PHASE I LIMITED SITE ASSESSMENT REPORT

FOR

BUILDING AS-510
MARINE CORPS AIR STATION
NEW RIVER, NORTH CAROLINA

NCDENR UST INCIDENT NO. PENDING

May 2, 2007

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

PREPARED BY:

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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

AS-510
MARINE CORPS AIR STATION
NEW RIVER, NORTH CAROLINA

NCDENR UST INCIDENT NO. PENDING

May 2, 2007

PURPOSE OF INVESTIGATION

The purpose of this Phase I Limited Site Assessment (LSA) is to provide the necessary information for NCDENR to classify the level of risk to human health and the environment resulting from a suspected release. CATLIN Engineers and Scientists (CATLIN) was authorized to perform this Phase I LSA by the Naval Facilities Engineering Command (NAVFACENGCOM) Mid-Atlantic in accordance with the Order of Supplies Contract Number N62470-05-D-6200, Delivery Order Number 0016. The AS-510 project site is located aboard the Marine Corps Air Station (MCAS), New River, North Carolina. Please refer to Figure 1 for a site vicinity map.

This Phase I LSA will provide a preliminary assessment of groundwater contamination in the vicinity of the former Underground Storage Tank (UST) at the AS-510 project site. A UST was discovered during activities associated with the construction of a parking lot near the intersection of Campbell Street and Foster Street aboard MCAS, New River. During preliminary excavation activities, conducted under the supervision of NCDENR representatives, obvious petroleum impact was observed within the excavation. Due to site conditions, a joint decision was made to expedite UST removal activities so as not to damage the integrity of a fiber optic cable located within the UST basin. On October 25, 2006, RES Environmental Services excavated and disposed the former UST. During the removal of the UST, soils and groundwater were noted to have been impacted by petroleum contamination. Due to contractual limitations, not all of the soils displaying signs of petroleum impact were excavated during the UST removal. Additionally, a groundwater sample obtained from a temporary well installed adjacent to the former tank basin exhibited contaminants in excess of the North Carolina Administrative Code (NCAC) T15A:02L Groundwater Quality Standards (2L GWQS). Therefore, a Phase I LSA was requested.

This document provides data to fulfill the requirements for Limited Site Assessment in accordance with 15A NCAC 2L .405. 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: May 2, 2007
Facility ID: N/A **UST Incident Number (if known):** Pending
Site Name: AS-510
Site Location: Marine Corps Air Station, New River
Nearest City/Town: Jacksonville **County:** Onslow
UST Owner: Commanding Officer – MCB Camp Lejeune
I&E/EMD/EQB
PSC 20004
Address: MCB Camp Lejeune, NC 28542 **Phone:** (910) 451-5068

UST Operator: Same as above (see Table 2)
Address: Same as above **Phone:** Same as above

Property Owner: Same as above (see Table 2)
Address: Same as above **Phone:** Same as above

Property Occupant: Unknown
AS-510 – Intersection of Campbell Street and
Address: an unnamed access road. **Phone:**

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

Release Information

Date Discovered: October 2006
Easting: 276250.96 **Northing:** 3844584.49
Estimated Quantity of Release: Unknown
Cause of Release: Unknown
Source of Release (e.g. Piping/UST): The source of the release is unknown; however, the removed UST appeared to be in poor condition with rusting and substantial pitting. With the addition of the fill port, no additional lines were identified during removal activities.

Sizes and contents of UST system(s) from which the release occurred:
One 500-gallon 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**

   No information provided indicates a water supply well has been contaminated as a result of the release from the AS-510 potential 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 MCAS New River 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?* YES **NO**
   If YES describe.

   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 a tributary to Southwest Creek located approximately 2,000 feet northeast of site AS-510 (refer to 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 on MCB Camp Lejeune as 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 currently 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, which extends from the ground surface to approximately 32 feet below grade. 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 MCAS, New River. Groundwater obtained from the Castle Hayne Aquifer is the raw water source for the MCAS, New River 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**

Surficial groundwater samples from site monitoring well USTAS510-MW01 were analyzed per EPA Method 602 + Xylenes, EPA Method 625+TICs and MADEP VPH/EPH parameters. 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.

The AS-510 project site is a parking lot located aboard the MCAS, New River, North Carolina.

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.

The AS-510 project site is located aboard the MCAS, New River, North Carolina and the subject property does not contain any places of public assembly (refer to Figure 1).

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 AS-510 project site is a parking lot located aboard the MCAS, New River, North Carolina.

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

Due to the subject site lying in an Industrial/Commercial area, children most likely will not visit the subject property.

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

The project site is located within the MCAS, New River and is restricted to base personnel and visitors.

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

The project site is capped with asphalt.

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?*

The MCAS, New River is not subject to local or county-zoning requirements; however, the project site is located within an Industrial/Commercial use area.

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

The current use of the MCAS, New River 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 project site is located within the MCAS, New River and is in an Industrial/Commercial use area.

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?*

   Athletic Courts are located approximately 1,000 feet north of the project site.

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

   As stated previously, site AS-510 is located within an Industrial/Commercial use area.

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

   The surrounding property is utilized primarily for military operations associated with the support and maintenance of aircraft.

C. RECEPTOR INFORMATION

1. Water Supply Wells

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

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 Building AS-510, 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 MCAS, New River water supply system. Groundwater obtained from the Castle Hayne Aquifer is the raw water source for the MCAS, New River potable water treatment facilities.

3. Surface Water

As stated previously, the nearest mapped surface water body is a tributary to Southwest Creek located approximately 2,000 feet northeast of the potential source area.

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 MCAS, New River. These utilities are reportedly located above the surficial groundwater table (± 6 feet 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 1).

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 site groundwater monitoring well USTAS510-MW-01. The encountered site soils can be summarized as follows:

USTAS510-MW01		
Depth in feet BLS	Soil Description	USCS
0-0.5	Asphalt	
0.5-3	No Split Spoon Sample	
3-5	Brown to tan, Silty very fine Sand. Trace orange-brown staining.	SP/SM
5-8	No Split Spoon Sample	
8-9	Dark gray very fine Sandy Clay. High Plasticity. Very soft.	CL
9-10	Dark brown fine to very fine Sand. Loose.	SM
10-13	No Split Spoon Sample	

The soils described above are consistent with undivided surficial deposits typically encountered within the area Coastal Plain Physiographic Province. A copy of the USTAS510-MW01 boring log, monitoring well as-built and North Carolina Well Construction record have been provided in Appendix A.

D.2 Site Hydrogeology

During the February 20, 2007 site visit, CATLIN personnel obtained depth to water data from site monitoring well USTAS510-MW01. Depth to surficial groundwater at well USTAS510-MW01 was 5.64 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 detail and the groundwater gauging data has been summarized in Table 3. The location of the monitoring well has been illustrated on Figure 2.

E. SAMPLING RESULTS

The initial findings of the UST Closure Report indicated potential areas of concern in the site groundwater. Soil laboratory data obtained during the closure activities was sufficient to assess on-site soil quality. To assess the potential impact to the site surficial aquifer a permanent Type II monitoring well (USTAS510-MW01) was installed at the location where soil staining was noted during the UST closure activities. All surficial groundwater assessment fieldwork methods were conducted in general accordance with CATLIN's Standard Methods of Investigation and Data Evaluation. A copy of the CATLIN Standard Methods of Investigation has been provided in Appendix B.

E.1 Soil Sampling

UST Closure Report – December 2006

During UST closure activities, soil staining and a strong petroleum hydrocarbon odor was detected. Sovereign obtained one soil sample from each of the side walls for analysis per EPA Methods 8260 and 8270 and MADEP VPH and EPH. Concentrations of Benzene , Naphthalene, 1,2,4-Trimethylbenzene, Benzo[a]anthracene, Benzo[a]pyrene, Dibenzofuran, 2-Methylnaphthalene ,C9-C18 Aliphatics and C9-C22 Aromatics were identified in three of the four side wall samples at concentrations above current Soil to Groundwater MSCCs. Benzo[a]pyrene, 2-Methylnaphthalene and C9-C22 Aromatics were the only constituents identified at concentrations above current Residential MSCCs. No constituents were identified within the samples collected from the excavation at concentrations above currently established Industrial/Commercial MSCCs.

LSA Investigation – February 2007

No soil samples were collected for laboratory analysis during this Phase I LSA investigation.

E.2 Groundwater Sampling

UST Closure Report – December 2006

During UST closure activities, a temporary monitoring well was installed for the collection of groundwater samples. Groundwater samples were analyzed per EPA Methods 602, 625 + TICs, 3030C and MADEP VPH and EPH. Benzene (1.53ug/L) and Naphthalene (42.5ug/L) were identified in the groundwater sample collected from temporary monitoring well USTAS510-MW01 at concentrations above the current 2L GWQS. The groundwater sample also contained C9-C22 Aromatics (<1,100ug/L) at a concentration above the current 2L GWQS. No groundwater constituents were identified above currently established GCLs.

LSA Investigation – February 2007

CATLIN personnel installed Type II monitoring well USTAS510-MW01 on February 16, 2007. The groundwater was allowed to equilibrate and the well was gauged for depth to water, potential free-phase product thickness, and to determine well volume. CATLIN purged a minimum of three well volumes from the monitoring well prior to placing groundwater samples directly into laboratory provided glassware. A copy of the sampling field data worksheet has been provided in Appendix C. All groundwater samples were labeled with the monitoring well identification, sample date, site name, sampler, and placed in an iced cooler. Samples were then delivered to SGS Environmental Services, Inc. (North Carolina Certification #481) in Wilmington, North Carolina. In accordance with Table 10 of the *2001 Guidelines,* site groundwater samples were analyzed for suspected fuel oil contamination per EPA Method 602 + Xylenes, EPA Method 625 (+ 10 largest non-target peaks) and MADEP VPH/EPH.

A copy of the resulting groundwater sample laboratory analysis report has been provided in Appendix D. For regulatory compliance, the resulting laboratory analysis data have been compared to applicable 2L GWQS and GCL listed in the *2001 Guidelines.* Laboratory results of the groundwater samples submitted for laboratory analysis can be summarized as follows:

EPA METHOD 602 + XYLENES

Laboratory analysis of monitoring well USTAS510-MW01 groundwater samples revealed all EPA Method 602 compounds below the laboratory quantitation limits or below the 2L GWQS except for Benzene (5.79 ug/L; limit 1 ug/L). The GCL for Benzene is 5,000 ug/L. EPA Method 602 laboratory report data has been summarized in Table 4B and is illustrated on Figure 4.

EPA METHOD 625 + TICs

Laboratory analysis of the groundwater sample from monitoring well USTAS510-MW01 detected no EPA Method 625 compounds above 2L GWQS. EPA Method 625 laboratory report data has been summarized in Table 4A and is illustrated on Figure 3.

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 Tentatively Identified Compounds (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 of these TICs. Laboratory analysis revealed several TICs in the USTAS510-MW01 groundwater samples.

MADEP VPH/EPH

Laboratory analysis of monitoring well USTAS510-MW01 groundwater sample revealed that the C9-C22 Aromatic concentration was above the 2L GWQS. GCLs have not been established for MADEP hydrocarbon fractions. MADEP VPH/EPH laboratory report data has been summarized on Table 4C and is illustrated on Figure 5.

E.3 Free-Phase Product

No measurable thickness of free-phase product was detected in the site groundwater monitoring well USTAS510-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 subject site meets the criteria for Industrial/Commercial land use and Low Risk classification.

- Based on the results of soil sampling performed as part of the Tank Closure, contaminant constituents were identified in excess of the Soil-to-Groundwater and Residential MSCCs; however, no contaminants were identified in excess of Industrial/Commercial MSCCs.

- The groundwater sarnple from USTAS510-MW01 was analyzed per EPA Method 602 + Xylenes, EPA Method 625 (+ 10 largest non-target peaks) and MADEP VPH/EPH. Laboratory analyses revealed that all analyte concentrations were either below method detection limits or below applicable 2L GWQS and GCLs, except as follows:

  - Benzene (5.79 ug/L) and the C9-C22 (<260 ug/L) Aromatic concentration were above their corresponding 2L GWQS. The GCL for Benzene is 5,000 ug/L. GCLs for MADEP hydrocarbon fractions have not been established.

- No measurable thickness of free-phase product was detected in the site groundwater monitoring well USTAS510-MW01 during this Phase I LSA.

F.2 Recommendations

Ultimately, the NCDENR Division of Waste Management UST Section Underground Storage Section personnel will 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.

Current site soil and groundwater conditions apparently meet the criteria for "No Further Action" with a "Notice of Residual Petroleum" or Land Use Restrictions.

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 Corps Base, Camp Lejeune, North Carolina, August 2002.

CATLIN Engineers and Scientists, *Underground Storage Tank Closure Report for UST AS510, Marine Corps Air Station, New River, North Carolina,* December 18, 2006.

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/frametstnew.php.

TABLES

TABLE 1
SITE HISTORY

UST SYSTEM INFORMATION

AS-510
PHASE I LIMITED SITE ASSESSMENT
MCAS, NEW RIVER, NORTH CAROLINA

UST ID Number	Product	Capacity (gallons)	Date Installed	Date Permanently Closed
Unknown	Unknown	500	Unknown	10/25/2006

TABLE 2
SITE HISTORY

UST OWNER/OPERATOR INFORMATION

AS-510
PHASE I LIMITED SITE ASSESSMENT
MCAS, NEW RIVER, NORTH CAROLINA

Dates of Ownership/Operation	UST ID Number	Name of Owner/ Operator	Address	Telephone Number
Unknown	Unknown	Commanding Officer Attn: Director I&E/EMD/EQB	PSC Box 20004 Marine Corps Base Camp Lejeune, NC 28542-0004	(910) 451-5068

TABLE 3

WELL CONSTRUCTION INFORMATION

AS-510
PHASE I LIMITED SITE ASSESSMENT
MCAS, NEW RIVER, NORTH CAROLINA

Well ID	Date Installed (m/dd/yyyy)	Date Water Level Measured (m/dd/yyyy)	Well Casing Depth (ft. BGS)	Screened Interval (x to y ft. BGS)	Bottom of Well (ft. BGS)	Top of Casing Elevation (ft.)	Depth to Water from Top of Casing (ft.)	Free Product Thickness (ft.)	Ground Water Elevation (ft.)	Comments
USTAS510-MW01	2/13/2007	2/20/2007	3	3-13	13	16.59	5.64	0.00	10.95	Monitoring

ft BGS = feet below ground surface

TABLE 4A
SUMMARY OF GROUNDWATER LABORATORY RESULTS

Name: AS-510

Date: February 2007

Analytical Method: EPA Method 602 + Xylenes

Well ID	Contaminant of Concern → Sample ID	Date Collected	Benzene	Ethylbenzene	m/p-Xylene	o-Xylene	Remaining EPA Method 602 Compounds
2L GWQS GCL			1 5,000	550 84,500	530* 87,500*		Varies Varies
USTAS510-MW01	USTAS510-MW01	2/20/2007	5.79	7.01	3.77	<2.0	BQL

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

* = Total Xylenes limit

BQL = Below Quantitation Limit

Shaded results indicate concentration above 2L GWQS.

TABLE 4B SUMMARY OF GROUNDWATER LABORATORY RESULTS

Date: February 2007 Name: AS-510

Analytical Method: EPA Method 625

Well ID	Contaminant of Concern →		Acenaphthene	Fluorene	Naphthalene	Phenanthrene	All Other Remaining EPA Method 625 Compounds
	Sample ID	Date Collected					
2L GWQS			80	280	21	210	Varies
GCL			2,120	950	15,500	410	Varies
USTAS510-MW01	USTAS510-MW01	2/20/2007	3.10 J	4.90 J	10.6	4.50 J	BQL

BQL = Below Quantitation Limit

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

J = Below calibration limit, concentration is an estimated value

TABLE 4C SUMMARY OF GROUNDWATER LABORATORY RESULTS

Date: February 2007

Name: AS-510

Analytical Method: MADEP VPH/EPH as compared to NCDENR 2L GWQS

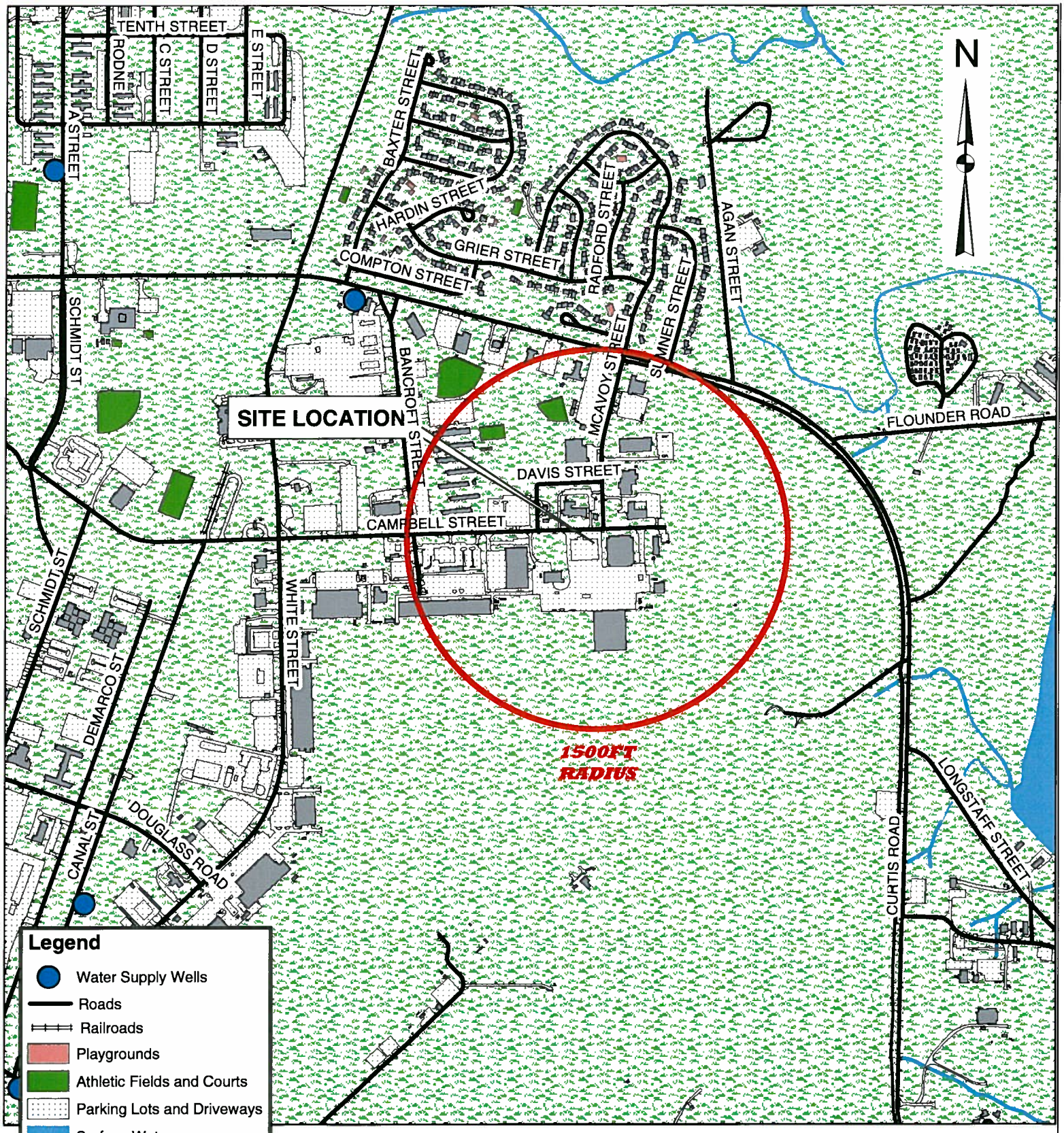
Well ID	Hydrocarbon Fraction of Concern →		C5-C8 Aliphatics	C9-C18 Aliphatics	C19-C36 Aliphatics	C9-C22 Aromatics
	Sample ID	Date Collected				
GCL 2L GWQS			NE 420	NE 4,200	NE 42,000	NE 210
USTAS510-MW-01	USTAS510-MW-01	2/20/2007	<100	410	<100	<260 *

* The value represents the sum of the reported practical quantitation limit of one fraction and the detected concentration of the other fraction.

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

Shaded results indicate concentration above 2L GWQS.

FIGURES

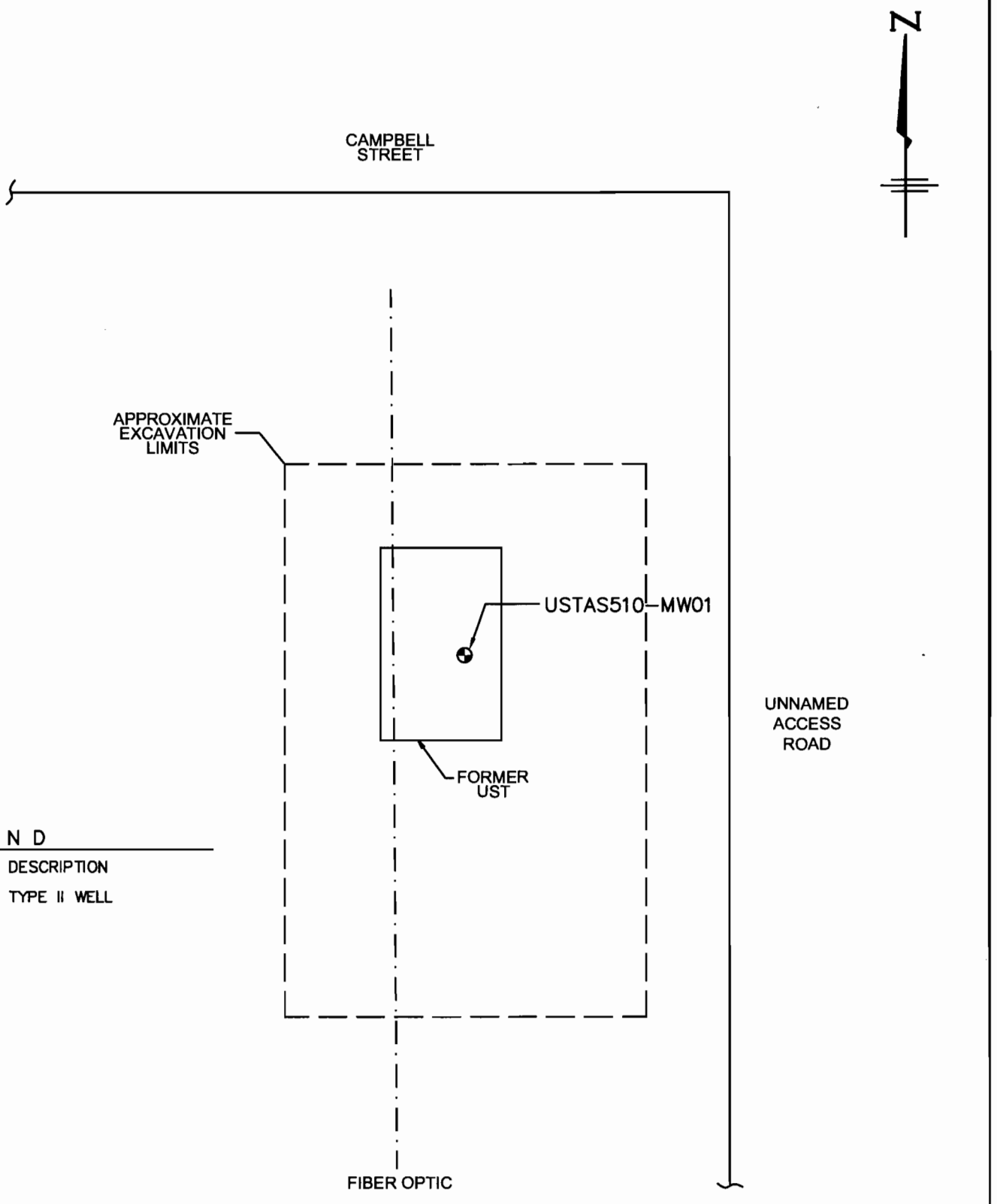


Data Sources: Data Layers provided by MCB Camp Lejeune GIS Office.

CATLIN ENGINEERS and SCIENTISTS
WILMINGTON, NORTH CAROLINA

PROJECT	TITLE	FIGURE
AS-510 PHASE I LIMITED SITE ASSESSMENT MCAS, NEW RIVER, NC	1,500' RADIUS WITH WATER WELL SURVEY AND PLACES OF PUBLIC ASSEMBLY	1

JOB NO.	DATE	SCALE	DRAWN BY	CHECKED BY
205-077	APRIL 2007	AS SHOWN	KAWS	JAC



NOTES:
1. ALL LOCATIONS ARE APPROXIMATE.
2. SITE SKETCH BASED ON FIELD SKETCH PROVIDED BY SOVEREIGN CONSULTING INC.

CATLIN ENGINEERS and SCIENTISTS
WILMINGTON, NORTH CAROLINA

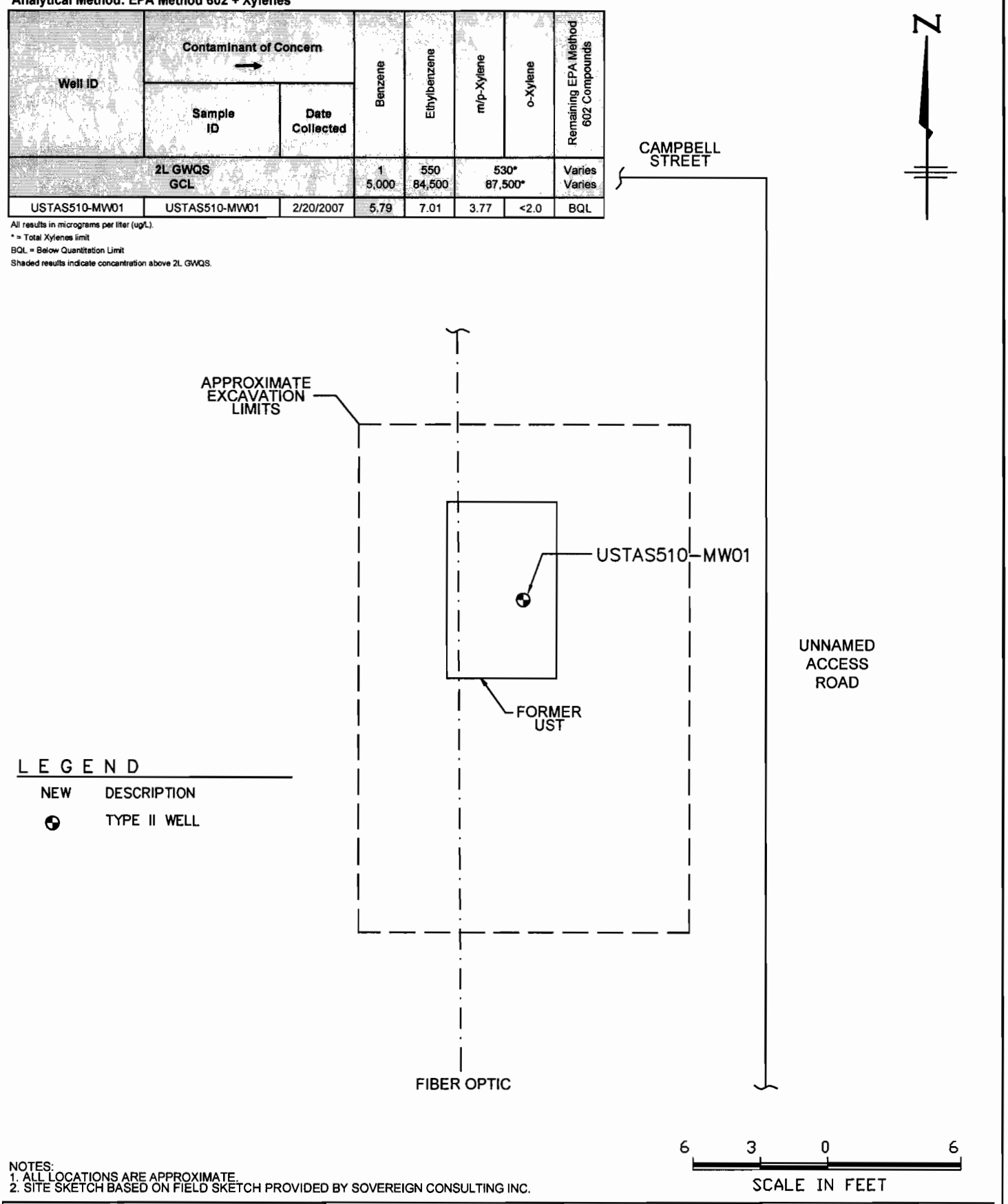
PROJECT: AS-510 PHASE I LIMITED SITE ASSESSMENT MCAS, NEW RIVER, NC		TITLE: SITE PLAN WITH MONITORING WELL LOCATION			FIGURE 2
JOB NO: 205-077	DATE: APRIL 2007	SCALE: 1"=6'	DRAWN BY: KAWS	CHECKED BY: JAC	

205077-AS-510-APRIL07-FIGURE2

Analytical Method: EPA Method 602 + Xylenes

Well ID	Contaminant of Concern →		Benzene	Ethylbenzene	m/p-Xylene	o-Xylene	Remaining EPA Method 602 Compounds
	Sample ID	Date Collected					
2L GWQS GCL			1 5,000	550 84,500	530* 87,500*		Varies Varies
USTAS510-MW01	USTAS510-MW01	2/20/2007	5.79	7.01	3.77	<2.0	BQL

All results in micrograms per liter (ug/L).
* = Total Xylenes limit
BQL = Below Quantitation Limit
Shaded results indicate concentration above 2L GWQS.



NOTES:
1. ALL LOCATIONS ARE APPROXIMATE.
2. SITE SKETCH BASED ON FIELD SKETCH PROVIDED BY SOVEREIGN CONSULTING INC.

CATLIN ENGINEERS and SCIENTISTS
WILMINGTON, NORTH CAROLINA

PROJECT: AS-510 PHASE I LIMITED SITE ASSESSMENT MCAS, NEW RIVER, NC

TITLE: SITE PLAN WITH GROUNDWATER ANALYSIS RESULTS - EPA METHOD 602 + XYLENES

FIGURE 3

JOB NO: 205-077 | DATE: APRIL 2007 | SCALE: 1"=6' | DRAWN BY: KAWS | CHECKED BY: JAC

205077-AS-510-APRIL07-FIGURE3

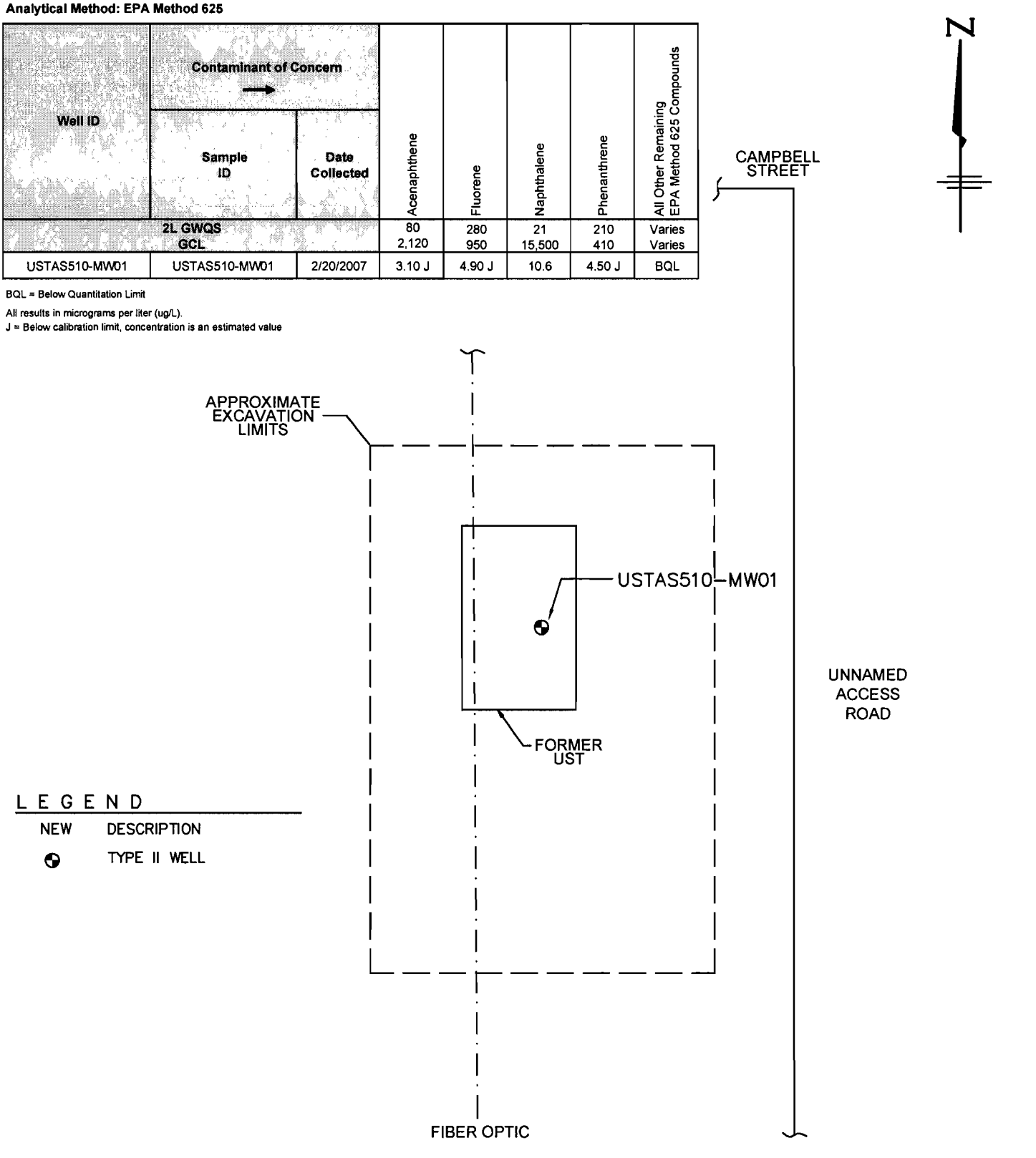
Analytical Method: EPA Method 625

Well ID	Contaminant of Concern → Sample ID	Date Collected	Acenaphthene	Fluorene	Naphthalene	Phenanthrene	All Other Remaining EPA Method 625 Compounds
2L GWQS			80	280	21	210	Varies
GCL			2,120	950	15,500	410	Varies
USTAS510-MW01	USTAS510-MW01	2/20/2007	3.10 J	4.90 J	10.6	4.50 J	BQL

BQL = Below Quantitation Limit

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

J = Below calibration limit, concentration is an estimated value



NOTES:
1. ALL LOCATIONS ARE APPROXIMATE.
2. SITE SKETCH BASED ON FIELD SKETCH PROVIDED BY SOVEREIGN CONSULTING INC.

CATLIN ENGINEERS and SCIENTISTS
WILMINGTON, NORTH CAROLINA

PROJECT: AS-510 PHASE I LIMITED SITE ASSESSMENT MCAS, NEW RIVER, NC

TITLE: SITE PLAN WITH GROUNDWATER ANALYSIS RESULTS – EPA METHOD 625

FIGURE 4

JOB NO: 205-077 | DATE: APRIL 2007 | SCALE: 1"=6' | DRAWN BY: KAWS | CHECKED BY: JAC

205077-AS-510-APRIL07-FIGURE4

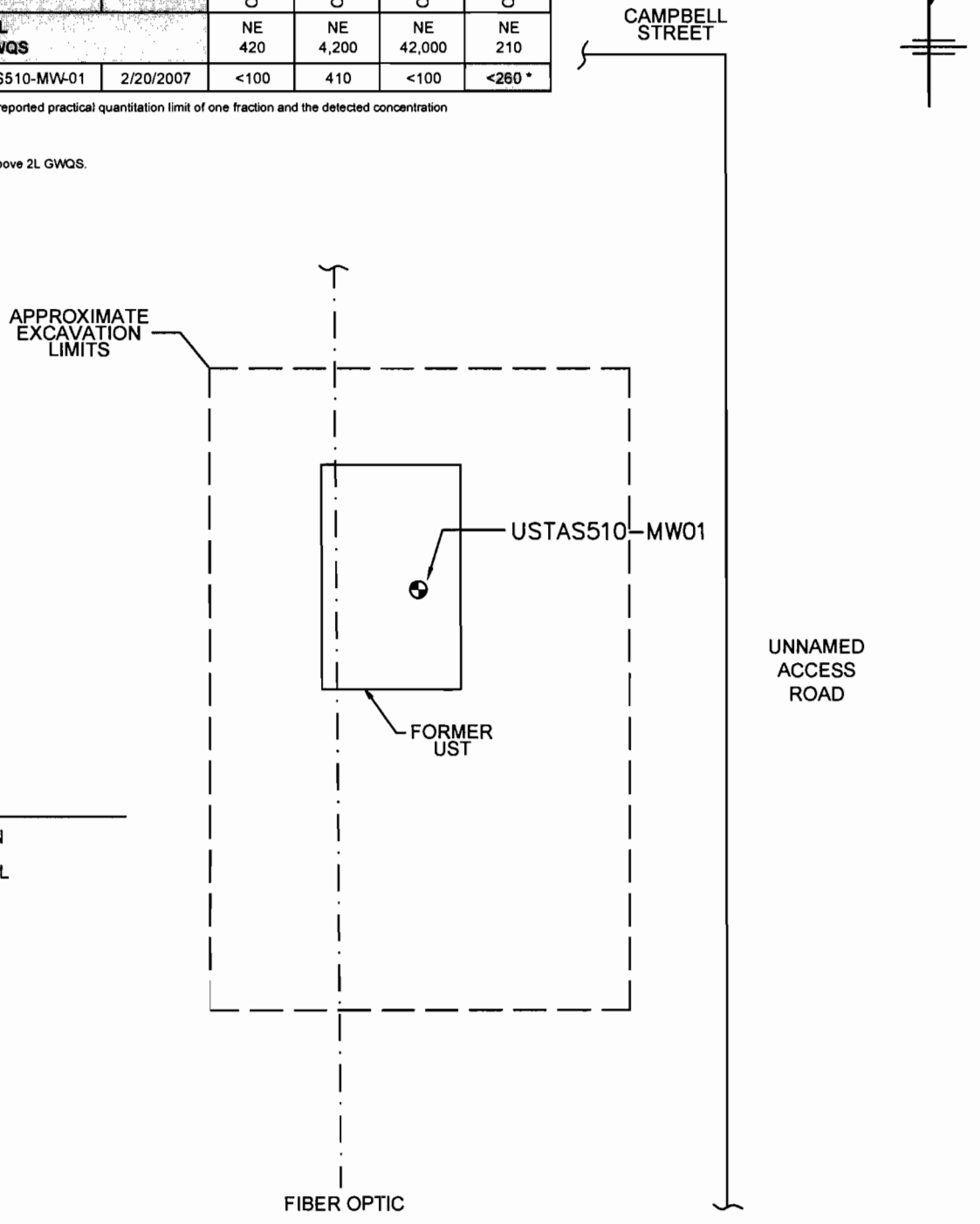
Analytical Method: MADEP VPH/EPH as compared to NCDENR 2L GWQS

Well ID	Hydrocarbon Fraction of Concern → Sample ID	Date Collected	C5-C8 Aliphatics	C9-C18 Aliphatics	C19-C36 Aliphatics	C9-C22 Aromatics
GCL 2L GWQS			NE 420	NE 4,200	NE 42,000	NE 210
USTAS510-MW-01	USTAS510-MW-01	2/20/2007	<100	410	<100	<260 *

* The value represents the sum of the reported practical quantitation limit of one fraction and the detected concentration of the other fraction.

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

Shaded results indicate concentration above 2L GWQS.



NOTES:
1. ALL LOCATIONS ARE APPROXIMATE.
2. SITE SKETCH BASED ON FIELD SKECTH PROVIDED BY SOVEREIGN CONSULTING INC.

CATLIN ENGINEERS and SCIENTISTS
WILMINGTON, NORTH CAROLINA

PROJECT: AS-510 PHASE I LIMITED SITE ASSESSMENT MCAS, NEW RIVER, NC

TITLE: SITE PLAN WITH GROUNDWATER ANALYSIS RESULTS – MADEP VPH/EPH AS COMPARED TO NCDENR 2L GWQS

FIGURE 5

JOB NO: 205-077 | DATE: APRIL 2007 | SCALE: 1"=6' | DRAWN BY: KAWS | CHECKED BY: JAC

205077-AS-510-APRIL07-FIGURE5

APPENDICES

APPENDIX A

BORING LOG, MONITORING WELL AS-BUILT, AND NORTH CAROLINA WELL CONSTRUCTION RECORD

WELL LOG

CATLIN ENGINEERS and SCIENTISTS
205-077
Wilmington, NC

SHEET 1 OF 1

PROJECT NO.: 205-077	STATE: NC	COUNTY: Onslow	LOCATION: Jacksonville
PROJECT NAME: Building AS-510		LOGGED BY: T. Stetler	WELL ID: USTAS510 - MW01
		DRILLER: William J. Miller	
NORTHING: 3844602.5	EASTING: 276205.9	CREW: A. Chance	
SYSTEM: UTM NAD83 (m)	BORING LOCATION: In striped "No Parking" area		T.O.C. ELEV.:
DRILL MACHINE: CME 45B ATV	METHOD: HSA	0 HOUR DTW: 4.3	TOTAL DEPTH: 13.0
START DATE: 2/16/07	FINISH DATE: 2/16/07	24 HOUR DTW: 5.6	WELL DEPTH: 13.0

DEPTH	BLOW COUNT 6in	6in	6in	6in	OVA (ppm)	LAB.	USCS	LOG	SOIL AND ROCK DESCRIPTION	WELL DETAIL
									0.0 LAND SURFACE	0.0
0.0									0.5 6" ASPHALT	0.0
0.5										1.0
										1.5
3.0									3.0	3.0
	2	2	2	2	31.9		SP/SM		Brown to tan, SILTY vf. SAND. Trace orange-brown staining. Saturated. Slight HCO.	
5.0									5.0	
8.0									8.0	
	0	0	3	3	814.5		CL		Dark gray, vf. SANDY CLAY. High Plasticity. Wet. Very soft.	
9.0							SM		9.0 Dark brown, f. to vf. SAND. Saturated. Loose. Strong HCO.	
10.0									10.0	
									Boring Terminated at Depth 13.0 ft	13.0 13.0

2" Sch. 40 PVC

2" .010 Sch. 40 PVC

Portland Cement | Bentonite Pellets | #2 Medium Sand

CATLIN BORING LOG 205-077 AS-510.GPJ TEST.GDT 3/27/07

NON RESIDENTIAL WELL CONSTRUCTION RECORD

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

WELL CONTRACTOR CERTIFICATION #: 2927

1. WELL CONTRACTOR:

William J. Miller
Well Contractor (Individual) Name

CATLIN Engineers and Scientists
Well Contractor Company Name

STREET ADDRESS 220 Old Dairy Road

Wilmington | North Carolina | 28405
City or Town | State | Zip Code

(910) - 452-5861
Area code - Phone number

2. WELL INFORMATION

SITE WELL ID #(if applicable): USTAS510 - MW01
STATE WELL PERMIT #(if applicable): N/A
DWQ or OTHER PERMIT # (if applicable): N/A
WELL USE (Check Applicable Box): Monitoring ☒ Municipal/Public ☐
Industrial/Commercial ☐ Agricultural ☐ Recovery ☐ Injection ☐
Irrigation ☐ Other ☐ (list use):
DATE DRILLED: 02/16/2007
TIME COMPLETED: 12:00 **AM** ☐ **PM** ☒

3. WELL LOCATION:

CITY: Jacksonville COUNTY: Onslow
Bldg. AS-510, MCAS New River,
(Street Name, Numbers, Community, Subdivision, Lot No., Parcel, Zip Code)

TOPOGRAPHIC / LAND SETTING
Slope ☐ Valley ☐ Flat ☒ Ridge ☐ Other:

NORTHING: 3,844,602.5
EASTING: 276,205.9
UTM NAD83 (m)
May be in degrees, minutes, seconds, or in a decimal format

Latitude/longitude source: ☒ GPS ☐ Topo. map
(Location of well must be shown on a USGS topo map and attached to this form if not using a GPS.)

4. FACILITY - is the name of the business where the well is located.

FACILITY ID #(if applicable) N/A
NAME OF FACILITY:
STREET ADDRESS: Bldg. AS-510, MCAS New River
Jacksonville | NC
City or Town | State | Zip Code
CONTACT PERSON: Mr. Andrew Smith
STREET ADDRESS: Attn: I&E/ EMD/ EQB/ PSC Box 20004
Camp Lejeune | NC | 28542-0004
City or Town | State | Zip Code

(910)- 451-9017
Area code - Phone number

5. WELL DETAILS:

a. TOTAL DEPTH: 13
b. DOES WELL REPLACE EXISTING WELL? YES ☐ NO ☒
c. WATER LEVEL Below Top of Casing: 5.64 FT.
(Use "+" if Above Top of Casing)

d. TOP OF CASING IS 0 FT. Above Land Surface*
* Top of casing terminated at/or below land surface requires a variance in accordance with 15A NCAC 2C.0118

e. YIELD (gpm): N/A **METHOD OF TEST:** N/A
f. DISINFECTION: Type N/A **Amount:** N/A
g. WATER ZONES (depth):
From ____ To ____ From ____ To ____
From ____ To ____ From ____ To ____
From ____ To ____ From ____ To ____

6. CASING:

	Depth		Diameter	Thickness/ Weight	Material
From 0	To 3	ft.	2	Sch. 40	PVC
From ____	To ____	ft.	____	____	____
From ____	To ____	ft.	____	____	____

7. GROUT:

	Depth		Material	Method
From 0	To 1	Ft.	Portland Cement	Surface Pour
From 1	To 1.5	Ft.	Bent. Pellets	Surface Pour
From ____	To ____	Ft.	____	____

8. SCREEN:

	Depth		Diameter	Slot Size	Material
From 3	To 13	Ft.	2 in.	.010 in.	PVC
From ____	To ____	Ft.	____ in.	____ in.	____
From ____	To ____	Ft.	____ in.	____ in.	____

9. SAND/GRAVEL PACK:

	Depth		Size	Material
From 1.5	To 13	Ft.	#2 Medium	Torpedo Sand
From ____	To ____	Ft.	____	____
From ____	To ____	Ft.	____	____

10. DRILLING LOG

From	To	Formation Description
		SEE ATTACHED

11. REMARKS:

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

SIGNATURE OF CERTIFIED WELL CONTRACTOR — DATE 4/25/07

William J. Miller
PRINTED NAME OF PERSON CONSTRUCTING THE WELL

Submit the original to the Division of Water Quality within 30 days, Attn: Information Management, 1617 Mail Service Center - Raleigh, NC 27699167, Phone No. (919) 733-7015 ext 568.

Modified from Form GW-1b Rev. 7/05

APPENDIX B

CATLIN STANDARD METHODS OF INVESTIGATION

CATLIN STANDARD METHODS OF INVESTIGATION

(REVISED APRIL 2002)

1.0 DATA COLLECTION

1.1 BACKGROUND DATA

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

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

1.2 SURVEYS AND POTENTIAL RECEPTOR DATA

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

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

1.2.1 Horizontal Survey

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

1.2.2 Vertical Survey

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

1.3 DRILLING AND MONITORING WELL/PIEZOMETER INSTALLATION

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

1.3.1 Drilling Methods and Subsurface Data Collection

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

Auger Drilling

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

Hand Augering

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

Direct Push

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

Other Methods

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

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

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

1.3.2 Hydropunch Installation

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

1.3.3 Well Installation

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

1.3.4 Well Development

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

1.4 HYDROGEOLOGIC DATA COLLECTION

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

1.4.1 Regional Geology

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

1.4.2 Site Geology

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

1.4.3 Groundwater Occurrence and Characteristics

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

Well Water Levels

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

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

Aquifer Testing

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

Other Methods

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

1.5 PETROLEUM HYDROCARBON DATA COLLECTION

1.5.1 Collection Methods

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

Field Analysis

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

Laboratory Analysis

- Laboratory analysis of phase-separated products.

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

1.5.2 Field Sampling

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

Product Samples

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

Vapor Samples

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

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

Soil Samples

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

Groundwater Samples

Groundwater samples are collected in accordance with the following procedures:

- Creeks/Lakes/Etc.

  Grab samples are obtained.

- Domestic Wells

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

- Monitoring Wells

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

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

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

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

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

Sampling records are field prepared.

Samples are labeled and proper chain of custody documents are maintained.

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

2.0 DATA EVALUATION

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

- Background data are evaluated in context with the suspected or confirmed problem.
- Survey data are utilized to develop site maps and to evaluate contaminant receptors.
- Well construction records are compiled and presented as part of the report. As-built information is used in combination with other data to evaluate subsurface conditions and monitoring well screen settings as they relate to the investigation.
- Subsurface drilling logs are used to develop geologic cross-sections, fence diagrams, isopachs, 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

SAMPLING FIELD DATA WORKSHEET

AS-510
PHASE I LIMITED SITE ASSESSMENT
MCAS, NEW RIVER, NORTH CAROLINA

Well No.	Date	Time Sampled	Diameter (in.)	Well Depth (feet)	DTW (feet)	Feet of Water in Well	Gal/Foot	One Volume (gals.)	Three Volumes (gals.)	Volume of Bailer (gals.)	No. Bails Required	No. Bails Taken
USTAS510-MW01	2/20/2007	1230	2	13	5.64	7.36	0.163	1.20	3.60	0.24	15.00	15

APPENDIX D

LABORATORY REPORTS
AND
CHAIN-OF-CUSTODY DOCUMENTATION

Mr. Mike E. Mason
Richard Catlin & Associates
P.O. Box 10279
Wilmington NC 28404-0279

Report Number: G128-1901

Client Project: 205-077

Dear Mr. Mason:

Enclosed are the results of the analytical services performed under the referenced project. The samples are certified to meet the requirements of the National Environmental Laboratory Accreditation Conference Standards. Copies of this report and supporting data will be retained in our files for a period of five years in the event they are required for future reference. Any samples submitted to our laboratory will will be retained for a maximum of thirty (30) days from the date of this report unless other arrangements are requested.

If there are any questions about the report or the services performed during this project, please call SGS/Paradigm at (910) 350-1903. We will be happy to answer any questions or concerns which you may have.

Thank you for using SGS/Paradigm Analytical Labs for your analytical services. We look forward to working with you again on any additional analytical needs which you may have.

Sincerely,
SGS/Paradigm Analytical Laboratories, Inc.

Laboratory Director
J. Patrick Weaver

3/6/2007
Date

Results for Volatiles
by GC 602

Client Sample ID: AS-510 MW-01
Client Project ID: 205-077
Lab Sample ID: G128-1901-1A
Lab Project ID: G128-1901

Analyzed By: RSB
Date Collected: 2/20/2007 12:30
Date Received: 2/20/2007
Matrix: Water

Analyte	Result ug/L	RL ug/L	MDL ug/L	Dilution Factor	Date Analyzed	Flags
Benzene	**5.79**	1.00	0.183	1	2/28/2007	
Diisopropyl ether (DIPE)	BQL	1.00	0.229	1	2/28/2007	
Ethylbenzene	**7.01**	1.00	0.181	1	2/28/2007	
Methyl-tert butyl ether (MTBE)	BQL	2.00	0.359	1	2/28/2007	
Toluene	BQL	1.00	0.157	1	2/28/2007	
m/p-Xylene	**3.77**	2.00	0.481	1	2/28/2007	
o-Xylene	BQL	2.00	0.584	1	2/28/2007	

Surrogate Spike Recoveries	Spike Added	Spike Result	Percent Recovery
Trifluorotoluene	40	43.2	108

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

Reviewed By: [signature]
GC-VOA_WA

Results for Volatiles
by GC 602

Client Sample ID: Method Blank
Client Project ID:
Lab Sample ID: VBLK3022807A
Lab Project ID:

Analyzed By: RSB
Date Collected:
Date Received:
Matrix: Water

Analyte	Result ug/L	RL ug/L	MDL ug/L	Dilution Factor	Date Analyzed	Flags
Benzene	BQL	1.00	0.183	1	2/28/2007	
Diisopropyl ether (DIPE)	BQL	1.00	0.229	1	2/28/2007	
Ethylbenzene	BQL	1.00	0.181	1	2/28/2007	
Methyl-tert butyl ether (MTBE)	BQL	2.00	0.359	1	2/28/2007	
Toluene	BQL	1.00	0.157	1	2/28/2007	
m/p-Xylene	BQL	2.00	0.481	1	2/28/2007	
o-Xylene	BQL	2.00	0.584	1	2/28/2007	

Surrogate Spike Recoveries	Spike Added	Spike Result	Percent Recovery
Trifluorotoluene	40	43.1	108

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

Reviewed By: [signature]
GC-VOA_WA

Summary Results for Labortory Control Spike

Method: 602
GC3
Filename : 022807/004R

Compound	SA ug/L	Result ug/L	Rec (%)	LCS Limits Lower	LCS Limits Upper
Benzene	10.0	11.0	109.7	39	150
Chlorobenzene	10.0	10.7	107.2	55	135
1,2-Dichlorobenzene	20.0	22.1	110.5	37	154
1,3-Dichlorobenzene	10.0	10.8	108.3	50	141
1,4-Dichlorobenzene	20.0	21.6	108.2	42	143
• Diisopropyl ether	10.0	10.4	104.1	30	170
Ethylbenzene	10.0	11.1	111.3	32	160
• MTBE	20.0	22.0	109.8	35	165
Toluene	10.0	11.0	109.8	46	148
• m,p-Xylene	20.0	22.3	111.7	0	239
• o-Xylene	20.0	21.9	109.6	36	164

Flags :

+ = out of QC limits.
• = lab generated limits.
D = Detected
SA = Spiked Amount

Summary Results for Labortory Control Spike

Method: 602
GC3
Filename : 022807/005R

	Compound	SA ug/L	Result ug/L	Rec (%)	LCS Limits Lower	LCS Limits Upper
	Benzene	10.0	8.7	86.6	39	150
	Chlorobenzene	10.0	8.4	84.1	55	135
	1,2-Dichlorobenzene	20.0	17.3	86.6	37	154
	1,3-Dichlorobenzene	10.0	8.5	84.8	50	141
	1,4-Dichlorobenzene	20.0	16.8	84.1	42	143
•	Diisopropyl ether	10.0	8.1	81.1	30	170
	Ethylbenzene	10.0	8.7	87.2	32	160
•	MTBE	20.0	17.3	86.5	35	165
	Toluene	10.0	8.6	86.3	46	148
•	m,p-Xylene	20.0	17.4	87.2	0	239
•	o-Xylene	20.0	17.1	85.7	36	164

Flags :

+ = out of QC limits.
• = lab generated limits.
D = Detected
SA = Spiked Amount

Summary Results for MS-MSD

Sample : 022807/017F::022807/017R
MS : 022807/019F::022807/019R
MSD : 022807/020F::022807/020R

GC3

			µg/L			REC(%)		REC Limits	
	Compound	SA	Sam.	MS	MSD	MS	MSD	Lower	Upper
	Benzene	10.0	79.5	12.0	12.7	120	120	39	150
	Chlorobenzene	10.0	ND	11.2	12.0	112	112	55	135
	1,2-Dichlorobenzene	20.0	ND	23.1	25.1	116	116	37	154
	1,3-Dichlorobenzene	10.0	ND	11.2	12.1	112	112	50	141
	1,4-Dichlorobenzene	20.0	ND	21.9	23.6	109	109	42	143
•	Diisopropyl ether	10.0	1.2	12.9	13.7	129	129	30	170
	Ethylbenzene	10.0	13.2	12.3	13.1	123	123	32	160
•	MTBE	20.0	15.4	22.8	24.2	114	114	35	165
	Toluene	10.0	48.1	12.1	12.3	121	121	46	148
•	m,p-Xylene	20.0	21.9	24.0	25.2	120	120	D	239
•	o-Xylene	20.0	17.8	23.8	25.2	119	119	36	164

Flags :

+ = out of QC limits.
• = lab generated limits.
D = Detected
ND = None Detected
SA= Spike Added

SGS ENVIRONMENTAL SERVICES, INC.

Results for Semivolatiles
by GCMS 625

Client Sample ID: AS-510 MW-01
Client Project ID: 205-077
Lab Sample ID: G128-1901-1H
Lab Project ID: G128-1901

Analyzed By: EAW
Date Collected: 2/20/2007 12:30
Date Received: 2/20/2007
Date Extracted: 2/21/2007
Matrix: Water

Compound	Result ug/L	RL ug/L	MDL ug/L	Dilution Factor	Date Analyzed	Flag
Acenaphthene	**3.10**	10.0	1.22	1	2/23/2007	J
Acenaphthylene	BQL	10.0	1.12	1	2/23/2007	
Anthracene	BQL	10.0	1.75	1	2/23/2007	
Benzo[a]anthracene	BQL	10.0	1.36	1	2/23/2007	
Benzo[a]pyrene	BQL	10.0	1.27	1	2/23/2007	
Benzo[b]fluoranthene	BQL	10.0	1.43	1	2/23/2007	
Benzo[g,h,i]perylene	BQL	10.0	4.57	1	2/23/2007	
Benzo[k]fluoranthene	BQL	10.0	1.09	1	2/23/2007	
Bis(2-chloroethoxy)methane	BQL	10.0	1.11	1	2/23/2007	
Bis(2-chloroethyl)ether	BQL	10.0	1.09	1	2/23/2007	
Bis(2-chloroisopropyl)ether	BQL	10.0	1.57	1	2/23/2007	
Bis(2-ethylhexyl)phthalate	BQL	10.0	1.33	1	2/23/2007	
4-bromophenyl phenyl ether	BQL	10.0	1.99	1	2/23/2007	
Butylbenzylphthalate	BQL	10.0	1.53	1	2/23/2007	
2-Chloronaphthalene	BQL	10.0	1.25	1	2/23/2007	
2-Chlorophenol	BQL	10.0	4.22	1	2/23/2007	
4-Chloro-3-methylphenol	BQL	10.0	3.26	1	2/23/2007	
4-Chlorophenyl phenyl ether	BQL	10.0	1.42	1	2/23/2007	
Chrysene	BQL	10.0	1.11	1	2/23/2007	
Dibenzo[a,h]anthracene	BQL	10.0	4.87	1	2/23/2007	
Di-n-Butylphthalate	BQL	10.0	1.65	1	2/23/2007	
1,2-Dichlorobenzene	BQL	10.0	1.25	1	2/23/2007	
1,3-Dichlorobenzene	BQL	10.0	1.24	1	2/23/2007	
1,4-Dichlorobenzene	BQL	10.0	1.20	1	2/23/2007	
3,3'-Dichlorobenzidine	BQL	20.0	4.10	1	2/23/2007	
2,4-Dichlorophenol	BQL	10.0	3.75	1	2/23/2007	
Diethylphthalate	BQL	10.0	1.48	1	2/23/2007	
Dimethylphthalate	BQL	10.0	1.04	1	2/23/2007	
2,4-Dimethylphenol	BQL	10.0	9.25	1	2/23/2007	
Di-n-octylphthalate	BQL	10.0	1.16	1	2/23/2007	
4,6-Dinitro-2-methylphenol	BQL	50.0	3.71	1	2/23/2007	
2,4-Dinitrophenol	BQL	50.0	4.20	1	2/23/2007	
2,4-Dinitrotoluene	BQL	10.0	1.52	1	2/23/2007	
2,6-Dinitrotoluene	BQL	10.0	1.41	1	2/23/2007	
Diphenylamine *	BQL	10.0	1.53	1	2/23/2007	
Fluoranthene	BQL	10.0	1.41	1	2/23/2007	
Fluorene	**4.90**	10.0	1.22	1	2/23/2007	J
Hexachlorobenzene	BQL	10.0	1.22	1	2/23/2007	
Hexachlorobutadiene	BQL	10.0	1.58	1	2/23/2007	
Hexachlorocyclopentadiene	BQL	20.0	20.0	1	2/23/2007	
Hexachloroethane	BQL	10.0	1.58	1	2/23/2007	
Indeno(1,2,3-c,d)pyrene	BQL	10.0	4.57	1	2/23/2007	
Isophorone	BQL	10.0	1.27	1	2/23/2007	
Naphthalene	**10.6**	10.0	1.08	1	2/23/2007	

SGS ENVIRONMENTAL SERVICES, INC.

Results for Semivolatiles
by GCMS 625

Client Sample ID: AS-510 MW-01
Client Project ID: 205-077
Lab Sample ID: G128-1901-1H
Lab Project ID: G128-1901

Analyzed By: EAW
Date Collected: 2/20/2007 12:30
Date Received: 2/20/2007
Date Extracted: 2/21/2007
Matrix: Water

Compound	Result ug/L	RL ug/L	MDL ug/L	Dilution Factor	Date Analyzed	Flag
Nitrobenzene	BQL	10.0	1.32	1	2/23/2007	
2-Nitrophenol	BQL	10.0	3.52	1	2/23/2007	
4-Nitrophenol	BQL	50.0	3.17	1	2/23/2007	
N-Nitrosodi-n-propylamine	BQL	10.0	1.87	1	2/23/2007	
Pentachlorophenol	BQL	50.0	2.83	1	2/23/2007	
Phenanthrene	**4.50**	10.0	1.38	1	2/23/2007	J
Phenol	BQL	10.0	3.38	1	2/23/2007	
Pyrene	BQL	10.0	2.08	1	2/23/2007	
1,2,4-Trichlorobenzene	BQL	10.0	1.33	1	2/23/2007	
2,4,6-Trichlorophenol	BQL	10.0	2.92	1	2/23/2007	

	Spike Added	Spike Result	Percent Recovered
2-Fluorobiphenyl	10	8.1	81
2-Fluorophenol	10	8.2	82
Nitrobenzene-d5	10	8.4	84
Phenol-d6	10	8.3	83
2,4,6-Tribromophenol	10	9.4	94
4-Terphenyl-d14	10	7.6	76

Comments:

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

Flags:

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

Reviewed By: _____

SGS ENVIRONMENTAL SERVICES, INC.

Results of Library Search for Semivolatile Compounds

by GCMS

Client Sample ID: AS-510 MW-01
Client Project ID: 205-077
Lab Sample ID: G128-1901-1H
Lab Project ID: G128-1901
Sample Wt/Vol: 500 ML
Dilution: 1

Analyzed By: EAW
Date Collected: 2/20/2007 12:30
Date Received: 2/20/2007
Date Extracted: 2/21/2007
Date Analyzed: 2/23/2007
Matrix: Water

No.	Compound	Retention Time	CAS#	Match Probability	Result (ug/L)
1	Naphthalene, 2,6-dimethyl-	10.59	000581-42-0	97	42
2	Naphthalene, 2,7-dimethyl-	10.63	000582-16-1	97	29
3	Naphthalene, 1,7-dimethyl-	10.47	000575-37-1	96	24.5
4	Naphthalene, 1,4,6-trimethyl-	11.66	002131-42-2	97	21.2
5	Dodecane, 2,6,11-trimethyl-	12.75	031295-56-4	93	19.8
6	Naphthalene, 1,5-dimethyl-	10.77	000571-61-9	97	19.3
7	Unknown	11.70			18.7
8	Naphthalene, 1-ethyl-	10.38	001127-76-0	95	18.6
9	Benzene, 1,2,4,5-tetramethyl-	7.98	000095-93-2	90	17.5
10	Unknown	12.09			14.8

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: _____

SGS ENVIRONMENTAL SERVICES, INC.

Results for Semivolatiles
by GCMS 625

Client Sample ID: Method Blank
Client Project ID:
Lab Sample ID: PB7403
Lab Project ID:

Analyzed By: EAW
Date Collected:
Date Received:
Date Extracted: 2/21/2007
Matrix: WATER

Compound	Result ug/L	RL ug/L	MDL ug/L	Dilution Factor	Date Analyzed	Flag
Acenaphthene	BQL	10.0	1.22	1	2/24/2007	
Acenaphthylene	BQL	10.0	1.12	1	2/24/2007	
Anthracene	BQL	10.0	1.75	1	2/24/2007	
Benzo[a]anthracene	BQL	10.0	1.36	1	2/24/2007	
Benzo[a]pyrene	BQL	10.0	1.27	1	2/24/2007	
Benzo[b]fluoranthene	BQL	10.0	1.43	1	2/24/2007	
Benzo[g,h,i]perylene	BQL	10.0	4.57	1	2/24/2007	
Benzo[k]fluoranthene	BQL	10.0	1.09	1	2/24/2007	
Bis(2-chloroethoxy)methane	BQL	10.0	1.11	1	2/24/2007	
Bis(2-chloroethyl)ether	BQL	10.0	1.09	1	2/24/2007	
Bis(2-chloroisopropyl)ether	BQL	10.0	1.57	1	2/24/2007	
Bis(2-ethylhexyl)phthalate	BQL	10.0	1.33	1	2/24/2007	
4-bromophenyl phenyl ether	BQL	10.0	1.99	1	2/24/2007	
Butylbenzylphthalate	BQL	10.0	1.53	1	2/24/2007	
2-Chloronaphthalene	BQL	10.0	1.25	1	2/24/2007	
2-Chlorophenol	BQL	10.0	4.22	1	2/24/2007	
4-Chloro-3-methylphenol	BQL	10.0	3.26	1	2/24/2007	
4-Chlorophenyl phenyl ether	BQL	10.0	1.42	1	2/24/2007	
Chrysene	BQL	10.0	1.11	1	2/24/2007	
Dibenzo[a,h]anthracene	BQL	10.0	4.87	1	2/24/2007	
Di-n-Butylphthalate	BQL	10.0	1.65	1	2/24/2007	
1,2-Dichlorobenzene	BQL	10.0	1.25	1	2/24/2007	
1,3-Dichlorobenzene	BQL	10.0	1.24	1	2/24/2007	
1,4-Dichlorobenzene	BQL	10.0	1.20	1	2/24/2007	
3,3'-Dichlorobenzidine	BQL	20.0	4.10	1	2/24/2007	
2,4-Dichlorophenol	BQL	10.0	3.75	1	2/24/2007	
Diethylphthalate	BQL	10.0	1.48	1	2/24/2007	
Dimethylphthalate	BQL	10.0	1.04	1	2/24/2007	
2,4-Dimethylphenol	BQL	10.0	9.25	1	2/24/2007	
Di-n-octylphthalate	BQL	10.0	1.16	1	2/24/2007	
4,6-Dinitro-2-methylphenol	BQL	50.0	3.71	1	2/24/2007	
2,4-Dinitrophenol	BQL	50.0	4.20	1	2/24/2007	
2,4-Dinitrotoluene	BQL	10.0	1.52	1	2/24/2007	
2,6-Dinitrotoluene	BQL	10.0	1.41	1	2/24/2007	
Diphenylamine *	BQL	10.0	1.53	1	2/24/2007	
Fluoranthene	BQL	10.0	1.41	1	2/24/2007	
Fluorene	BQL	10.0	1.22	1	2/24/2007	
Hexachlorobenzene	BQL	10.0	1.22	1	2/24/2007	
Hexachlorobutadiene	BQL	10.0	1.58	1	2/24/2007	
Hexachlorocyclopentadiene	BQL	20.0	20.0	1	2/24/2007	
Hexachloroethane	BQL	10.0	1.58	1	2/24/2007	
Indeno(1,2,3-c,d)pyrene	BQL	10.0	4.57	1	2/24/2007	
Isophorone	BQL	10.0	1.27	1	2/24/2007	
Naphthalene	**2.40**	10.0	1.08	1	2/24/2007	J

Results for Semivolatiles
by GCMS 625

Client Sample ID: Method Blank
Client Project ID:
Lab Sample ID: PB7403
Lab Project ID:

Analyzed By: EAW
Date Collected:
Date Received:
Date Extracted: 2/21/2007
Matrix: WATER

Compound	Result ug/L	RL ug/L	MDL ug/L	Dilution Factor	Date Analyzed	Flag
Nitrobenzene	BQL	10.0	1.32	1	2/24/2007	
2-Nitrophenol	BQL	10.0	3.52	1	2/24/2007	
4-Nitrophenol	BQL	50.0	3.17	1	2/24/2007	
N-Nitrosodi-n-propylamine	BQL	10.0	1.87	1	2/24/2007	
Pentachlorophenol	BQL	50.0	2.83	1	2/24/2007	
Phenanthrene	BQL	10.0	1.38	1	2/24/2007	
Phenol	BQL	10.0	3.38	1	2/24/2007	
Pyrene	BQL	10.0	2.08	1	2/24/2007	
1,2,4-Trichlorobenzene	BQL	10.0	1.33	1	2/24/2007	
2,4,6-Trichlorophenol	BQL	10.0	2.92	1	2/24/2007	

	Spike Added	Spike Result	Percent Recovered
2-Fluorobiphenyl	10	7.2	72
2-Fluorophenol	10	6.8	68
Nitrobenzene-d5	10	8.7	87
Phenol-d6	10	7.4	74
2,4,6-Tribromophenol	10	5.8	58
4-Terphenyl-d14	10	9.8	98

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

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

Reviewed By: _____

Results For Matrix Spike / Matrix Spike Duplicate and Laboratory Control Standard (MS/MSD/LCS)
by GCMS

Client Sample ID: Batch QC
Client Project ID:
Lab Sample ID: Batch-7403-MS/MSD/LCS
Lab Project ID: G135-303-100F
Matrix: WATER
Prep Method: 3520

Date Collected:
Date Received:
Date Extracted: 02/21/07
Date Analyzed: 02/25/07
Analyzed By: EAW
Dilution: 10

	Sample Amount (µg/L)	MS Spike (µg/L)	MS Conc. (µg/L)	MS Spike % Rec.	MSD Spike (µg/L)	MSD Conc. (µg/L)	MSD Conc. % Rec.	RPD	QC Limits RPD	QC Limits % Rec.
Acenaphthylene	BQL	100	112	112	100	120	120*	6.90	30	62.0-119
4-Chloro-3-methylphenol	BQL	100	67.0	67.0	100	69.0	69.0	2.94	30	67.0-109
2-Chlorophenol	BQL	100	77.0	77.0	100	81.0	81.0	5.06	30	59.0-95.0
1,4-Dichlorobenzene	BQL	100	84.0	84.0	100	89.0	89.0*	5.78	30	29.0-86.0
2,4-Dinitrotoluene	BQL	100	94.0	94.0	100	108	108*	13.9	30	63.0-103
N-Nitrosodi-n-propylamine	BQL	100	128	128*	100	135	135*	5.32	30	67.0-107
4-Nitrophenol	BQL	100	2.00	2.00*	100	5.00	5.00*	85.7*	30	49.0-146
Pentachlorophenol	BQL	100	65.0	65.0	100	74.0	74.0	12.9	30	43.0-106
Phenol	BQL	100	71.0	71.0	100	78.0	78.0	9.40	30	61.0-100
Pyrene	BQL	100	124	124*	100	138	138*	10.7	30	41.0-123
1,2,4-Trichlorobenzene	BQL	100	104	104*	100	113	113*	8.29	30	41.0-96.0

	Spiked Amount (µg/L)	LCS Conc. (µg/L)	LCS Spike %	QC Limits % Rec.
Acenaphthylene	100	96.1	96.1	72.9-127
4-Chloro-3-methylphenol	100	75.0	75.0	61.6-113
2-Chlorophenol	100	74.5	74.5	52.3-104
1,4-Dichlorobenzene	100	77.3	77.3	27.3-85.0
2,4-Dinitrotoluene	100	87.2	87.2	66.5-117
N-Nitrosodi-n-propylamine	100	106	106	54.4-119
4-Nitrophenol	100	40.7	40.7	32.4-150
Pentachlorophenol	100	34.4	34.4	23.9-115
Phenol	100	72.8	72.8	54.5-106
Pyrene	100	110	110	63.5-126
1,2,4-Trichlorobenzene	100	92.9	92.9	49.1-98.5

Comments:

Concentrations reflect the spiked sample amounts.

Flags:

* = Out of limits.
NA = Not applicable.

Reviewed By: [signature]

VPH (Aliphatics/Aromatics) Laboratory Reporting Form

Client Name: Richard Catlin & Associates

Project Name: 205-077

Sample Information and Analytical Results	
Sample Identification	AS-510 MW-01
Sample Matrix	Water
Collection Option (for Soil)*	
Date Collected	02/20/07
Date Received	02/20/07
Date Extracted	02/24/07
Date Analyzed	02/24/07
Dry Weight	
Dilution Factor	1
C_5-C_8 Aliphatics**	< 100 (µg/L)
C_9-C_{12} Aliphatics**	230 (µg/L)
C_9-C_{10} Aromatics**	160 (µg/L)
Surrogate % Recovery - PID	120
Surrogate % Recovery - FID	100

* = 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.

Lab Info: g128-1901-1e

Reviewed By: RM

Attachment 2

VPH Laboratory Reporting Form

Calibration and QA/QC Information

FID Initial Calibration Date: 02/22/07 PID Initial Calibration Date: 02/22/07

Calibration Ranges and Limits

Range	MDL (07/15/2004) (µg/L)	ML (µg/L)	RL (µg/L)	RL (mg/Kg)
C_5-C_8 Aliphatics	4.4	14	100	10
C_9-C_{12} Aliphatics	3.4	11	100	10
C_9-C_{10} Aromatics	0.13	0.41	100	10

Calibration Concentration Levels

Range	Levels (µg/L)	%RSD or CCC	Method of Quantitation
C_5-C_8 Aliphatics	40	1.0	Calibration Factor
	1000		
	2000		
	3000		
	4000		
C_9-C_{12} Aliphatics	10	22.20	Calibration Factor
	250		
	500		
	750		
	1000		
C_9-C_{10} Aromatics	10	20.60	Calibration Factor
	250		
	500		
	750		
	1000		

Calibration Check Date: 02/23/07

Calibration Check

Range	Levels (µg/L)	Levels (mg/Kg)	RPD
C_5-C_8 Aliphatics	2000	200	8.8
C_9-C_{12} Aliphatics	500	50	3.5
C_9-C_{10} Aromatics	500	50	-12.5

MDL = Method Detection Limit
ML = Minimum Limit
RL = Reportable Limit
RPD = Relative Percent Difference
%RSD = Percent Relative Standard Deviation
CCC = Correlation Coefficient of Curve

EPH (Aliphatics/Aromatics) Results

by MDEP-EPH

Client Name: Richard Catlin & Associates

Project Name: 205-077

Sample Information and Analytical Results	
Sample Identification	AS-510 MW-01
Sample Matrix	Water
Date Collected	02/20/07
Date Received	02/20/07
Date Extracted	02/22/07
Date Analyzed	02/26/07
Dry Weight	
Dilution Factor	1:1
C_9-C_{18} Aliphatics*	180 (ug/L)
C_{19}-C_{36} Aliphatics*	< 100 (ug/L)
C_{11}-C_{22} Aromatics*	< 100 (ug/L)
Aliphatic Surrogate % Recovery	75
Aromatic Surrogate % Recovery	65
Fractionation Surrogate 1 % Recovery	82

Comments:

* = Excludes any surrogates or internal standards.

Lab info: G128-1901-1I

Reviewed By: [signature]

Attachment 3

EPH Laboratory Reporting Form

Calibration and QA/QC Information

Initial Calibration Date: 02/14/07

Calibration Ranges and Limits

Range	MDL (2/2004) (µg/L)	ML (µg/L)	RL (µg/L)	RL (mg/Kg)
C_9-C_{18} Aliphatics	3.84	12.2	100	10
C_{19}-C_{36} Aliphatics	0.57	1.8	100	10
C_{11}-C_{22} Aromatics	4.54	14.4	100	10

Calibration Concentration Levels

Range	Levels (µg/mL)	%RSD or CCC	Method of Quantitation
C_9-C_{18} Aliphatics	6	4.20	Calibration Factor
	30		
	60		
	120		
	240		
C_{19}-C_{36} Aliphatics	8	3.6	Calibration Factor
	40		
	80		
	160		
	320		
C_{11}-C_{22} Aromatics	17	7.2	Calibration Factor
	85		
	170		
	340		
	680		

Calibration Check Date: 02/26/07

Calibration Check

Range	Levels (µg/mL)	RPD
C_9-C_{18} Aliphatics	120	-2.1
C_{19}-C_{36} Aliphatics	160	-0.1
C_{11}-C_{22} Aromatics	340	10.4

MDL = Method Detection Limit
ML = Minimum Limit
RL = Reportable Limit
RPD = Relative Percent Difference
%RSD = Percent Relative Standard Deviation
CCC = Correlation Coefficient of Curve

List of Reporting Abbreviations and Data Qualifiers

B = Compound also detected in batch blank

BQL = Below Quantitation Limit (RL or MDL)

DF = Dilution Factor

Dup = Duplicate

D = Detected, but RPD is > 40% between results in dual column method.

E = Estimated concentration, exceeds calibration range.

J = Estimated concentration, below calibration range and above MDL

LCS(D) = Laboratory Control Spike (Duplicate)

MDL = Method Detection Limit

MS(D) = Matrix Spike (Duplicate)

PQL = Practical Quantitation Limit

RL = Reporting Limit

RPD = Relative Percent Difference

mg/kg = milligram per kilogram, ppm, parts per million

ug/kg = micrograms per kilogram, ppb, parts per billion

mg/L = milligram per liter, ppm, parts per million

ug/L = micrograms per liter, ppb, parts per billion

% Rec = Percent Recovery

% soilds = Percent Solids

Special Notes:

1) Metals and mercury samples are digested with a hot block, see the standard operating procedure document for details.

2) Uncertainty for all reported data is less than or equal to 30 percent.

MI34.030606.3

SGS

CHAIN OF CUSTODY RECORD
SGS Enviromental Services Inc.

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

www.us.sgs.com

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SGS

(1)

CLIENT: Catlin

CONTACT: Tom Landis PHONE NO:(910) 452.5861

PROJECT: 205-077 SITE/PWSID#: AS-510

REPORTS TO: Mike E. Mason E-MAIL: mike.e.mason@catlinusa.com

FAX NO.:(910) 452.7563

INVOICE TO: Sheila Smith QUOTE #

P.O. NUMBER 270220-3

SGS Reference: G128-1901

PAGE _____ OF _____

(2)

LAB NO.	SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	No CONTAINERS	SAMPLE TYPE (C=COMP G=GRAB)	Preservatives Used	HCl	—	HCl	HCl						
							Analysis Required (3)	602 + xylenes	625 + TICS	VPH	EPH						REMARKS
20A	AS-510 MW01	2/20	1230	W	7	G		✓	✓	✓	✓						

(5)

Collected/Relinquished By:(1)	Date	Time	Received By:	Date	Time
Justin Hetes	2/20	2:05		2/20	14:05
Relinquished By: (2)	Date	Time	Received By:	Date	Time
Relinquished By: (3)	Date	Time	Received By:	Date	Time
Relinquished By: (4)	Date	Time	Received By:	Date	Time

(4)

Shipping Carrier:

Shipping Ticket No:

Samples Received Cold? (Circle) YES NO

Temperature °C: 5.4 °F _____

Special Deliverable Requirements:

Chain of Custody Seal: (Circle)

INTACT BROKEN ABSENT

Special Instructions: standard turn around

Requested Turnaround Time:

☐ RUSH _____ (Date Needed) ☐ STD

SGS ENVIRONMENTAL SERVICES, INC.

N.C. CERTIFICATION #481

☐ 200 W. Potter Drive **Anchorage, AK 99518** Tel: (907) 562-2343 Fax: (907) 561-5301
☐ 5500 Business Drive **Wilmington, NC 28405** Tel: (910) 350-1903 Fax: (910) 350-1557
☐ 1270 Greenbrier Street **Charleston, WV 25311** Tel: (304) 346-0725 Fax: (304) 346-0761

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