroethene	BQL	0.103	100	11/13/2007
1,1,1-Trichloroethane	BQL	0.103	100	11/13/2007
1,1,2-Trichloroethane	BQL	0.103	100	11/13/2007
Trichlorofluoromethane	BQL	0.103	100	11/13/2007
1,2,3-Trichloropropane	BQL	0.103	100	11/13/2007
1,2,4-Trimethylbenzene	1.92	0.103	100	11/13/2007
1,3,5-Trimethylbenzene	0.656	0.103	100	11/13/2007
Vinyl chloride	BQL	0.103	100	11/13/2007
m-,p-Xylene	BQL	0.206	100	11/13/2007
o-Xylene	BQL	0.103	100	11/13/2007

	Spike Added	Spike Result	Percent Recovered
1,2-Dichloroethane-d4	0.01	0.011	110
Toluene-d8	0.01	0.0102	102
4-Bromofluorobenzene	0.01	0.0102	102

Comments:

Flags:

BQL = Below Quantitation Limits.

Reviewed By: 

**Results for Volatiles
by GCMS 8260B/5035**

Client Sample ID: USTA13 DW01 (3.5-5)
Client Project ID: USTA 13
Lab Sample ID: G128-2057-2D
Lab Project ID: G128-2057
Report Basis: Dry Weight

Analyzed By: MJC
Date Collected: 10/31/2007 12:40
Date Received: 11/1/2007
Matrix: Soil
Sample Amount: 5.23 g
%Solids: 100.0

Compound	Result MG/KG	Quantitation Limit MG/KG	MDL MG/KG	Dilution Factor	Date Analyzed	Flag
Acetone	BQL	2.39	0.104	100	11/9/2007	
Benzene	BQL	0.0956	0.00765	100	11/9/2007	
Bromobenzene	BQL	0.0956	0.0137	100	11/9/2007	
Bromochloromethane	BQL	0.0956	0.0250	100	11/9/2007	
Bromodichloromethane	BQL	0.0956	0.0140	100	11/9/2007	
Bromoform	BQL	0.0956	0.0263	100	11/9/2007	
Bromomethane	BQL	0.0956	0.0250	100	11/9/2007	
2-Butanone	BQL	2.39	0.146	100	11/9/2007	
n-Butylbenzene	BQL	0.0956	0.0100	100	11/9/2007	
sec-Butylbenzene	0.170	0.0956	0.0112	100	11/9/2007	
tert-Butylbenzene	0.0363	0.0956	0.0122	100	11/9/2007	J
Carbon disulfide	BQL	0.0956	0.00602	100	11/9/2007	
Carbon tetrachloride	BQL	0.0956	0.00975	100	11/9/2007	
Chlorobenzene	BQL	0.0956	0.00688	100	11/9/2007	
Chloroethane	BQL	0.0956	0.0543	100	11/9/2007	
Chloroform	BQL	0.0956	0.0116	100	11/9/2007	
Chloromethane	BQL	0.0956	0.0197	100	11/9/2007	
2-Chlorotoluene	BQL	0.0956	0.0105	100	11/9/2007	
4-Chlorotoluene	BQL	0.0956	0.0102	100	11/9/2007	
Dibromochloromethane	BQL	0.0956	0.0119	100	11/9/2007	
1,2-Dibromo-3-chloropropane	BQL	0.478	0.0860	100	11/9/2007	
Dibromomethane	BQL	0.0956	0.0190	100	11/9/2007	
1,2-Dibromoethane (EDB)	BQL	0.0956	0.0115	100	11/9/2007	
1,2-Dichlorobenzene	BQL	0.0956	0.0111	100	11/9/2007	
1,3-Dichlorobenzene	BQL	0.0956	0.0165	100	11/9/2007	
1,4-Dichlorobenzene	BQL	0.0956	0.0150	100	11/9/2007	
trans-1,4-Dichloro-2-butene	BQL	0.478	0.0755	100	11/9/2007	
1,1-Dichloroethane	BQL	0.0956	0.00841	100	11/9/2007	
1,1-Dichloroethene	BQL	0.0956	0.0195	100	11/9/2007	
1,2-Dichloroethane	BQL	0.0956	0.0126	100	11/9/2007	
cis-1,2-Dichloroethene	BQL	0.0956	0.00335	100	11/9/2007	
trans-1,2-dichloroethene	BQL	0.0956	0.0151	100	11/9/2007	
1,2-Dichloropropane	BQL	0.0956	0.00918	100	11/9/2007	
1,3-Dichloropropane	BQL	0.0956	0.0155	100	11/9/2007	
2,2-Dichloropropane	BQL	0.0956	0.0173	100	11/9/2007	
1,1-Dichloropropene	BQL	0.0956	0.0116	100	11/9/2007	
cis-1,3-Dichloropropene	BQL	0.0956	0.0116	100	11/9/2007	
trans-1,3-Dichloropropene	BQL	0.0956	0.0104	100	11/9/2007	
Dichlorodifluoromethane	BQL	0.478	0.0243	100	11/9/2007	
Diisopropyl ether (DIPE)	BQL	0.0956	0.00813	100	11/9/2007	
Ethylbenzene	BQL	0.0956	0.0106	100	11/9/2007	
Hexachlorobutadiene	BQL	0.0956	0.0219	100	11/9/2007	



**Results for Volatiles
by GCMS 8260B/5035**

Client Sample ID: USTA13 DW01 (3.5-5)
 Client Project ID: USTA 13
 Lab Sample ID: G128-2057-2D
 Lab Project ID: G128-2057
 Report Basis: Dry Weight

Analyzed By: MJC
 Date Collected: 10/31/2007 12:40
 Date Received: 11/1/2007
 Matrix: Soil
 Sample Amount: 5.23 g
 %Solids: 100.0

Compound	Result MG/KG	Quantitation Limit MG/KG	MDL MG/KG	Dilution Factor	Date Analyzed	Flag
2-Hexanone	BQL	0.478	0.0832	100	11/9/2007	
Iodomethane	BQL	0.0956	0.00755	100	11/9/2007	
Isopropylbenzene	0.137	0.0956	0.0121	100	11/9/2007	
4-Isopropyltoluene	0.195	0.0956	0.0119	100	11/9/2007	
Methylene chloride	0.0813	0.478	0.0190	100	11/9/2007	J
4-Methyl-2-pentanone	BQL	0.478	0.0994	100	11/9/2007	
Methyl-tert-butyl ether (MTBE)	BQL	0.0956	0.0132	100	11/9/2007	
Naphthalene	0.0832	0.0956	0.0165	100	11/9/2007	J
n-Propyl benzene	0.383	0.0956	0.0115	100	11/9/2007	
Styrene	BQL	0.0956	0.0104	100	11/9/2007	
1,1,1,2-Tetrachloroethane	BQL	0.0956	0.0120	100	11/9/2007	
1,1,2,2-Tetrachloroethane	BQL	0.0956	0.0179	100	11/9/2007	
Tetrachloroethene	BQL	0.0956	0.0107	100	11/9/2007	
Toluene	BQL	0.0956	0.00870	100	11/9/2007	
1,2,3-Trichlorobenzene	BQL	0.0956	0.0168	100	11/9/2007	
1,2,4-Trichlorobenzene	BQL	0.0956	0.00688	100	11/9/2007	
Trichloroethene	BQL	0.0956	0.00832	100	11/9/2007	
1,1,1-Trichloroethane	BQL	0.0956	0.0106	100	11/9/2007	
1,1,2-Trichloroethane	BQL	0.0956	0.0167	100	11/9/2007	
Trichlorofluoromethane	BQL	0.0956	0.0236	100	11/9/2007	
1,2,3-Trichloropropane	BQL	0.0956	0.0194	100	11/9/2007	
1,2,4-Trimethylbenzene	1.50	0.0956	0.0116	100	11/9/2007	
1,3,5-Trimethylbenzene	0.526	0.0956	0.0101	100	11/9/2007	
Vinyl chloride	BQL	0.0956	0.0292	100	11/9/2007	
m-,p-Xylene	0.0344	0.191	0.0206	100	11/9/2007	J
o-Xylene	BQL	0.0956	0.0105	100	11/9/2007	
		Spike Added	Spike Result	Percent Recovered		
1,2-Dichloroethane-d4		0.01	0.0101	101		
Toluene-d8		0.01	0.0103	103		
4-Bromofluorobenzene		0.01	0.00975	98		

Comments:

Flags:

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

Reviewed By: 



**Results for Semivolatiles
by GCMS 8270**

Client Sample ID: USTA13 MW01 (3.5-5)
 Client Project ID: USTA 13
 Lab Sample ID: G128-2057-1J
 Lab Project ID: G128-2057
 Report Basis: Dry weight

Analyzed By: DES
 Date Collected: 10/31/2007 14:20
 Date Received: 11/1/2007
 Date Extracted: 11/6/2007
 Matrix: Soil
 % Solids: 91.71

Compound	Result mg/Kg	RL mg/Kg	MDL mg/Kg	Dilution Factor	Date Analyzed	Flag
Acenaphthene	0.705	1.68	0.240	5	11/7/2007	J
Acenaphthylene	BQL	1.68	0.223	5	11/7/2007	
Anthracene	BQL	1.68	0.243	5	11/7/2007	
Benzo[a]anthracene	BQL	1.68	0.290	5	11/7/2007	
Benzo[a]pyrene	BQL	1.68	0.257	5	11/7/2007	
Benzo[b]fluoranthene	BQL	1.68	0.294	5	11/7/2007	
Benzo[g,h,i]perylene	BQL	1.68	0.457	5	11/7/2007	
Benzo[k]fluoranthene	BQL	1.68	0.324	5	11/7/2007	
Benzoic Acid	BQL	3.36	3.36	5	11/7/2007	
Bis(2-chloroethoxy)methane	BQL	1.68	0.250	5	11/7/2007	
Bis(2-chloroethyl)ether	BQL	1.68	0.203	5	11/7/2007	
Bis(2-chloroisopropyl)ether	BQL	1.68	0.210	5	11/7/2007	
Bis(2-ethylhexyl)phthalate	0.302	1.68	0.225	5	11/7/2007	J
4-bromophenyl phenyl ether	BQL	1.68	0.284	5	11/7/2007	
Butylbenzylphthalate	BQL	1.68	0.259	5	11/7/2007	
2-Chloronaphthalene	BQL	1.68	0.264	5	11/7/2007	
2-Chlorophenol	BQL	1.68	0.526	5	11/7/2007	
4-Chloro-3-methylphenol	BQL	1.68	0.524	5	11/7/2007	
4-Chloroaniline	BQL	8.40	1.28	5	11/7/2007	
4-Chlorophenyl phenyl ether	BQL	1.68	0.247	5	11/7/2007	
Chrysene	0.285	1.68	0.181	5	11/7/2007	J
Dibenzo[a,h]anthracene	BQL	1.68	0.470	5	11/7/2007	
Dibenzofuran	0.437	1.68	0.306	5	11/7/2007	J
Di-n-Butylphthalate	BQL	1.68	0.200	5	11/7/2007	
1,2-Dichlorobenzene	BQL	1.68	0.186	5	11/7/2007	
1,3-Dichlorobenzene	BQL	1.68	0.183	5	11/7/2007	
1,4-Dichlorobenzene	BQL	1.68	0.190	5	11/7/2007	
3,3'-Dichlorobenzidine	BQL	3.36	0.423	5	11/7/2007	
2,4-Dichlorophenol	BQL	1.68	0.604	5	11/7/2007	
Diethylphthalate	BQL	1.68	0.217	5	11/7/2007	
Dimethylphthalate	BQL	1.68	0.203	5	11/7/2007	
2,4-Dimethylphenol	BQL	1.68	1.20	5	11/7/2007	
Di-n-octylphthalate	BQL	1.68	0.277	5	11/7/2007	
4,6-Dinitro-2-methylphenol	BQL	8.40	0.989	5	11/7/2007	
2,4-Dinitrophenol	BQL	8.40	3.70	5	11/7/2007	
2,4-Dinitrotoluene	BQL	1.68	0.218	5	11/7/2007	
2,6-Dinitrotoluene	BQL	1.68	0.306	5	11/7/2007	
Diphenylamine *	BQL	1.68	0.165	5	11/7/2007	
Fluoranthene	0.487	1.68	0.235	5	11/7/2007	J
Fluorene	0.537	1.68	0.208	5	11/7/2007	J
Hexachlorobenzene	BQL	1.68	0.259	5	11/7/2007	
Hexachlorobutadiene	BQL	1.68	0.269	5	11/7/2007	
Hexachlorocyclopentadiene	BQL	3.36	0.173	5	11/7/2007	
Hexachloroethane	BQL	1.68	0.151	5	11/7/2007	
Indeno(1,2,3-c,d)pyrene	BQL	1.68	0.430	5	11/7/2007	
Isophorone	BQL	1.68	0.247	5	11/7/2007	
2-Methylnaphthalene	0.554	1.68	0.490	5	11/7/2007	J



**Results for Semivolatiles
by GCMS 8270**

Client Sample ID: USTA13 MW01 (3.5-5)
 Client Project ID: USTA 13
 Lab Sample ID: G128-2057-1J
 Lab Project ID: G128-2057
 Report Basis: Dry weight

Analyzed By: DES
 Date Collected: 10/31/2007 14:20
 Date Received: 11/1/2007
 Date Extracted: 11/6/2007
 Matrix: Soil
 % Solids: 91.71

Compound	Result mg/Kg	RL mg/Kg	MDL mg/Kg	Dilution Factor	Date Analyzed	Flag
2-Methylphenol	BQL	1.68	0.591	5	11/7/2007	
3- & 4-Methylphenol	BQL	1.68	0.569	5	11/7/2007	
Naphthalene	BQL	1.68	0.136	5	11/7/2007	
2-Nitroaniline	BQL	1.68	0.264	5	11/7/2007	
3-Nitroaniline	BQL	8.40	1.73	5	11/7/2007	
4-Nitroaniline	BQL	8.40	0.517	5	11/7/2007	
Nitrobenzene	BQL	1.68	0.227	5	11/7/2007	
2-Nitrophenol	BQL	1.68	0.521	5	11/7/2007	
4-Nitrophenol	BQL	8.40	0.465	5	11/7/2007	
N-Nitrosodi-n-propylamine	BQL	1.68	0.213	5	11/7/2007	
Pentachlorophenol	BQL	8.40	0.438	5	11/7/2007	
Phenanthrene	0.672	1.68	0.191	5	11/7/2007	J
Phenol	BQL	1.68	0.460	5	11/7/2007	
Pyrene	0.521	1.68	0.322	5	11/7/2007	J
1,2,4-Trichlorobenzene	BQL	1.68	0.210	5	11/7/2007	
2,4,5-Trichlorophenol	BQL	1.68	0.650	5	11/7/2007	
2,4,6-Trichlorophenol	BQL	1.68	0.598	5	11/7/2007	

	Spike Added	Spike Result	Percent Recovered
2-Fluorobiphenyl	2	1.7	83
2-Fluorophenol	2	1.4	70
Nitrobenzene-d5	2	1.4	72
Phenol-d6	2	1.6	81
2,4,6-Tribromophenol	2	1.3	65
4-Terphenyl-d14	2	2	102

Comments:

Sample reported at a dilution due to sample matrix interference.

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: USTA13 MW01 (3.5-5)
 Client Project ID: USTA 13
 Lab Sample ID: G128-2057-1J
 Lab Project ID: G128-2057
 Sample Wt/Vol: 32.47 g
 Dilution: 5

Analyzed By: DES
 Date Collected: 10/31/2007 14:20
 Date Received: 11/1/2007
 Date Extracted: 11/6/2007
 Date Analyzed: 11/7/2007
 Matrix: Soil
 % Solids: 91.7

No.	Compound	Retention Time	CAS#	Match Probability	Result (ug/KG)
1	Pentadecane	15.46	000629-62-9	93	2940
2	Pentadecane, 2,6,10,14-tetramethyl-	12.95	001921-70-6	91	2770
3	Unknown	11.19			2130
4	Aromatic, Unknown	7.13			1630
5	Alkane, Unknown	11.02			1290
6	Unknown	5.96			1250
7	Unknown	10.86			1220
8	Aromatic, Unknown	8.16			1170
9					
10					

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 Metals


Client Sample ID: USTA13 MW01 (3.5-5)
Client Project ID: USTA 13
Lab Sample ID: G128-2057-1
Lab Project ID: G128-2057
Batch ID: 9596
Report Basis: Dry

Analyzed By: AEC
Date Collected: 10/31/2007 14:20
Date Received: 11/1/2007
Matrix: SOIL
Solids 91.71

Metals	Result	RL	MDL	DF	Units	Method	Date Analyzed	Flags
Chromium	9.05	0.940	0.103	1	MG/KG	6010B	11/7/2007	B
Lead	68.7	0.940	0.603	1	MG/KG	6010B	11/7/2007	

Comments

BQL = Below Quantitation Limits
DF = Dilution Factor
J = Between MDL and RL
B= Amount in Prep Blank > MDL

Reviewed By: 
METALS.XLS



Results for Metals


Client Sample ID: USTA13 MW01
Client Project ID: USTA 13
Lab Sample ID: G128-2057-3H
Lab Project ID: G128-2057
Batch ID: 9649

Analyzed By: AEC
Date Collected: 11/7/2007 16:30
Date Received: 11/8/2007
Matrix: WATER

Metals	Result	RL	MDL	DF	Units	Method	Date Analyzed	Flags
Chromium	0.00508	0.00500	0.000812	25	MG/L	6020	11/13/2007	B
Lead	BQL	0.00500	0.000617	25	MG/L	6020	11/13/2007	

Comments

BQL = Below Quantitation Limits
DF = Dilution Factor
J = Between MDL and RL
B= Amount in Prep Blank > MDL
Samples Prepared by 3030C

Reviewed By: 
METALS.XLS



EPH (Aliphatics/Aromatics) Laboratory Reporting Form

Client Name: Richard Catlin & Associates

Project Name: USTA 13

Sample Information	
Sample Identification	USTA13 MW01 (3.5-5)
Sample Matrix	Soil
Date Collected	10/31/07
Date Received	11/01/07
Date Extracted	11/05/07
Date Analyzed	11/09/07 02:15 - 11/09/07 02:43
Dry Weight	91.7
Dilution Factor	20 - 5
Initial weight (g)	13.06
Final Volume (mL)	10.0

Analytical Results			
Analytes**	Result mg/Kg	Report Limit mg/Kg	Flags
C9-C18 Aliphatics	77.8	10.0	
C19-C36 Aliphatics	3310	10.0	
C11-C22 Aromatics	104	10.0	

Surrogates	Percent Recovery	Flags	Limits	
			Lower	Upper
Aliphatic (chloro-octadecane)	11.7	****	40	140
Aromatic (ortho-terphenyl)	7.09	****	40	140
Fractionation 1 (2-bromonaphthalene)	6.74	****	40	140
Fractionation 2 (2-fluorobiphenyl)	6.66	****	40	140

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

**** = Low surrogate recovery failure.

Lab Info: G128-2057-1I	Lab Info: G128-2057-1I
Aliphatic: EP110807/035F3301.D	Aromatic: EP110807/036F3401.D

Reviewed By: 



EPH (Aliphatics/Aromatics) Laboratory Reporting Form

Client Name: Richard Catlin & Associates

Project Name: USTA 13

Sample Information	
Sample Identification	USTA13 MW01
Sample Matrix	Water
Date Collected	11/01/07
Date Received	11/01/07
Date Extracted	11/05/07
Date Analyzed	11/08/07 07:43 - 11/08/07 08:11
Dry Weight	NA
Dilution Factor	1 - 1
Initial Volume (mL)	500
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	Upper
Aliphatic (chloro-octadecane)	74.0		40	140
Aromatic (ortho-terphenyl)	49.8		40	140
Fractionation 1 (2-bromonaphthalene)	58.8		40	140
Fractionation 2 (2-fluorobiphenyl)	60.4		40	140

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

Lab Info: G128-2057-3K	Lab Info: G128-2057-3K
Aliphatic: EP110707/048F3301.D	Aromatic: EP110707/049F3401.D

Reviewed By: 

Attachment 3

EPH Laboratory Reporting Form

Calibration and QA/QC Information

Initial Calibration Date: 10/25/07

Calibration Ranges and Limits

Range	MDL		ML		RL	
	(10/17/06) (µg/L)	(10/17/06) (mg/Kg)	(µg/L)	(mg/Kg)	(µg/L)	(mg/Kg)
C9-C18 Aliphatics	28.1	0.847	89	2.69	100	10
C19-C36 Aliphatics	36.5	1.17	116	3.72	100	10
C11-C22 Aromatics	27.6	9.47	87.8	30.1	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	400	12.5	16.84	Calibration Factor
	200	6.25		
	100	3.13		
	50	1.56		
	10	0.313		
C ₁₉ -C ₃₆ Aliphatics	400	12.5	9.14	Calibration Factor
	200	6.25		
	100	3.13		
	50	1.56		
	10	0.313		
C ₁₁ -C ₂₂ Aromatics	400	12.5	2.74	Calibration Factor
	200	6.25		
	100	3.13		
	50	1.56		
	10	0.313		

Calibration Check Date: 11/07/07
11/07/07

Filenames: ep110707/001f0101.d
ep110707/002f0201.d

Calibration Check

Range	Levels (mg/Kg)	(µg/L)	%Difference if CF %Drift if LR	Limits
C9-C18 Aliphatics	200	6.25	2.7	±25%
C19-C36 Aliphatics	200	6.25	5.3	±25%
C11-C22 Aromatics	200	6.25	-0.9	±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

Attachment 3

EPH Laboratory Reporting Form

Calibration and QA/QC Information

Initial Calibration Date: 10/25/07

Calibration Ranges and Limits

Range	MDL		ML		RL	
	(10/17/06) (µg/L)	(10/17/06) (mg/Kg)	(µg/L)	(mg/Kg)	(µg/L)	(mg/Kg)
C9-C18 Aliphatics	28.1	0.847	89	2.69	100	10
C19-C36 Aliphatics	36.5	1.17	116	3.72	100	10
C11-C22 Aromatics	27.6	9.47	87.8	30.1	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	400	12.5	16.84	Calibration Factor
	200	6.25		
	100	3.13		
	50	1.56		
	10	0.313		
C ₁₉ -C ₃₆ Aliphatics	400	12.5	9.14	Calibration Factor
	200	6.25		
	100	3.13		
	50	1.56		
	10	0.313		
C ₁₁ -C ₂₂ Aromatics	400	12.5	2.74	Calibration Factor
	200	6.25		
	100	3.13		
	50	1.56		
	10	0.313		

Calibration Check Date: 11/08/07
11/08/07

Filenames: ep110807/001f0101.d
ep110807/002f0201.d

Calibration Check

Range	Levels (µg/L)	Levels (mg/Kg)	%Difference if CF %Drift if LR	Limits
C9-C18 Aliphatics	200	6.25	1.1	≤±25%
C19-C36 Aliphatics	200	6.25	2.9	≤±25%
C11-C22 Aromatics	200	6.25	-0.5	≤±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: 10/25/07

Calibration Ranges and Limits

Range	MDL		ML		RL	
	(10/17/06) (µg/L)	(10/17/06) (mg/Kg)	(µg/L)	(mg/Kg)	(µg/L)	(mg/Kg)
C9-C18 Aliphatics	28.1	0.847	89	2.69	100	10
C19-C36 Aliphatics	36.5	1.17	116	3.72	100	10
C11-C22 Aromatics	27.6	9.47	87.8	30.1	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	400	12.5	16.84	Calibration Factor
	200	6.25		
	100	3.13		
	50	1.56		
	10	0.313		
C ₁₉ -C ₃₆ Aliphatics	400	12.5	9.14	Calibration Factor
	200	6.25		
	100	3.13		
	50	1.56		
	10	0.313		
C ₁₁ -C ₂₂ Aromatics	400	12.5	2.74	Calibration Factor
	200	6.25		
	100	3.13		
	50	1.56		
	10	0.313		

Calibration Check Date: 11/08/07 Filenames: ep110807/001f0101.d
11/08/07 ep110807/002f0201.d

Calibration Check

Range	Levels (µg/L)	Levels (mg/Kg)	%Difference if CF %Drift if LR	Limits
C9-C18 Aliphatics	200	6.25	1.1	≤±25%
C19-C36 Aliphatics	200	6.25	2.9	≤±25%
C11-C22 Aromatics	200	6.25	-0.5	≤±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: 10/25/07

Calibration Ranges and Limits

Range	MDL		ML		RL	
	(10/17/06) (µg/L)	(10/17/06) (mg/Kg)	(µg/L)	(mg/Kg)	(µg/L)	(mg/Kg)
C9-C18 Aliphatics	28.1	0.847	89	2.69	100	10
C19-C36 Aliphatics	36.5	1.17	116	3.72	100	10
C11-C22 Aromatics	27.6	9.47	87.8	30.1	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	400	12.5	16.84	Calibration Factor
	200	6.25		
	100	3.13		
	50	1.56		
	10	0.313		
C ₁₉ -C ₃₆ Aliphatics	400	12.5	9.14	Calibration Factor
	200	6.25		
	100	3.13		
	50	1.56		
	10	0.313		
C ₁₁ -C ₂₂ Aromatics	400	12.5	2.74	Calibration Factor
	200	6.25		
	100	3.13		
	50	1.56		
	10	0.313		

Calibration Check Date: 11/08/07
11/09/07

Filenames: ep110807/099f4701.d
ep110807/100f4801.d

Calibration Check

Range	Levels (mg/Kg)	(µg/L)	%Difference if CF %Drift if LR	Limits
C9-C18 Aliphatics	200	6.25	10.7	±25%
C19-C36 Aliphatics	200	6.25	14.0	±25%
C11-C22 Aromatics	200	6.25	3.6	±25%

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

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



VPH (Aliphatics/Aromatics) Laboratory Reporting Form

Client Name: Richard Catlin & Associates

Project Name: USTA 13

Sample Information	
Sample Identification	USTA13 MW01 (3.5-5)
Sample Matrix	Soil
Collection Option (for Soil)*	2
Date Collected	10/31/07
Date Received	11/01/07
Date Extracted	11/05/07
Date Analyzed	11/08/07 21:35 - 11/08/07 21:35
Dry Weight	91.7
Dilution Factor	1 - 1

Analytical Results				
Analyte	Result mg/Kg	Report Limit mg/Kg	Flags	
C ₅ -C ₈ Aliphatics**	BQL	10.0		
C ₉ -C ₁₂ Aliphatics**	31.5	10.0		
C ₉ -C ₁₀ Aromatics**	21.3	10.0		
	Percent Recovery	Flags	Limits Lower Upper	
Surrogate % Recovery - PID	86.3		70	130
Surrogate % Recovery - FID	88.0		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: g128-2057-1d	Lab Info: g128-2057-1d
FID Info: VP110807/030F0101.D	PID Info: VP110807/030R0101.D

Reviewed By: 



VPH (Aliphatics/Aromatics) Laboratory Reporting Form

Client Name: Richard Catlin & Associates

Project Name: USTA 13

Sample Information	
Sample Identification	USTA13 MW01
Sample Matrix	Water
Collection Option (for Soil)*	NA
Date Collected	11/01/07
Date Received	11/01/07
Date Extracted	11/09/07 03:56 - 11/09/07 03:56
Date Analyzed	11/09/07 03:56 - 11/09/07 03:56
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 Upper	
Surrogate % Recovery - PID	95.5		70	130
Surrogate % Recovery - FID	90.0		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: g128-2057-3b	Lab Info: g128-2057-3b
FID Info: VP110807/044F0101.D	PID Info: VP110807/044R0101.D

Reviewed By: 



Attachment 2

VPH Laboratory Reporting Form

Calibration and QA/QC Information

FID Initial Calibration Date: 11/06/07 PID Initial Calibration Date: 11/06/07

Calibration Ranges and Limits

Range	MDL		ML		RL	
	(µg/L)	(mg/Kg)	(µg/L)	(mg/Kg)	(µg/L)	(mg/Kg)
C ₅ -C ₈ Aliphatics	33.1	0.265	105	0.842	100	10
C ₉ -C ₁₂ Aliphatics	30.9	0.247	98.3	0.786	100	10
C ₉ -C ₁₀ Aromatics	27.7	0.222	88.1	0.705	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	5.12	Calibration Factor
	250	20		
	500	40		
	750	60		
	1000	80		
C ₉ -C ₁₂ Aliphatics	10	0.8	1.00	Linear Regression
	250	20		
	500	40		
	750	60		
	1000	80		
C ₉ -C ₁₀ Aromatics	10	0.8	20.79	Calibration Factor
	250	20		
	500	40		
	750	60		
	1000	80		

Calibration Check Date: 11/08/07 Filename: VP110807/037F0101.d

Calibration Check

Range	Levels		%Difference if CF %Drift if LR	Limits
	(µg/L)	(mg/Kg)		
C ₅ -C ₈ Aliphatics	500	4	2.3	±25%
C ₉ -C ₁₂ Aliphatics	500	4	5.2	±25%
C ₉ -C ₁₀ Aromatics	500	4	3.2	±25%

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

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



Attachment 2

VPH Laboratory Reporting Form

Calibration and QA/QC Information

FID Initial Calibration Date: 11/06/07 PID Initial Calibration Date: 11/06/07

Calibration Ranges and Limits

Range	MDL		ML		RL	
	(µg/L)	(mg/Kg)	(µg/L)	(mg/Kg)	(µg/L)	(mg/Kg)
C ₅ -C ₈ Aliphatics	33.1	0.265	105	0.842	100	10
C ₉ -C ₁₂ Aliphatics	30.9	0.247	98.3	0.786	100	10
C ₉ -C ₁₀ Aromatics	27.7	0.222	88.1	0.705	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	5.12	Calibration Factor
	250	20		
	500	40		
	750	60		
	1000	80		
C ₉ -C ₁₂ Aliphatics	10	0.8	1.00	Linear Regression
	250	20		
	500	40		
	750	60		
	1000	80		
C ₉ -C ₁₀ Aromatics	10	0.8	20.79	Calibration Factor
	250	20		
	500	40		
	750	60		
	1000	80		

Calibration Check Date: 11/08/07 Filename: VP110807/004F0101.d

Calibration Check

Range	Levels (µg/L)	Levels (mg/Kg)	%Difference if CF %Drift if LR	Limits
C ₅ -C ₈ Aliphatics	500	4	5.3	±25%
C ₉ -C ₁₂ Aliphatics	500	4	16.0	±25%
C ₉ -C ₁₀ Aromatics	500	4	18.0	±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

Results for Volatiles
by GCMS 6210DClient Sample ID: USTA13 MW01
Client Project ID: USTA 13
Lab Sample ID: G128-2057-3A
Lab Project ID: G128-2057Analyzed By: MJC
Date Collected: 11/1/2007 10:00
Date Received: 11/1/2007
Matrix: Water
Sample Amount: 5 mL

Compound	Result UG/L	Quantitation Limit UG/L	MDL UG/L	Dilution Factor	Date Analyzed	Flag
Benzene	BQL	0.500	0.0800	1	11/13/2007	
Bromobenzene	BQL	0.500	0.143	1	11/13/2007	
Bromochloromethane	BQL	0.500	0.261	1	11/13/2007	
Bromodichloromethane	BQL	0.500	0.146	1	11/13/2007	
Bromoform	BQL	0.500	0.275	1	11/13/2007	
Bromomethane	BQL	0.500	0.261	1	11/13/2007	
n-Butylbenzene	BQL	0.500	0.105	1	11/13/2007	
sec-Butylbenzene	BQL	0.500	0.117	1	11/13/2007	
tert-Butylbenzene	0.130	0.500	0.128	1	11/13/2007	J
Carbon tetrachloride	BQL	0.500	0.102	1	11/13/2007	
Chlorobenzene	BQL	0.500	0.0720	1	11/13/2007	
Chloroethane	BQL	0.500	0.568	1	11/13/2007	
Chloroform	BQL	0.500	0.121	1	11/13/2007	
Chloromethane	BQL	0.500	0.206	1	11/13/2007	
2-Chlorotoluene	BQL	0.500	0.110	1	11/13/2007	
4-Chlorotoluene	BQL	0.500	0.107	1	11/13/2007	
Dibromochloromethane	BQL	0.500	0.124	1	11/13/2007	
1,2-Dibromo-3-chloropropane	BQL	5.00	0.900	1	11/13/2007	
Dibromomethane	BQL	0.500	0.199	1	11/13/2007	
1,2-Dibromoethane (EDB)	BQL	0.500	0.120	1	11/13/2007	
1,2-Dichlorobenzene	BQL	0.500	0.116	1	11/13/2007	
1,3-Dichlorobenzene	BQL	0.500	0.173	1	11/13/2007	
1,4-Dichlorobenzene	BQL	0.500	0.157	1	11/13/2007	
1,1-Dichloroethane	BQL	0.500	0.0880	1	11/13/2007	
1,1-Dichloroethene	BQL	0.500	0.204	1	11/13/2007	
1,2-Dichloroethane	BQL	0.500	0.132	1	11/13/2007	
cis-1,2-Dichloroethene	BQL	0.500	0.0350	1	11/13/2007	
trans-1,2-dichloroethene	BQL	0.500	0.158	1	11/13/2007	
1,2-Dichloropropane	BQL	0.500	0.0960	1	11/13/2007	
1,3-Dichloropropane	BQL	0.500	0.162	1	11/13/2007	
2,2-Dichloropropane	BQL	0.500	0.181	1	11/13/2007	
1,1-Dichloropropene	BQL	0.500	0.121	1	11/13/2007	
Dichlorodifluoromethane	BQL	5.00	0.254	1	11/13/2007	
Diisopropyl ether (DIPE)	BQL	0.500	0.0850	1	11/13/2007	
Ethylbenzene	BQL	0.500	0.111	1	11/13/2007	
Hexachlorobutadiene	BQL	0.500	0.229	1	11/13/2007	
Isopropylbenzene	BQL	0.500	0.127	1	11/13/2007	
4-Isopropyltoluene	BQL	0.500	0.124	1	11/13/2007	
Methylene chloride	BQL	5.00	0.199	1	11/13/2007	
Methyl-tert-butyl ether (MTBE)	BQL	0.500	0.138	1	11/13/2007	
Naphthalene	BQL	0.500	0.173	1	11/13/2007	
n-Propyl benzene	BQL	0.500	0.120	1	11/13/2007	



Results for Volatiles
by GCMS 6210D

Client Sample ID: USTA13 MW01
Client Project ID: USTA 13
Lab Sample ID: G128-2057-3A
Lab Project ID: G128-2057

Analyzed By: MJC
Date Collected: 11/1/2007 10:00
Date Received: 11/1/2007
Matrix: Water
Sample Amount: 5 mL

Compound	Result UG/L	Quantitation Limit UG/L	MDL UG/L	Dilution Factor	Date Analyzed	Flag
Styrene	BQL	0.500	0.109	1	11/13/2007	
1,1,1,2-Tetrachloroethane	BQL	0.500	0.125	1	11/13/2007	
1,1,2,2-Tetrachloroethane	BQL	0.500	0.187	1	11/13/2007	
Tetrachloroethene	BQL	0.500	0.112	1	11/13/2007	
Toluene	BQL	0.500	0.0910	1	11/13/2007	
1,2,3-Trichlorobenzene	BQL	0.500	0.176	1	11/13/2007	
1,2,4-Trichlorobenzene	BQL	0.500	0.0720	1	11/13/2007	
Trichloroethene	BQL	0.500	0.0870	1	11/13/2007	
1,1,1-Trichloroethane	BQL	0.500	0.111	1	11/13/2007	
1,1,2-Trichloroethane	BQL	0.500	0.175	1	11/13/2007	
Trichlorofluoromethane	BQL	0.500	0.247	1	11/13/2007	
1,2,3-Trichloropropane	BQL	0.500	0.203	1	11/13/2007	
1,2,4-Trimethylbenzene	BQL	0.500	0.121	1	11/13/2007	
1,3,5-Trimethylbenzene	BQL	0.500	0.106	1	11/13/2007	
Vinyl chloride	BQL	0.500	0.305	1	11/13/2007	
m-,p-Xylene	BQL	1.00	0.215	1	11/13/2007	
o-Xylene	BQL	0.500	0.110	1	11/13/2007	
		Spike Added	Spike Result	Percent Recovered		
1,2-Dichloroethane-d4		10	11	110		
Toluene-d8		10	9.8	98		
4-Bromofluorobenzene		10	9.69	97		

Comments:

Flags:

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

Reviewed By: 

**Results for Volatiles
by GCMS 6210D**

Client Sample ID: USTA13 DW01
Client Project ID: USTA 13
Lab Sample ID: G128-2057-4A
Lab Project ID: G128-2057

Analyzed By: MJC
Date Collected: 11/1/2007 9:30
Date Received: 11/1/2007
Matrix: Water
Sample Amount: 5 mL

Compound	Result	Quantitation	MDL	Dilution	Date	Flag
	UG/L	Limit UG/L	UG/L	Factor	Analyzed	
Benzene	BQL	0.500	0.0800	1	11/13/2007	
Bromobenzene	BQL	0.500	0.143	1	11/13/2007	
Bromochloromethane	BQL	0.500	0.261	1	11/13/2007	
Bromodichloromethane	BQL	0.500	0.146	1	11/13/2007	
Bromoform	BQL	0.500	0.275	1	11/13/2007	
Bromomethane	BQL	0.500	0.261	1	11/13/2007	
n-Butylbenzene	BQL	0.500	0.105	1	11/13/2007	
sec-Butylbenzene	BQL	0.500	0.117	1	11/13/2007	
tert-Butylbenzene	BQL	0.500	0.128	1	11/13/2007	
Carbon tetrachloride	BQL	0.500	0.102	1	11/13/2007	
Chlorobenzene	BQL	0.500	0.0720	1	11/13/2007	
Chloroethane	BQL	0.500	0.568	1	11/13/2007	
Chloroform	BQL	0.500	0.121	1	11/13/2007	
Chloromethane	BQL	0.500	0.206	1	11/13/2007	
2-Chlorotoluene	BQL	0.500	0.110	1	11/13/2007	
4-Chlorotoluene	BQL	0.500	0.107	1	11/13/2007	
Dibromochloromethane	BQL	0.500	0.124	1	11/13/2007	
1,2-Dibromo-3-chloropropane	BQL	5.00	0.900	1	11/13/2007	
Dibromomethane	BQL	0.500	0.199	1	11/13/2007	
1,2-Dibromoethane (EDB)	BQL	0.500	0.120	1	11/13/2007	
1,2-Dichlorobenzene	BQL	0.500	0.116	1	11/13/2007	
1,3-Dichlorobenzene	BQL	0.500	0.173	1	11/13/2007	
1,4-Dichlorobenzene	BQL	0.500	0.157	1	11/13/2007	
1,1-Dichloroethane	BQL	0.500	0.0880	1	11/13/2007	
1,1-Dichloroethene	BQL	0.500	0.204	1	11/13/2007	
1,2-Dichloroethane	BQL	0.500	0.132	1	11/13/2007	
cis-1,2-Dichloroethene	BQL	0.500	0.0350	1	11/13/2007	
trans-1,2-dichloroethene	BQL	0.500	0.158	1	11/13/2007	
1,2-Dichloropropane	BQL	0.500	0.0960	1	11/13/2007	
1,3-Dichloropropane	BQL	0.500	0.162	1	11/13/2007	
2,2-Dichloropropane	BQL	0.500	0.181	1	11/13/2007	
1,1-Dichloropropene	BQL	0.500	0.121	1	11/13/2007	
Dichlorodifluoromethane	BQL	5.00	0.254	1	11/13/2007	
Diisopropyl ether (DIPE)	BQL	0.500	0.0850	1	11/13/2007	
Ethylbenzene	BQL	0.500	0.111	1	11/13/2007	
Hexachlorobutadiene	BQL	0.500	0.229	1	11/13/2007	
Isopropylbenzene	BQL	0.500	0.127	1	11/13/2007	
4-Isopropyltoluene	BQL	0.500	0.124	1	11/13/2007	
Methylene chloride	BQL	5.00	0.199	1	11/13/2007	
Methyl-tert-butyl ether (MTBE)	BQL	0.500	0.138	1	11/13/2007	
Naphthalene	BQL	0.500	0.173	1	11/13/2007	
n-Propyl benzene	BQL	0.500	0.120	1	11/13/2007	



Results for Volatiles
by GCMS 6210D

Client Sample ID: USTA13 DW01
Client Project ID: USTA 13
Lab Sample ID: G128-2057-4A
Lab Project ID: G128-2057

Analyzed By: MJC
Date Collected: 11/1/2007 9:30
Date Received: 11/1/2007
Matrix: Water
Sample Amount: 5 mL


Compound	Result UG/L	Quantitation Limit UG/L	MDL UG/L	Dilution Factor	Date Analyzed	Flag
Styrene	BQL	0.500	0.109	1	11/13/2007	
1,1,1,2-Tetrachloroethane	BQL	0.500	0.125	1	11/13/2007	
1,1,2,2-Tetrachloroethane	BQL	0.500	0.187	1	11/13/2007	
Tetrachloroethene	BQL	0.500	0.112	1	11/13/2007	
Toluene	BQL	0.500	0.0910	1	11/13/2007	
1,2,3-Trichlorobenzene	BQL	0.500	0.176	1	11/13/2007	
1,2,4-Trichlorobenzene	BQL	0.500	0.0720	1	11/13/2007	
Trichloroethene	BQL	0.500	0.0870	1	11/13/2007	
1,1,1-Trichloroethane	BQL	0.500	0.111	1	11/13/2007	
1,1,2-Trichloroethane	BQL	0.500	0.175	1	11/13/2007	
Trichlorofluoromethane	BQL	0.500	0.247	1	11/13/2007	
1,2,3-Trichloropropane	BQL	0.500	0.203	1	11/13/2007	
1,2,4-Trimethylbenzene	BQL	0.500	0.121	1	11/13/2007	
1,3,5-Trimethylbenzene	BQL	0.500	0.106	1	11/13/2007	
Vinyl chloride	BQL	0.500	0.305	1	11/13/2007	
m-,p-Xylene	BQL	1.00	0.215	1	11/13/2007	
o-Xylene	BQL	0.500	0.110	1	11/13/2007	

	Spike Added	Spike Result	Percent Recovered
1,2-Dichloroethane-d4	10	11	110
Toluene-d8	10	10	100
4-Bromofluorobenzene	10	9.34	93

Comments:

Flags:

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

Reviewed By: 

Results for Semivolatiles
by GCMS 625Client Sample ID: USTA13 MW01
Client Project ID: USTA 13
Lab Sample ID: G128-2057-3L
Lab Project ID: G128-2057Analyzed By: DES
Date Collected: 11/1/2007 10:00
Date Received: 11/1/2007
Date Extracted: 11/6/2007
Matrix: Water

Compound	Result ug/L	RL ug/L	MDL ug/L	Dilution Factor	Date Analyzed	Flag
Acenaphthene	BQL	10.0	1.22	1	11/13/2007	
Acenaphthylene	BQL	10.0	1.12	1	11/13/2007	
Anthracene	BQL	10.0	1.75	1	11/13/2007	
Benzo[a]anthracene	BQL	10.0	1.36	1	11/13/2007	
Benzo[a]pyrene	BQL	10.0	1.27	1	11/13/2007	
Benzo[b]fluoranthene	BQL	10.0	1.43	1	11/13/2007	
Benzo[g,h,i]perylene	BQL	10.0	4.57	1	11/13/2007	
Benzo[k]fluoranthene	BQL	10.0	1.09	1	11/13/2007	
Bis(2-chloroethoxy)methane	BQL	10.0	1.11	1	11/13/2007	
Bis(2-chloroethyl)ether	BQL	10.0	1.09	1	11/13/2007	
Bis(2-chloroisopropyl)ether	BQL	10.0	1.57	1	11/13/2007	
Bis(2-ethylhexyl)phthalate	BQL	10.0	1.33	1	11/13/2007	
4-bromophenyl phenyl ether	BQL	10.0	1.99	1	11/13/2007	
Butylbenzylphthalate	BQL	10.0	1.53	1	11/13/2007	
2-Chloronaphthalene	BQL	10.0	1.25	1	11/13/2007	
2-Chlorophenol	BQL	10.0	4.22	1	11/13/2007	
4-Chloro-3-methylphenol	BQL	10.0	3.26	1	11/13/2007	
4-Chlorophenyl phenyl ether	BQL	10.0	1.42	1	11/13/2007	
Chrysene	BQL	10.0	1.11	1	11/13/2007	
Dibenzo[a,h]anthracene	BQL	10.0	4.87	1	11/13/2007	
Di-n-Butylphthalate	BQL	10.0	1.65	1	11/13/2007	
3,3'-Dichlorobenzidine	BQL	20.0	4.10	1	11/13/2007	
2,4-Dichlorophenol	BQL	10.0	3.75	1	11/13/2007	
Diethylphthalate	BQL	10.0	1.48	1	11/13/2007	
Dimethylphthalate	BQL	10.0	1.04	1	11/13/2007	
2,4-Dimethylphenol	BQL	10.0	9.25	1	11/13/2007	
Di-n-octylphthalate	BQL	10.0	1.16	1	11/13/2007	
4,6-Dinitro-2-methylphenol	BQL	50.0	3.71	1	11/13/2007	
2,4-Dinitrophenol	BQL	50.0	4.20	1	11/13/2007	
2,4-Dinitrotoluene	BQL	10.0	1.52	1	11/13/2007	
2,6-Dinitrotoluene	BQL	10.0	1.41	1	11/13/2007	
Diphenylamine *	BQL	10.0	1.53	1	11/13/2007	
Fluoranthene	BQL	10.0	1.41	1	11/13/2007	
Fluorene	BQL	10.0	1.22	1	11/13/2007	
Hexachlorobenzene	BQL	10.0	1.22	1	11/13/2007	
Hexachlorobutadiene	BQL	10.0	1.58	1	11/13/2007	
Hexachlorocyclopentadiene	BQL	20.0	20.0	1	11/13/2007	
Hexachloroethane	BQL	10.0	1.58	1	11/13/2007	
Indeno(1,2,3-c,d)pyrene	BQL	10.0	4.57	1	11/13/2007	
Isophorone	BQL	10.0	1.27	1	11/13/2007	
Naphthalene	BQL	10.0	1.08	1	11/13/2007	
Nitrobenzene	BQL	10.0	1.32	1	11/13/2007	
2-Nitrophenol	BQL	10.0	3.52	1	11/13/2007	
4-Nitrophenol	BQL	50.0	3.17	1	11/13/2007	
N-Nitrosodi-n-propylamine	BQL	10.0	1.87	1	11/13/2007	
Pentachlorophenol	BQL	50.0	2.83	1	11/13/2007	
Phenanthrene	BQL	10.0	1.38	1	11/13/2007	



Results for Semivolatiles
by GCMS 625

Client Sample ID: USTA13 MW01
Client Project ID: USTA 13
Lab Sample ID: G128-2057-3L
Lab Project ID: G128-2057

Analyzed By: DES
Date Collected: 11/1/2007 10:00
Date Received: 11/1/2007
Date Extracted: 11/6/2007
Matrix: Water

Compound	Result ug/L	RL ug/L	MDL ug/L	Dilution Factor	Date Analyzed	Flag
Phenol	BQL	10.0	3.38	1	11/13/2007	
Pyrene	BQL	10.0	2.08	1	11/13/2007	
1,2,4-Trichlorobenzene	BQL	10.0	1.33	1	11/13/2007	
2,4,6-Trichlorophenol	BQL	10.0	2.92	1	11/13/2007	
		Spike Added	Spike Result	Percent Recovered		
2-Fluorobiphenyl		10	7.7	78		
2-Fluorophenol		10	7.3	73		
Nitrobenzene-d5		10	7.6	76		
Phenol-d6		10	7.6	76		
2,4,6-Tribromophenol		10	7.6	76		
4-Terphenyl-d14		10	9.7	97		

Comments:

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

Flags:

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

Reviewed By: *lw*

**Results of Library Search for Semivolatile Compounds**
by GCMS

Client Sample ID: USTA13 MW01
Client Project ID: USTA 13
Lab Sample ID: G128-2057-3L
Lab Project ID: G128-2057
Sample Wt/Vol: 500 ML
Dilution: 1

Analyzed By: DES
Date Collected: 11/1/2007 10:00
Date Received: 11/1/2007
Date Extracted: 11/6/2007
Date Analyzed: 11/12/2007
Matrix: Water

No.	Compound	Retention Time	CAS#	Match Probability	Result (ug/L)
1	Unknown	12.23			16.1
2					
3					
4					
5					
6					
7					
8					
9					
10					

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: 



CHAIN OF CUSTODY RECORD

SGS Environmental Services Inc.

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

www.us.sgs.com

07892

SGS ENVIRONMENTAL SERVICES, INC.

SGS Reference: **G128-2057** PAGE **1** OF **1**

1 CLIENT: **CATUM Eng & Sci** PHONE NO: (910) 452-5261

CONTACT: **TASON COOK** SITE/PWSID#: _____

PROJECT: **USTA 13** E-MAIL: _____

REPORTS TO: **Catium - Jason Cook** FAX NO: () _____

INVOICE TO: **Catium - Stacia Smith** QUOTE # **1707101** PER J. COOK 11/14/07

CATUM - Stacia Smith P.O. NUMBER **271101-03** 11/14/07

2

LAB NO.	SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	No	SAMPLE TYPE	Preservatives Used	Analysis Required	REMARKS
USTA13 MW01 (3.55')	10-31-07	10-31-07	1430	Soil	7	C= COMP	✓	✓	MADE UP/EPH
USTA13 DW01 (3.55')	10-31-07	10-31-07	1340	Soil	4	G= GRAB	✓	✓	MADE UP/EPH
USTA13 MW01	11-1-07	11-1-07	1000	GLU	8		✓	✓	USE CONNECTION
USTA13 DW01	11-1-07	11-1-07	0930	GLU	3		✓	✓	TIMER ON JAR & PER S-TYLER PER SUB
									ADD VOA LOW
									RUN AS PER
									J COOK 11/14/07

3

4

5

Shipping Carrier: _____

Shipping Ticket No: _____

Special Deliverable Requirements: **SUMMARY B/D**

Special Instructions: _____

Samples Received Cold? (Circle) YES NO

Temperature (C): **11** **100**

Chain of Custody Seal: (Circle) INTACT BROKEN ABSENT

Requested Turnaround Time: RUSH STD

Date Needed: _____

Requested Turnaround Time: _____

Date: **11-1-07** **1710**

Received By: **[Signature]**

Relinquished By: (1) **[Signature]**

Relinquished By: (2) _____

Relinquished By: (3) _____

Relinquished By: (4) _____

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

1200 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



CHAIN OF CUSTODY RECORD
SGS Environmental Services Inc.

Locations Nationwide
 • Alaska
 • Louisiana
 • New Jersey
 • West Virginia
 • Hawaii
 • Maryland
 • North Carolina
 www.us.sgs.com



207-040

0657

SGS Reference: 0128-2060 PAGE 1 OF 1

1 CLIENT: CATLIN CONTACT: JASON COOK PHONE NO: (940) 452-5601

PROJECT: FORMER CERCLA SITES SITE/PWSID#: _____ E-MAIL: _____

REPORTS TO: JASON COOK FAX NO: (940) 452-7523

INVOICE TO: SHEILA CATLIN QUOTE # 209101 P.O. NUMBER 271000-2

2

LAB NO.	SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	NO CONTAINERS	SAMPLE TYPE C= COMP G= GRAB	Preservatives Used Analysis Required	REMARKS
	<u>WSTAD-MWD1</u>	<u>11/7/07</u>	<u>1550</u>	<u>GW</u>	<u>1</u>	<u>G</u>	<u>X</u>	<u>2.45</u>
	<u>WSTAD-MWD2</u>	<u>11/7/07</u>	<u>1630</u>	<u>GW</u>	<u>1</u>	<u>G</u>	<u>X</u>	

3

4 Shipping Carrier: _____
 Shipping Ticket No: _____
 Special Deliverable Requirements: _____
 Samples Received Cold? (Circle) YES: NO
 Temperature (C): 4.8°C
 Chain of Custody Seal: (Circle) INTACT: _____ BROKEN: _____ ABSENT: _____

5 Collected/Relinquished By: (1) John Jones Date 11/8/07 Time 1435 Received By: John Jones
 Relinquished By: (2) _____ Date _____ Time _____ Received By: _____
 Relinquished By: (3) _____ Date _____ Time _____ Received By: _____
 Relinquished By: (4) _____ Date _____ Time _____ Received By: _____

Requested Turnaround Time and Special Instructions:
STANDARD

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

0 200 W. Potter Drive Anchorage, AK 99518 Tel: (907) 562-2343 Fax: (907) 561-5301
 0 5500 Business Drive Wilmington, NC 28405 Tel: (910) 350-1903 Fax: (910) 350-1557

0 1270 Greenbrier Street Charleston, WV 25311 Tel: (304) 346-0725 Fax: (304) 348-0761