

PHASE I LIMITED SITE ASSESSMENT REPORT

FOR

**UST G-480
MARINE CORPS BASE
CAMP LEJEUNE, NORTH CAROLINA**

**NCDENR UST INCIDENT NO.: 23444
LAND USE CLASSIFICATION: PENDING
RISK CLASSIFICATION: PENDING**

JANUARY 6, 2009

**Navy Contract No.: N62470-05-D-6200
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CATLIN Project No.: 205-077**

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PHASE I LIMITED SITE ASSESSMENT REPORT

A. SITE IDENTIFICATION

DATE OF REPORT: January 6, 2009
Facility ID: _____ UST Incident Number (if known): 23444
Site Name: UST G-480
Site Location: (Camp Geiger) MCB, Camp Lejeune
Nearest City/Town: Jacksonville County: Onslow

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

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

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

Property Occupant: Same as above (Classroom for Advanced Infantry Training Battalion (AITB))
Address: Building G-480 Camp Geiger, North Carolina Phone: _____

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

Release Information

Date Discovered: February 8, 1994
Longitude: 77° 27' 08.44 W Latitude: 34° 44' 19.36 N
Estimated Quantity of Release: Unknown
Cause of Release: Unknown
Source of Release (e.g. Piping/UST): UST G-480 initiated investigation. Additional release in vicinity from TC-341 Pipeline

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

One 500 to 550-gallon diesel UST, and associated piping and dispenser.

I, Steven V. Hudson 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. PURPOSE OF INVESTIGATION

Initially, a 1994 Tank Removal Report completed for underground storage tank (UST) G-480 by Environmental & Regulatory Consultants (ERC) indicated site soils were impacted with total petroleum hydrocarbon (TPH) Method 3550 constituents in excess of applicable State Standards at levels of 630.0 milligrams per kilogram (mg/kg) and 830.0 mg/kg from soil samples S-1 and S-2, respectively. The project site was subsequently transferred to the Installation Restoration Program (IRP) due to its location within Operable Unit (OU) 10 (IR Site 35) 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.

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 from an UST located adjacent to Building G-480. CATLIN Engineers and Scientists (CATLIN) was authorized to perform this Phase I LSA by the NAVFAC Mid-Atlantic in accordance with the Order of Supplies Contract Number N62470-05-D-6200, Delivery Order Number 0016.

C. AREA OF INVESTIGATION

Building G-480 is located within Camp Geiger between "E" and "F" Streets. Camp Geiger, a satellite facility to Marine Corps Base, Camp Lejeune, is home to The School of Infantry. The building is situated within the project limits of OU 10 (IR Site 35), the site of the former Camp Geiger Fuel Farm (CGFF). The site vicinity is presented on Figure 1. The area of investigation is located on the north central portion of Building G-480 at the site of former UST G-480. Building G-480 and the former UST location are presented on Figure 3. Building G-480 was recently converted from an Explosive Ordnance and Disposal Armory to a classroom for Advanced Infantry Training Battalion (AITB).

D. PREVIOUS INVESTIGATIONS, REMEDIATION AND/OR CLOSURE

According to the Tank Removal Report dated February 8, 1994 prepared by ERC, one 500-gallon capacity UST (UST G-480) containing diesel was removed on January 19, 1994. As part of the removal activities, two soil samples were collected from the base of the excavation for laboratory analysis. Based on excavation dimensions presented in the report, the soil samples were collected from a depth of approximately 8 to 10 feet below land surface (BLS) and laboratory analyzed for TPH by Environmental Protection Agency (EPA) Methods 5030 and 3550. No groundwater was reportedly encountered during the excavation activities.

Analytical results from the soil sampling conducted during the UST removal activities revealed TPH 3550 (as kerosene) concentrations of 630.0 and 830.0

mg/kg from samples S-1 and S-2, respectively. Analytical results did not indicate the presence of TPH 5030 constituents. Although not specifically addressed in the Tank Removal report, the soils excavated as part of the UST removal activities appear to have been transported off site for disposal and the excavation backfilled with clean borrow material.

Additionally, numerous investigations and remedial activities have been completed on Site 35. In order to accommodate the construction of US Highway 17 Bypass, CGFF located southeast of the subject site was decommissioned and removed in 1995. An on-going Comprehensive Site Assessment (CSA) is being conducted addressing an underground fuel line (TC-341 Pipeline) associated with the CGFF that transferred Number 6 Fuel Oil and Kerosene from the CGFF, across the G-480 project site, to the former Camp Geiger mess hall located at former Building TC-341. Dissolved and free-phase petroleum associated with the TC-341 Pipeline release have been identified at the project site. Numerous groundwater monitoring wells have been installed during the various investigations.

E. SITE INVESTIGATION

One Type II groundwater monitoring well (USTG480-MW23) and three soil borings (USTG480-SB01 through USTG480-SB03) were installed by CATLIN personnel on November 17, 2008. Soil borings were advanced on the west, north, and east of the former UST basin using traditional hollow-stem augering techniques to five feet BLS. Monitoring well USTG480-MW23 was installed within the former UST basin. Boring and monitoring well locations are presented on Figure 3.

All field activities were conducted in general accordance with the CATLIN Standard Methods of Investigation included in Appendix A.

F. 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 UST G-480 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 (refer to Figure 1).
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? If YES describe.* YES NO
- 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 Brinson Creek located approximately 700 feet east northeast of the release (Figure 2). However, an unnamed and unmapped manmade drainage feature is located approximately 250 feet east northeast of the release.
- 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)? If YES describe.* YES NO
- 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 45 feet of Castle Hayne Confining Unit separate the Castle Hayne aquifer from the surficial aquifer.

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.

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. See Figure 2.

3. *Does the property contain a commercial (e.g., retail, warehouse, office/business space, etc.) or industrial (e.g., manufacturing, utilities, industrial* **YES** NO

research and development, chemical/petroleum bulk storage, etc.) enterprise, an inactive commercial or industrial enterprise, or is the land undeveloped? Describe.

The project site is located within the Camp Geiger area of MCB Camp Lejeune. Camp Geiger is home to the Marine Corps School of Infantry. Building G-480 was recently converted from an Explosive Ordnance and Disposal Armory to a classroom for Advanced Infantry Training Battalion (AITB).

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

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)? Explain.* **YES** NO

The UST G-480 project site is located along within the Camp Geiger area aboard MCAS New River which is restricted to base personnel.

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

The UST G-480 source area lies beneath asphalt, concrete, and Building G-480.

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

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

The current use of the local MCB Camp Lejeune or 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 Figures 1 and 2.

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

The UST G-480 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 located approximately 300 feet southeast of the release.

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.

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

The Camp Geiger area of MCB, Camp Lejeune is home to the Marine Corps School of Infantry. The area located to the immediate east and northeast of the subject site is composed of the US 17 Bypass, North Carolina Department of Transportation right-of-way, and undeveloped lowland.

G. 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 are 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 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 Brinson Creek located approximately 700 feet east northeast of the release (Figure 2). However, an unnamed and unmapped manmade drainage feature is located approximately 250 feet east northeast of the release.

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 December 8, 2008. 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 province. The December 8, 2008 program results regarding deep aquifers below the subject site can be summarized as follows:

Hydrogeologic Units	Approximate Depth (feet)	Approximate Elevation (feet MSL)
Surficial aquifer	0 - 59	15 - (-)44
Castle Hayne Confining Unit	59 - 104	(-)44 - (-)89
Castle Hayne Aquifer	104 - 302	(-)89 - (-)287
Pee Dee Confining Unit	302 - >477	(-)287 - >(-)462

6. *Subsurface Structures*

Numerous underground utilities are present across the project site. Utilities in the area of UST G-480 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 2.

H. SITE GEOLOGY AND HYDROGEOLOGY

1. *Site Geology*

Representative soil samples were collected from each boring advanced during this investigation. Soil samples were described in the field utilizing visual/manual techniques as described in American Society for Testing and Materials (ASTM) D-2488. The soils were classified in accordance with the Unified Soils Classification System (USCS) and a boring log of each boring was produced. Boring logs are included in Appendix B.

Materials encountered in the borings consisted of interbedded clay and silty to clayey sand to a depth of approximately 12 feet BLS. The materials are consistent with undivided surficial deposits typically encountered within the Coastal Plain physiographic province. A copy of the boring logs including organic vapor screening results, monitoring well as-builts, and North Carolina Non Residential Well Construction Records are provided in Appendix B.

2. *Site Hydrogeology*

CATLIN personnel obtained depth to water data from groundwater monitoring well USTG480-MW23 and numerous other groundwater monitoring wells in the vicinity on November 18, 2008. Depth to groundwater in well USTG480-MW23 was 6.06 feet below top of casing (TOC). Monitoring well field sampling and gauging data is included in Appendix C. Review of the data generated during this investigation and other investigations conducted recently in the vicinity, indicate surficial groundwater flow trend at the site to the east northeast. 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 3.

I. SAMPLING RESULTS

1. *Soil*

Soil samples collected during the installation of the monitoring well and advancement of soil borings were split in two and placed in plastic zip top bags. One sample was immediately placed on ice and the second was allowed to equilibrate then screened with a photo ionization detector (PID). One representative soil sample was selected from each soil boring for laboratory analysis. Due to it's location within the former UST basin, reportedly backfilled with clean borrow material, no soil samples were collected for laboratory analysis during installation of monitoring well USTG480-MW23.

Samples were selected based on physical evidence of impact, highest PID reading, or from the first sampled interval above the capillary fringe. The soil

samples collected on November 17, 2008 were transported to SGS Environmental Services, Inc. (NC Certification #481) in Wilmington, North Carolina under proper Chain-of-Custody (COC) documentation. At the laboratory, soil samples were analyzed for volatile organic compounds (VOCs) using EPA Method 8260 (including Diisopropyl Ether (DIPE) and Methyl Tertiary Butyl Ether (MTBE)), Semivolatile Organic Compounds (SVOCs) via EPA Method 8270 (plus 10 Tentatively Identified Compounds (TICs)), and Volatile and Extractable Petroleum Hydrocarbons (VPH/EPH) using the Massachusetts Department of Environmental Protection (MADEP) Methods.

Boring logs summarizing field data from the monitoring well and soil boring advancement are included in Appendix B.

Review of soil laboratory results indicated that no target constituents were identified in the submitted soil samples at levels above the method detection limit (MDL). A summary of soil laboratory results is presented on Table 4 and Figure 4. A copy of the laboratory analytical report and COC documentation has been provided in Appendix D.

2. *Groundwater*

CATLIN personnel installed one Type II monitoring well, USTG480-MW23, on November 17, 2008. The groundwater was allowed to equilibrate and the well was gauged to determine depth to water, potential free-phase product thickness, and well volume. CATLIN purged a minimum of three well volumes from the monitoring well prior to collecting representative groundwater samples. CATLIN personnel collected one groundwater sample (USTG480-MW23) and one duplicate sample (USTG480-MW23D) from monitoring well USTG480-MW23. 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 Monitoring Well Sampling Record has been provided in Appendix C.

Samples were transported to SGS Environmental Services, Inc. (North Carolina Certification #481) in Wilmington, North Carolina under proper COC Documentation where they were analyzed for the following: EPA Method 602 + DIPE, MTBE, and Xylenes, EPA Method 625 (+TICs), and MADEP VPH/EPH. Duplicate sample USTG480-MW23 DUP was analyzed for VOCs only per EPA Method 602.

A copy of the groundwater sample laboratory analytical report and 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:

EPA METHOD 602

Concentrations of Benzene, Ethylbenzene, and Total Xylenes were identified in both groundwater samples at concentrations above the laboratory MDL. Of these constituents, only Benzene was identified above the 2L GWQS at concentrations of 9.8 and 9.56 micrograms per liter ($\mu\text{g/L}$) in samples USTG480-MW23 and USTG480-MW23 DUP, respectively. The current 2L GWQS and GCL for Benzene is 1 $\mu\text{g/L}$ and 5,000 $\mu\text{g/L}$, respectively. Laboratory results from EPA 602 analysis are summarized on Table 5A and Figure 5A.

EPA METHOD 625 (+ TICs)

Estimated concentrations of Acenaphthene, Fluorene, and Phenanthrene were identified in groundwater sample USTG480-MW23 at concentrations above the laboratory MDL but below their corresponding 2L GWQS. Naphthalene was identified at a concentration of 259 $\mu\text{g/L}$ which is above the 2L GWQS of 21 $\mu\text{g/L}$. The current GCL for Naphthalene is 15,500 $\mu\text{g/L}$. All other EPA Method 625 compounds were reported as below MDL (BMDL). Laboratory results from EPA 625 analysis are summarized on Table 5B and Figure 5B.

MADEP VPH/EPH

As summarized on Table 5C, laboratory analysis of groundwater sample USTG480-MW23 revealed all MADEP fractions, except C5-C8 Aliphatics above the MDL. Comparison of MADEP fractions to current 2L GWQS indicates that C9-C18 Aliphatics (12,746 $\mu\text{g/L}$) and C9-C22 Aromatics (6,435 $\mu\text{g/L}$) are above the corresponding 2L GWQS of 4,200 $\mu\text{g/L}$ and 210 $\mu\text{g/L}$, respectively. Comparison of MADEP EPH/VPH fractions to 2L GWQS are summarized on Table 5D and Figure 5C. There currently are no GCLs for MADEP EPH/VPH fractions.

3. *Free-Phase Product*

No measurable thickness of free-phase product was detected in monitoring well USTG480-MW23 during this Phase I LSA. Groundwater gauging data is summarized on Table 3.

J. CONCLUSIONS AND RECOMMENDATIONS

1. Conclusions

Limited Site Assessment field and laboratory findings may be summarized as follows:

- Based on the field and laboratory findings of this Phase I LSA, CATLIN concludes that the UST G-480 project site meets the criteria for Industrial/Commercial Land Use and Low Risk classification.
- Laboratory analysis of soil samples did not reveal target compounds above MDLs.
- The following groundwater constituents were identified in groundwater sample USTG480-MW23 above 2L GWQS:

CONTAMINANT	CONCENTRATION	2L GWQS	GCL
Benzene	9.8	1	5,000
Naphthalene	259	21	15,500
C9-C18 Aliphatics	12,746	4,200	NE
C9-C22 Aromatics	6,435	210	NE

- Concentrations and Standards in µg/L
- NE = None Established

- No measurable free-phase product identified in groundwater monitoring well USTG480-MW23.
- Depth to groundwater in vicinity of former UST basin is approximately six feet BLS.
- Shallow groundwater flow trend to east northeast.
- Confirmed petroleum impact consisting of substantial dissolved and free-phase product at adjacent TC-341 Pipeline site.
- Former UST G-480 basin was backfilled with clean borrow material and is covered with asphalt and concrete.
- Based on depth to groundwater and reported UST G-480 dimensions, soil samples collected during tank closure from the bottom of the excavation were likely from below the vadose zone.

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 2008 Guidelines.

No soil contamination was identified during this investigation therefore no additional soil investigation or remedial efforts are recommended.

Petroleum based groundwater contamination was identified in the sample collected from USTG480-MW23 at levels above applicable 2L GWQSs but below established GCLs. MADEP EPH/VPH fractions for which no GCLs have been established were confirmed above 2L GWQSs. Based on the findings of this investigation, CATLIN believes the UST G-480 project site qualifies for No Further Action status.

However, petroleum based groundwater contamination of similar contaminant structure in addition to free-phase product has been confirmed at the adjacent ongoing TC-341 Pipeline site. The estimated extent of the dissolved contaminant plume as established in the August 19, 2008 TC-341 CSA encompasses the former UST G-480 basin and groundwater monitoring well USTG480-MW23.

Investigatory and remedial actions are included in the forthcoming Corrective Action Plan (CAP) underway at the TC-341 Pipeline project site. CATLIN proposes that additional activities addressing this site be included in the TC-341 Pipeline project.

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

K. REFERENCES

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

CATLIN Engineers and Scientists, *Leaking Underground Storage Tank Comprehensive Site Assessment Report for Site G480**, Marine Corps Base, Camp Lejeune, North Carolina, August 19, 2008. (* - Project site name changed to TC-341 Pipeline)

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 15, 2008 (2008 Guidelines).

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.

Environmental & Regulatory Consultants Inc., *Tank Removal Report, Marine Corps Base, Building G-480*, Camp Lejeune, North Carolina, February 8, 1994.

TABLES

**TABLE 1
UST SYSTEM INFORMATION**

Incident Name and No.: UST G-480 / 23444

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)
G480	Diesel*	550*	Unknown	(P) 1/19/1994	Yes**

* = Tank Removal Report dated February 8, 1994 completed by ERC lists product as Diesel and UST as 500-gallon capacity; Review of UST dimensions and laboratory results indicates the UST was possibly a 550-gallon UST containing either Kerosene, "Heating Oil", or both.

** = Petroleum release has been confirmed from TC-341 Pipeline located adjacent to subject UST

TABLE 2
UST OWNER/OPERATOR INFORMATION

Incident Name and No.: UST G-480 / 23444

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 (1/19/94)	PSC BOX 20004 Marine Corps Base Camp Lejeune, NC 28542	(910) 451-5068

**TABLE 3
MONITORING WELL CONSTRUCTION INFORMATION**

Incident Name and No.: UST G-480 / 23444

WELL IDENTIFICATION	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 ELEV.* (ft.)	DEPTH TO WATER From Top of Casing (ft.)	GROUND-WATER ELEV.* (ft.)	FREE-PHASE PRODUCT THICKNESS (ft.)	COMMENTS
USTG480- MW23	11/17/08	11/18/08	4.7	4.7 - 14.7	15.0	14.79	6.06	8.73	NMT	PERMANENT TYPE II MONITORING WELL

* Reference Point for Elevation Measurements NGVD 88.

** If free-phase product present, groundwater elevation calculated by: [Top of Casing Elevation - Depth to Water] + [Free-Phase Product Thickness x 0.82]

ft. BLS = Feet Below Land Surface

NMT = No Measurable Thickness

ND = No Data

**TABLE 4
SUMMARY OF SOIL LABORATORY RESULTS
ALL METHODS**

Incident Name and No.: UST G-480 / 23444

Sample ID	Contaminant of Concern →		ALL 8260 CONSTITUENTS	ALL 8270 CONSTITUENTS	ALL MADEP FRACTIONS
	Date Collected	Sample Depth (ft. BLS)			
Residential MSCC (mg/kg)			VARIES	VARIES	VARIES
Industrial/Commercial MSCC (mg/kg)			VARIES	VARIES	VARIES
STGW MSCC (mg/kg)			VARIES	VARIES	VARIES
USTG480-SB01 (1-3)	11/17/2008	1 - 3	BMDL	BMDL	BMDL
USTG480-SB02 (1-3)	11/17/2008	1 - 3	BMDL	BMDL	BMDL
USTG480-SB03 (1-3)	11/17/2008	1 - 3	BMDL	BMDL	BMDL
USTG480-SB01 (1-3) DUP	11/17/2008	1 - 3	BMDL	NA	NA

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

BMDL = Below Method Detection Limit

NA = Not Analyzed

ft. BLS = Feet Below Land Surface

STGW = Soil to Groundwater

MSCC = Maximum Soil Contaminant Concentration

TABLE 5A
SUMMARY OF GROUNDWATER LABORATORY RESULTS
EPA METHOD 602 + DIPE, MTBE, & XYLENES

Incident Name and No.: UST G-480 / 23444

Well ID	Contaminant of Concern →		Benzene	Diisopropyl ether (DIPE)	Ethylbenzene	Methyl-tert butyl ether (MTBE)	Toluene	Total Xylenes
	Sample ID	Date Collected						
2L GWQS (µg/L)			1	NE	550	200	1,000	530
GCL (mg/L)			5,000	NE	84,500	200,000	257,500	87,500
USTG480-MW23	USTG480-MW23	11/18/2008	9.8	<0.253	59.6	<0.306	<0.313	41.86
USTG480-MW23	USTG480-MW23 DUP	11/18/2008	9.56	<0.253	64.9	<0.306	<0.313	50.1

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

NE = None Established

Bold results indicate concentrations above 2L GWQS or GCL.

GCL = Gross Contaminant Level

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

< = Less than method detection limit

TABLE 5B
SUMMARY OF GROUNDWATER LABORATORY RESULTS
EPA METHOD 625 B/N/A + TICs

Incident Name and No.: UST G-480 / 23444

Well ID	Contaminant of Concern →		Acenaphthene	Fluorene	Naphthalene	Phenanthrene	All Other 625 Analytes
	Sample ID	Date Collected					
2L GWQS (µg/L)			80	280	21	210	VARIES
GCL (µg/L)			2,120	950	15,500	410	VARIES
USTG480-MW23	USTG480-MW23	11/18/2008	7.81 J	16.1 J	259	24.0 J	BMDL

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

B/N/A = Base/Neutral/Acid (extractables)

TICs = Tentatively Identified Compound

BMDL = Below Method Detection Limit

J = Estimated concentration, below calibration range and above MDL.

Bold results indicate concentrations above 2L GWQS or GCL.

GCL = Gross Contaminant Level

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

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

Incident Name and No.: UST G-480 / 23444

Well ID	Contaminant of Concern →		C9-C18 Aliphatics	C19-C36 Aliphatics	C11-C22 Aromatics	C5-C8 Aliphatics	C9-C12 Aliphatics	C9-C10 Aromatics
	Sample ID	Date Collected						
METHOD			EPH			VPH		
USTG480-MW23	USTG480-MW23	11/18/2008	12,300	837	5,550	<100	446	885

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

< = Less than method detection limit

**TABLE 5D
SUMMARY OF GROUNDWATER LABORATORY RESULTS
MADEP EPH/VPH AS COMPARED TO 2L GWQS**

Incident Name and No.: UST G-480 / 23444

Well ID	Contaminant of Concern →		C5-C8 Aliphatics	C9-C18 Aliphatics*	C19-C36 Aliphatics	C9-C22 Aromatics*
	Sample ID	Date Collected				
2L GWQS (µg/L)			420	4,200	42,000	210
USTG480-MW23	USTG480-MW23	11/18/2008	<100	12,746	837	6,435

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

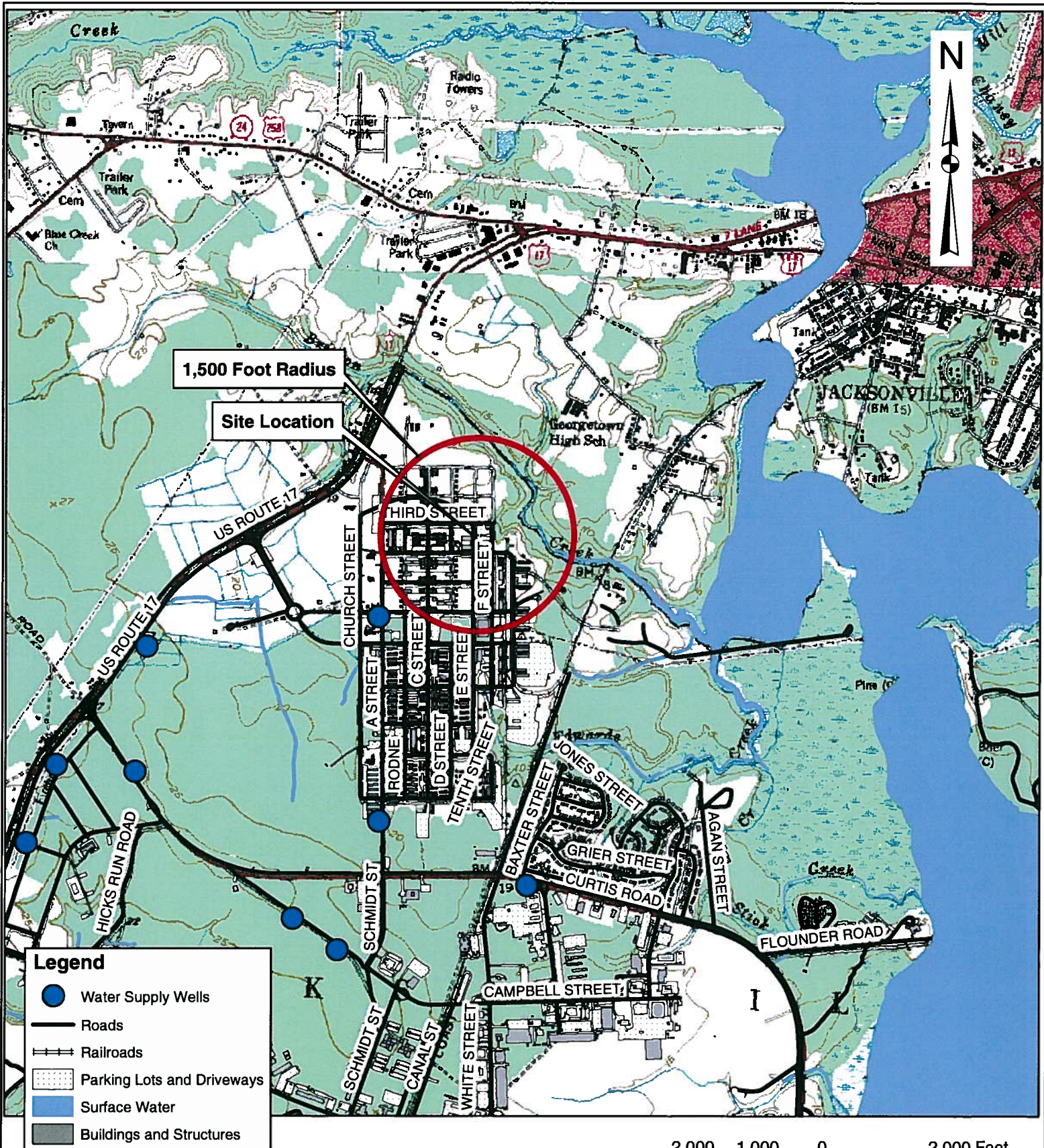
* = The value represents the sum of the reported practical quantitation limit of one fraction and the detected concentration of the other fraction.

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

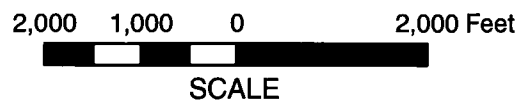
Bold results indicate concentrations above 2L GWQS.

< = Less than method detection limit

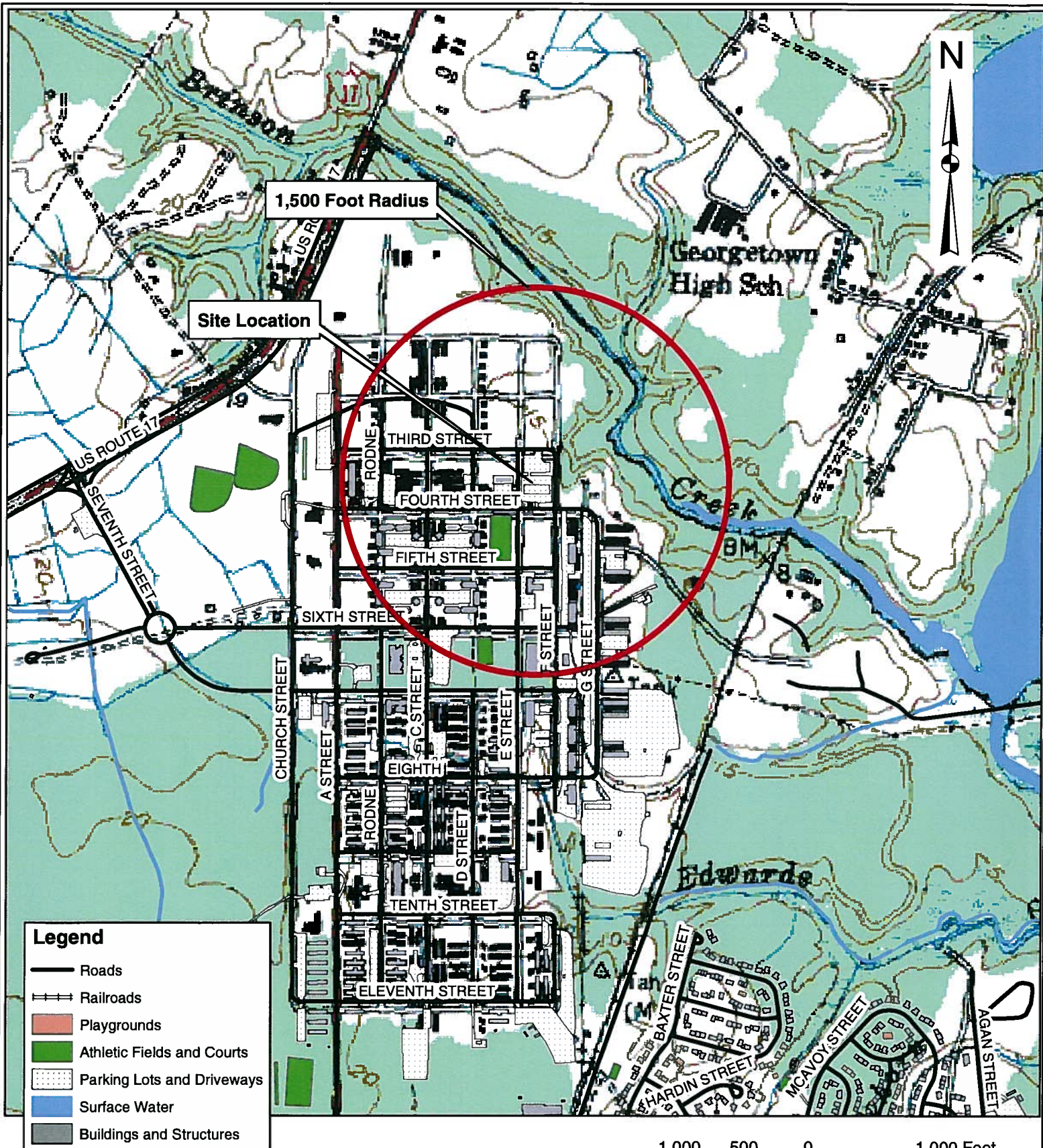
FIGURES



Data Sources: GIS Data Layers provided by MCB Camp Lejeune GIS Office.
 USGS Topographical Quad = Jacksonville South, NC 1952 (Photoinspected 1971).



	PROJECT	LIMITED SITE ASSESSMENT UST G-480 MARINE CORPS BASE CAMP LEJEUNE, NC		TITLE	SITE VICINITY AND WATER SUPPLY WELLS		FIGURE			
	JOB NO.	205-077	DATE	DEC 2008	SCALE	AS SHOWN	DRAWN BY	SAC	CHECKED BY	SVH



Data Sources: GIS Data Layers provided by MCB Camp Lejeune GIS Office.
 USGS Topographical Quad = Jacksonville South, NC 1952 (Photoinspected 1971).



PROJECT
 LIMITED SITE ASSESSMENT
 UST G-480
 MARINE CORPS BASE
 CAMP LEJEUNE, NC

TITLE
**SITE VICINITY WITH PLACES
 OF PUBLIC ASSEMBLY AND
 SURFACE WATER FEATURES**

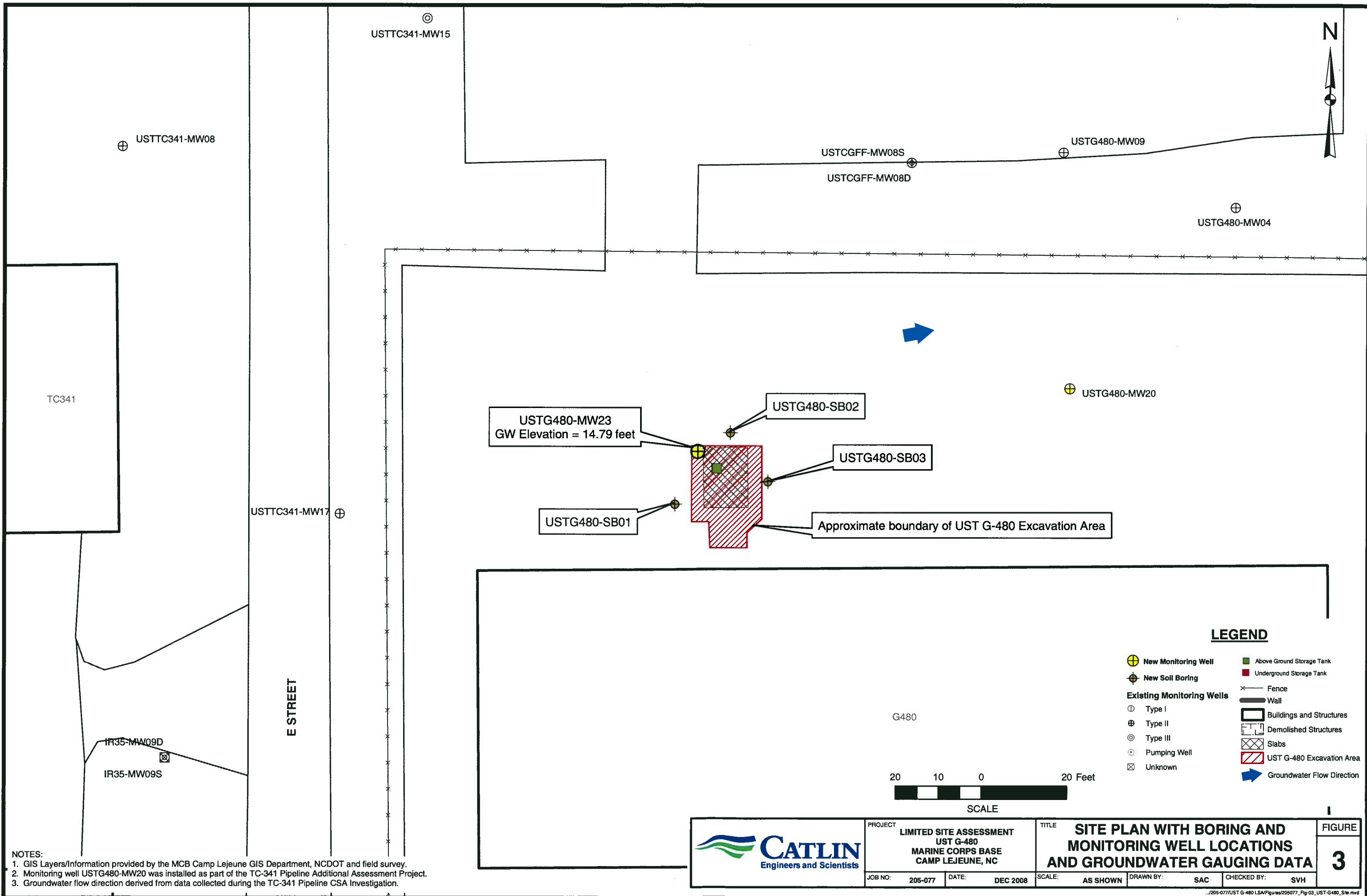
FIGURE
2

JOB NO. 205-077 DATE DEC 2008

SCALE AS SHOWN

DRAWN BY SAC

CHECKED BY SVH



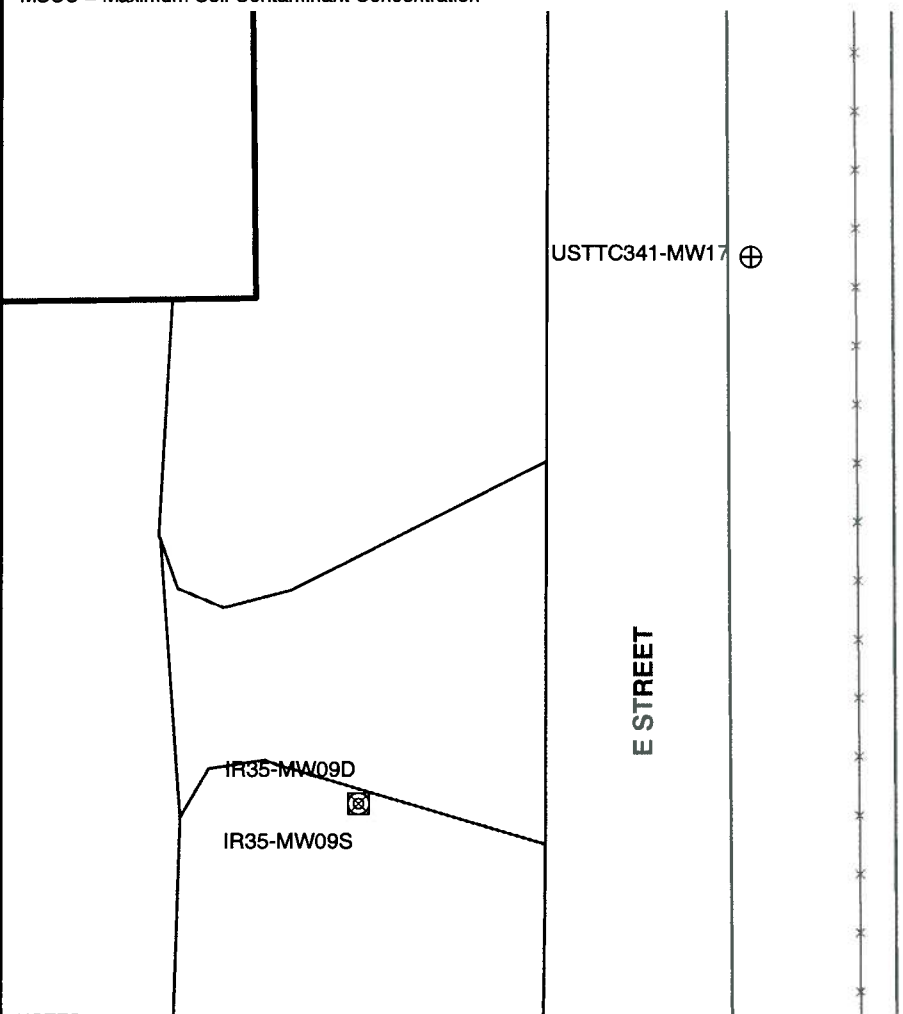
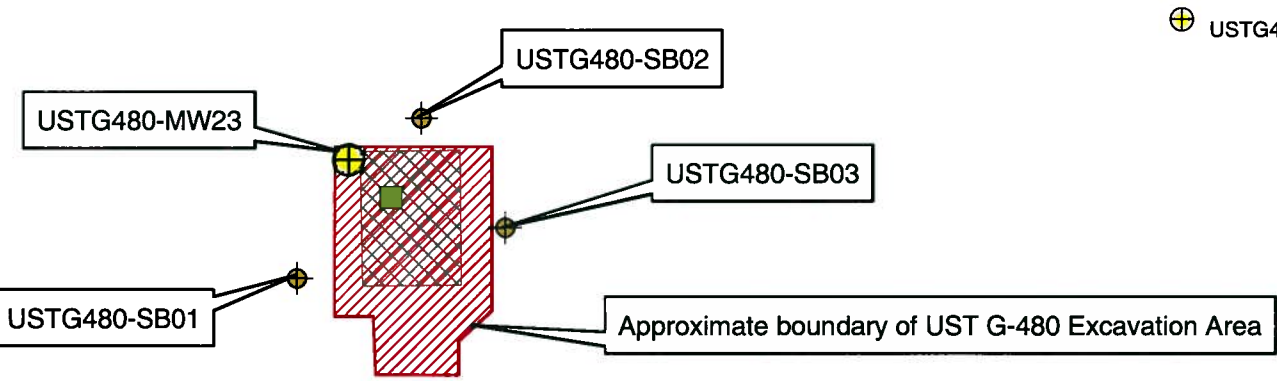
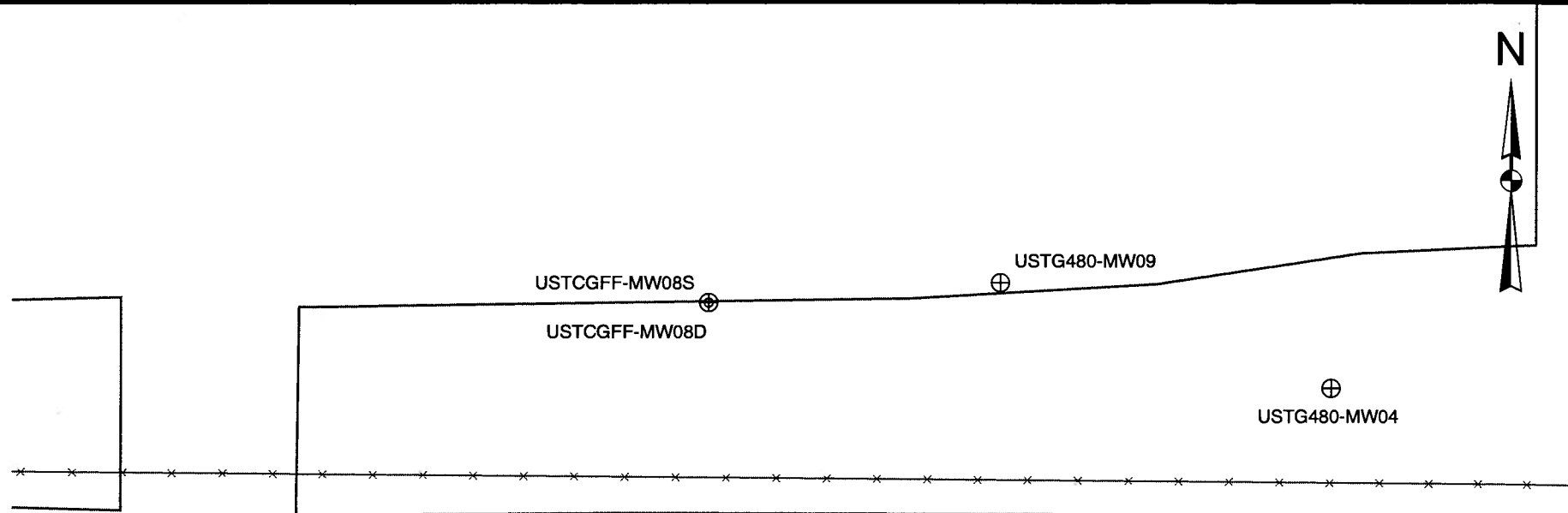
NOTES:
 1. GIS Layers/Information provided by the MCB Camp Lejeune GIS Department, NCDOT and field survey.
 2. Monitoring well USTG480-MW20 was installed as part of the TC-341 Pipeline Additional Assessment Project.
 3. Groundwater flow direction derived from data collected during the TC-341 Pipeline CSA Investigation.

 CATLIN Engineers and Scientists	PROJECT LIMITED SITE ASSESSMENT UST G-480 MARINE CORPS BASE CAMP LEJEUNE, NC	TITLE SITE PLAN WITH BORING AND MONITORING WELL LOCATIONS AND GROUNDWATER GAUGING DATA	FIGURE 3
	JOB NO: 205-077 DATE: DEC 2008	SCALE: AS SHOWN DRAWN BY: SAC CHECKED BY: SVH	

...205-077/UST G-480 LSA/Figures/205077_Fig-03_UST-G480_Site.mxd

Sample ID	Contaminant of Concern →		ALL 8260 CONSTITUENTS	ALL 8270 CONSTITUENTS	ALL MADEP FRACTIONS
	Date Collected	Sample Depth (ft. BLS)			
	Residential MSCC (mg/kg)		VARIES	VARIES	VARIES
	Industrial/Commercial MSCC (mg/kg)		VARIES	VARIES	VARIES
	STGW MSCC (mg/kg)		VARIES	VARIES	VARIES
USTG480-SB01 (1-3)	11/17/2008	1 - 3	BMDL	BMDL	BMDL
USTG480-SB02 (1-3)	11/17/2008	1 - 3	BMDL	BMDL	BMDL
USTG480-SB03 (1-3)	11/17/2008	1 - 3	BMDL	BMDL	BMDL
USTG480-SB01 (1-3) DUP	11/17/2008	1 - 3	BMDL	NA	NA

All results in milligrams per kilogram (mg/kg).
 BMDL = Below Method Detection Limit
 NA = Not Analyzed
 ft. BLS = Feet Below Land Surface
 STGW = Soil to Groundwater
 MSCC = Maximum Soil Contaminant Concentration



NOTES:
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 2. Monitoring well USTG480-MW20 was installed as part of the TC-341 Pipeline Additional Assessment Project.
 3. Groundwater flow direction derived from data collected during the TC-341 Pipeline CSA Investigation.

LEGEND

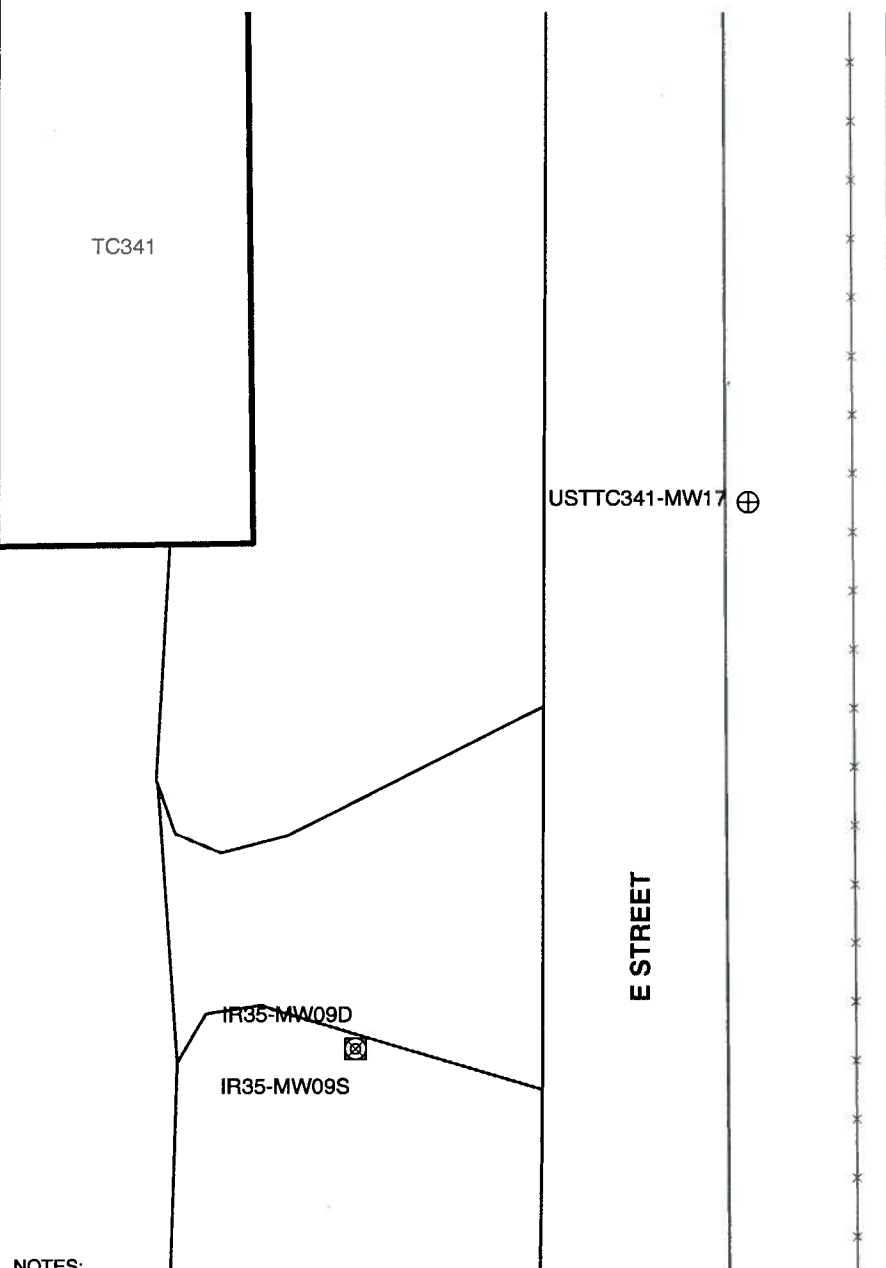
- ⊕ New Monitoring Well
- ⊗ New Soil Boring
- ⊙ Existing Monitoring Wells
 - ⊙ Type I
 - ⊕ Type II
 - ⊙ Type III
 - ⊙ Pumping Well
 - ⊗ Unknown
- Above Ground Storage Tank
- Underground Storage Tank
- Fence
- Wall
- ▭ Buildings and Structures
- ▭ Demolished Structures
- ▭ Slabs
- ▨ UST G-480 Excavation Area
- ➡ Groundwater Flow Direction

SCALE: 20 10 0 20 Feet

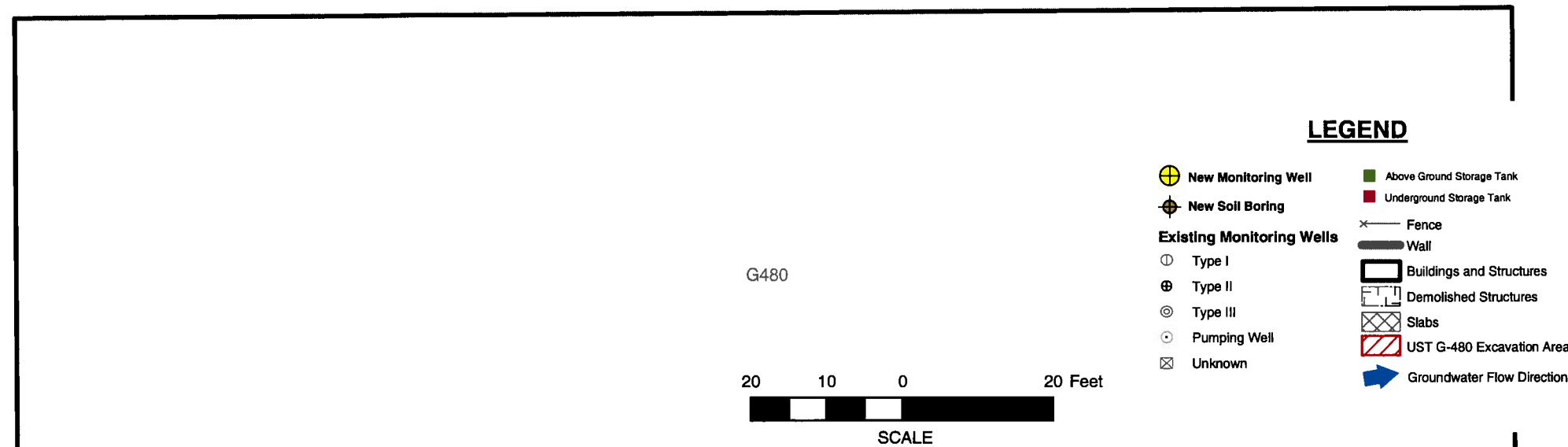
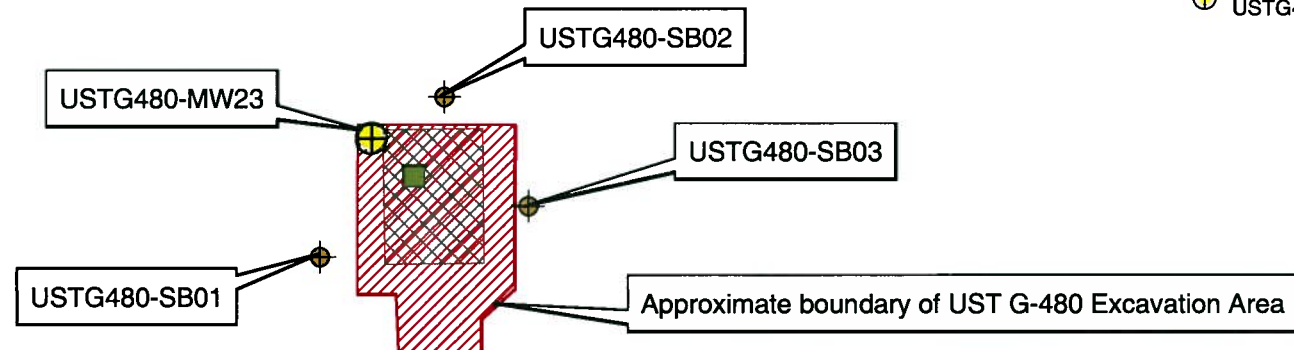
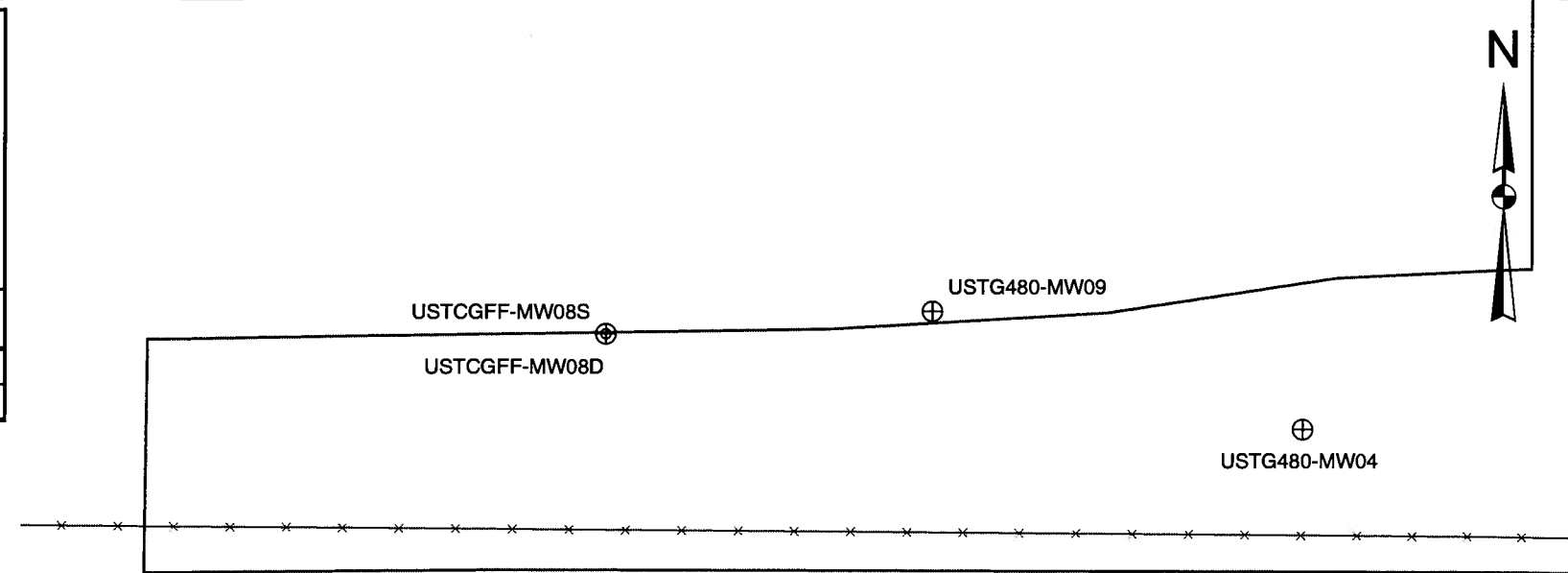
	PROJECT	LIMITED SITE ASSESSMENT UST G-480 MARINE CORPS BASE CAMP LEJEUNE, NC	TITLE	SITE PLAN WITH SOIL LABORATORY RESULTS			FIGURE	4	
	JOB NO:	205-077	DATE:	DEC 2008	SCALE:	AS SHOWN	DRAWN BY:	SAC	CHECKED BY:

Well ID	Contaminant of Concern →		Benzene	Diisopropyl ether (DIPE)	Ethylbenzene	Methyl-tert butyl ether (MTBE)	Toluene	Total Xylenes
	Sample ID	Date Collected						
2L GWQS (µg/L) GCL (mg/L)			1 5,000	NE NE	550 84,500	200 200,000	1,000 257,500	530 87,500
USTG480-MW23	USTG480-MW23	11/18/2008	9.8	<0.253	59.6	<0.306	<0.313	41.86
USTG480-MW23	USTG480-MW23 DUP	11/18/2008	9.56	<0.253	64.9	<0.306	<0.313	50.1

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



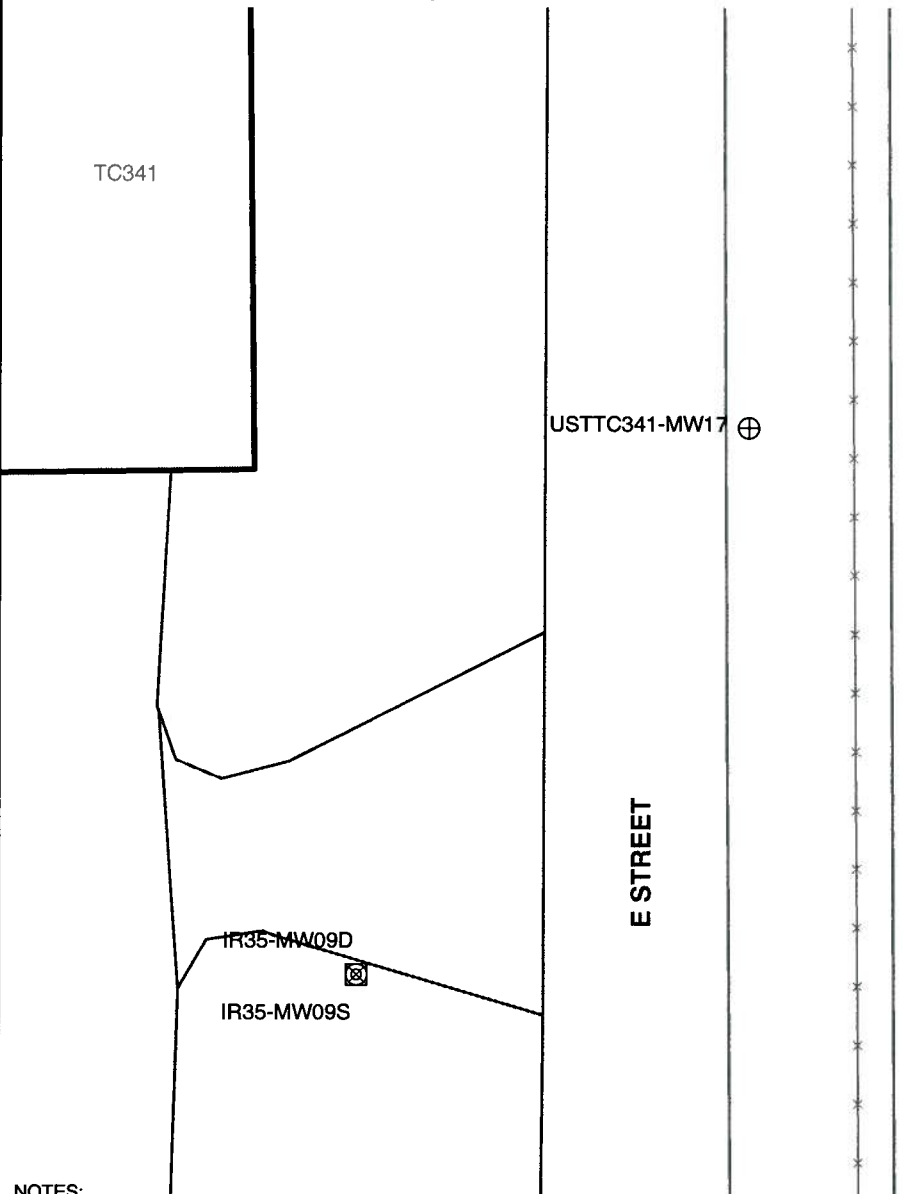
NOTES:
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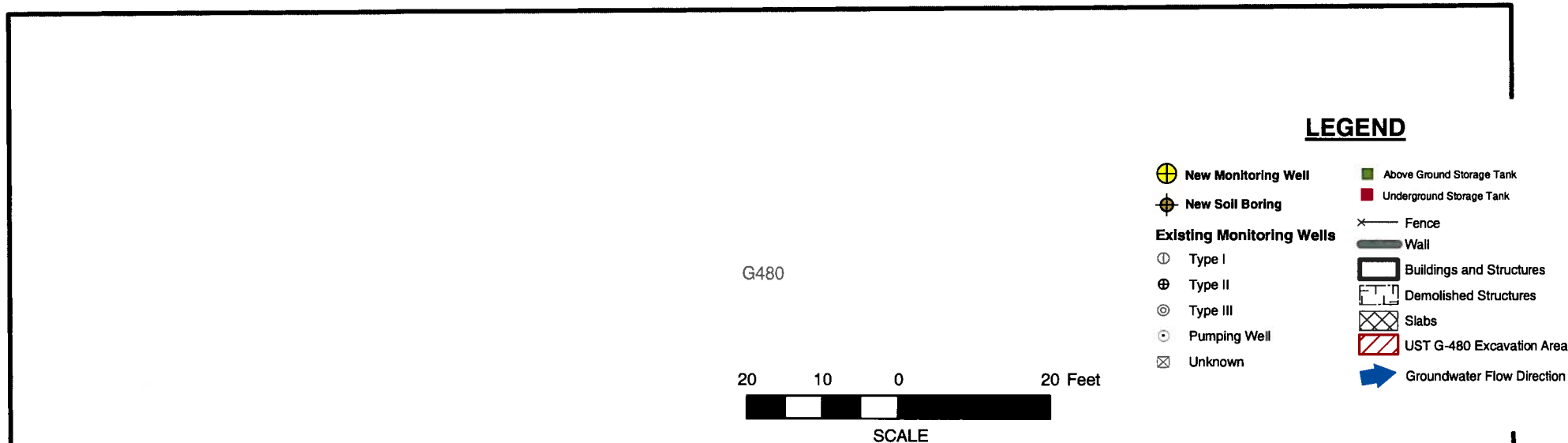
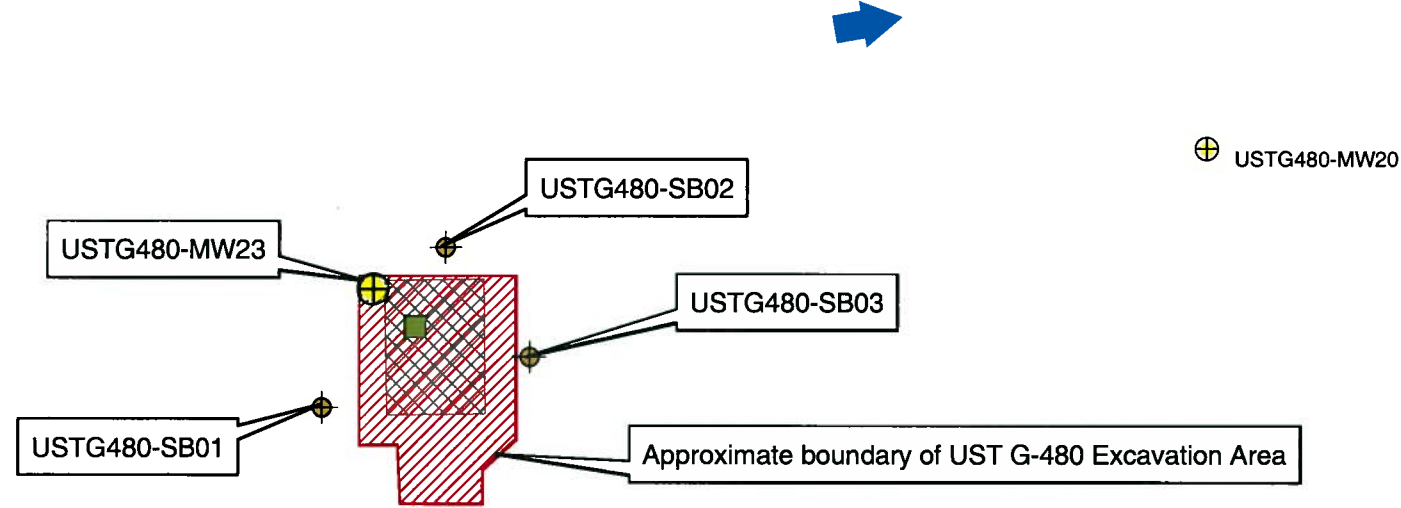
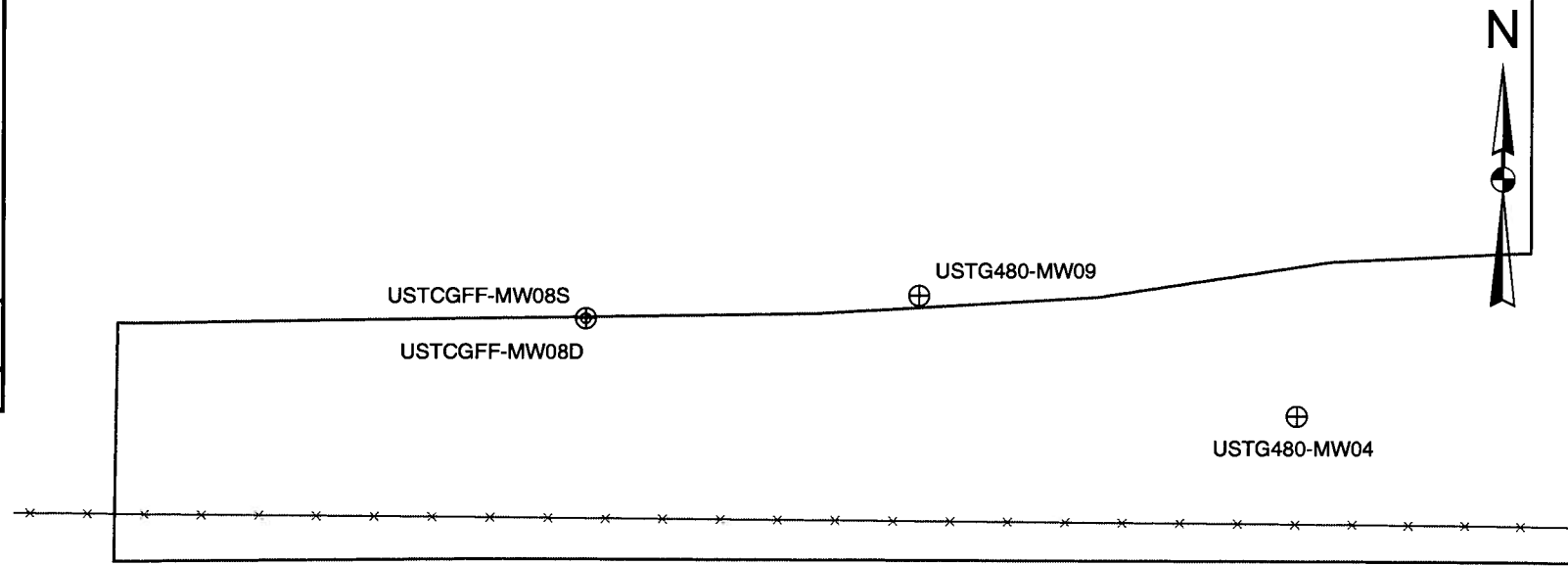
	PROJECT	LIMITED SITE ASSESSMENT UST G-480 MARINE CORPS BASE CAMP LEJEUNE, NC	TITLE	SITE PLAN WITH GROUNDWATER LABORATORY RESULTS - EPA METHOD 602 + DIPE, MTBE, & XYLENES			FIGURE	5A	
	JOB NO:	205-077	DATE:	DEC 2008	SCALE:	AS SHOWN	DRAWN BY:		SAC

Well ID	Contaminant of Concern →		Acenaphthene	Fluorene	Naphthalene	Phenanthrene	All Other 625 Analytes
	Sample ID	Date Collected					
2L GWQS (µg/L)			80	280	21	210	VARIABLES
GCL (µg/L)			2,120	950	15,500	410	VARIABLES
USTG480-MW23	USTG480-MW23	11/18/2008	7.81 J	16.1 J	259	24.0 J	BMDL

All results in micrograms per liter (µg/L)
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 GCL = Gross Contaminant Level
 2L GWQS = NCAC T15A:02L Groundwater Quality Standards



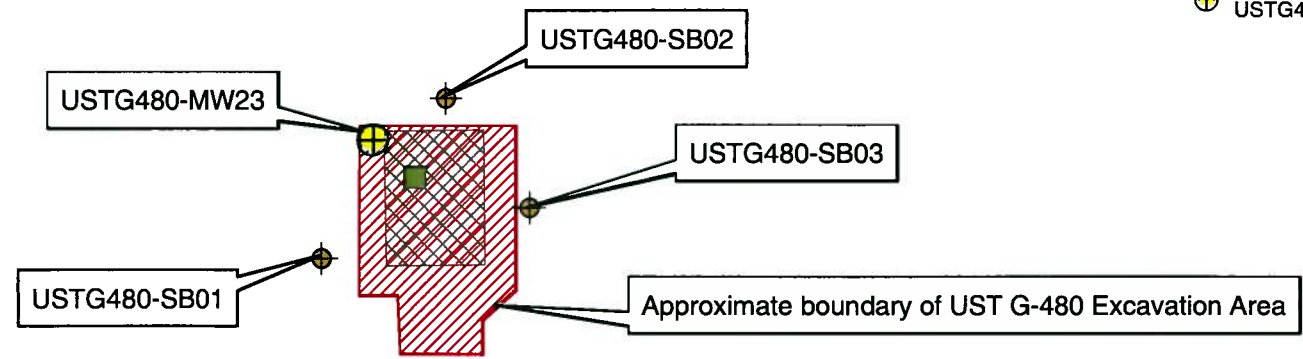
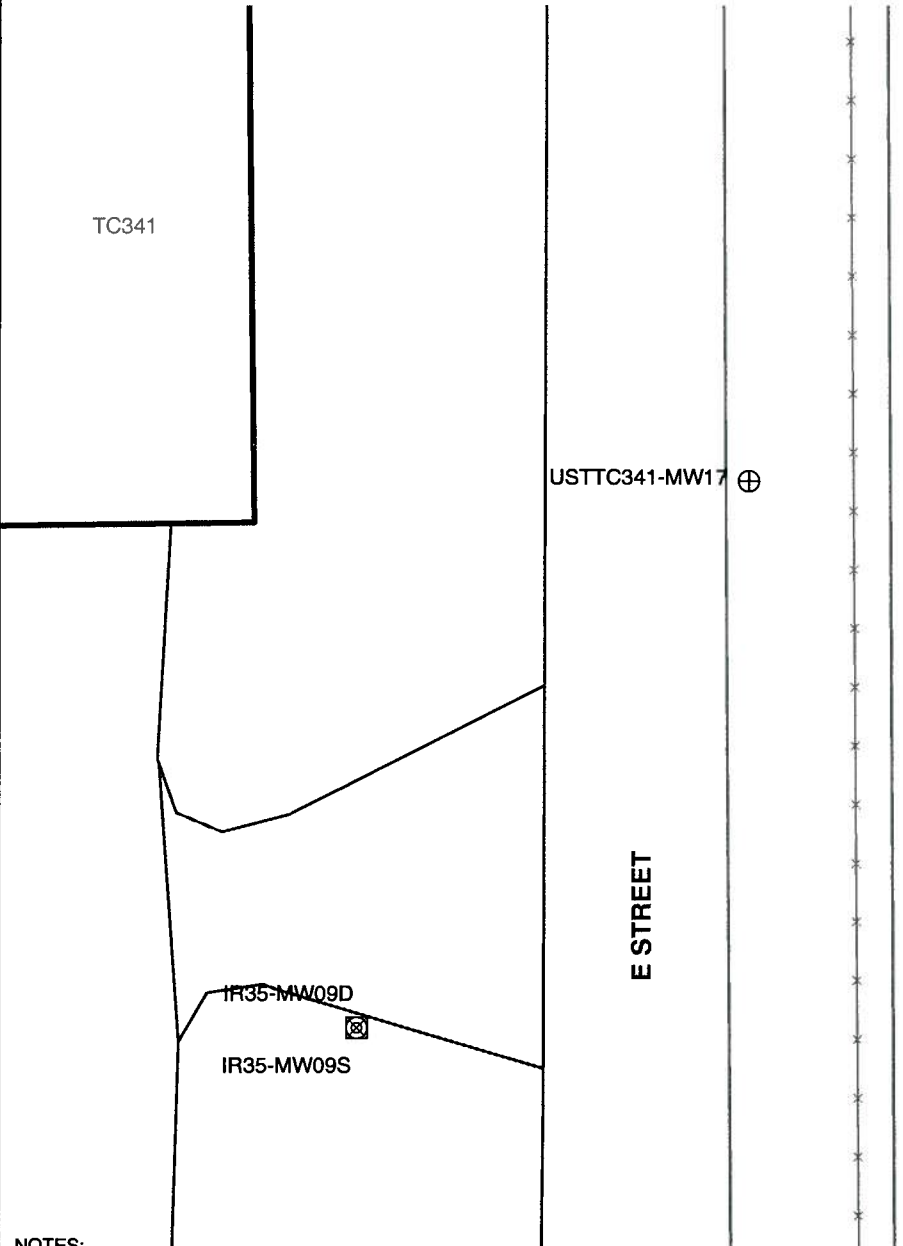
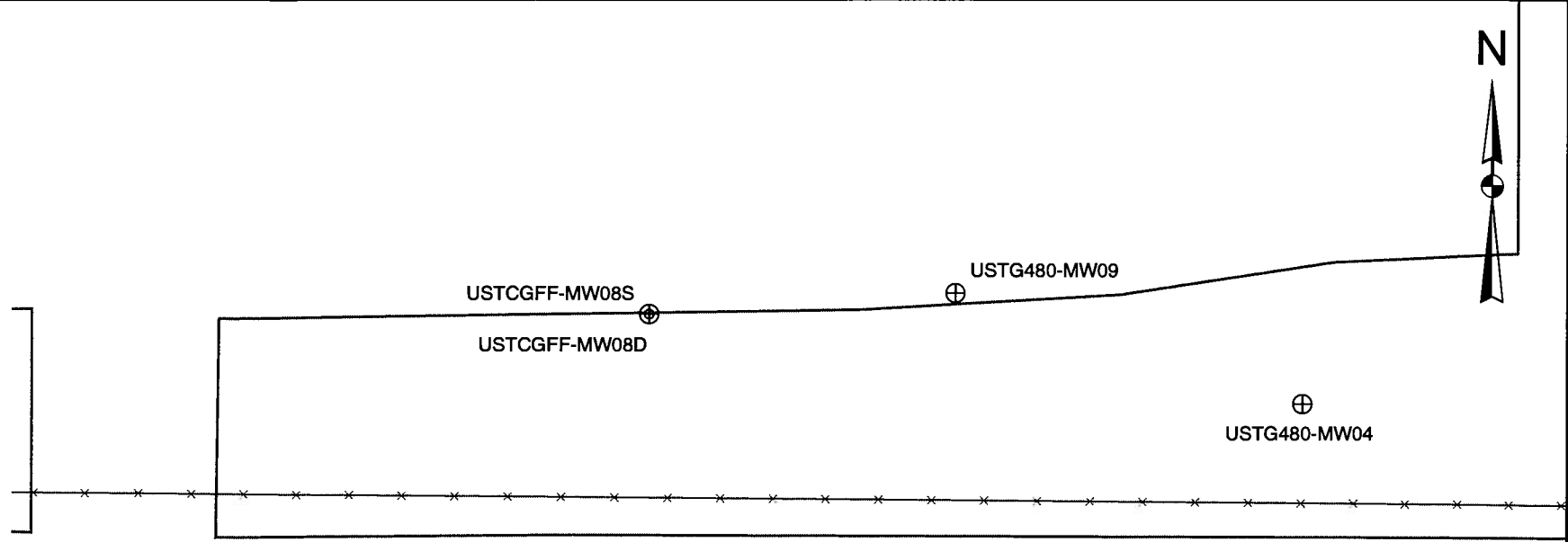
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	PROJECT	LIMITED SITE ASSESSMENT UST G-480 MARINE CORPS BASE CAMP LEJEUNE, NC	TITLE	SITE PLAN WITH GROUNDWATER LABORATORY RESULTS - EPA METHOD 625 B/N/A + TICs			FIGURE	5B	
	JOB NO:	205-077	DATE:	DEC 2008	SCALE:	AS SHOWN	DRAWN BY:		SAC

Well ID	Contaminant of Concern →		C5-C8 Aliphatics	C9-C18 Aliphatics*	C19-C36 Aliphatics	C9-C22 Aromatics*
	Sample ID	Date Collected				
2L GWQS (µg/L)			420	4,200	42,000	210
USTG480-MW23	USTG480-MW23	11/18/2008	<100	12,746	837	6,435

All results in micrograms per liter (µg/L).
 * = The value represents the sum of the reported practical quantitation limit of one fraction and the detected concentration of the other fraction.
 2L GWQS = NCAC T15A:02L Groundwater Quality Standards
 Bold results indicate concentrations above 2L GWQS.
 < = Less than method detection limit



LEGEND

- ⊕ New Monitoring Well
- ⊗ New Soil Boring
- ⊙ Existing Monitoring Wells
 - ⊙ Type I
 - ⊕ Type II
 - ⊙ Type III
 - ⊙ Pumping Well
 - ⊗ Unknown
- Above Ground Storage Tank
- Underground Storage Tank
- Fence
- Wall
- ▭ Buildings and Structures
- ▭ Demolished Structures
- ▭ Slabs
- ▨ UST G-480 Excavation Area
- ➡ Groundwater Flow Direction



NOTES:
 1. GIS Layers/Information provided by the MCB Camp Lejeune GIS Department, NCDOT and field survey.
 2. Monitoring well USTG480-MW20 was installed as part of the TC-341 Pipeline Additional Assessment Project.
 3. Groundwater flow direction derived from data collected during the TC-341 Pipeline CSA Investigation.

	PROJECT	LIMITED SITE ASSESSMENT UST G-480 MARINE CORPS BASE CAMP LEJEUNE, NC	TITLE	SITE PLAN WITH GROUNDWATER LABORATORY RESULTS - MADEP EPH/VPH AS COMPARED TO 2L GWQS			FIGURE	5C	
	JOB NO:	205-077	DATE:	DEC 2008	SCALE:	AS SHOWN	DRAWN BY:		SAC

APPENDIX A
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 B

**BORING LOGS, MONITORING WELL AS-BUILT, AND NORTH CAROLINA NON
RESIDENTIAL WELL CONSTRUCTION RECORD**

BORING LOG



SHEET 1 of 1

PROJECT NO.:	205-077	STATE:	NC	COUNTY:	Onslow	LOCATION:	MCB, Camp Lejeune
PROJECT NAME:	UST G-480 LSA			LOGGED BY:	Tom Stetler	BORING ID:	USTG480-SB01
				DRILLER:	Bobbie D. Fowler		
NORTHING:	3,846,807.09	EASTING:	275,485.78	CREW:	John Wood		
SYSTEM:	UTM NAD83 (m)	BORING LOCATION: Rear of G-480 compound.				LAND ELEV.:	15.2
DRILL MACHINE:	Diedrich D-50	METHOD:	H.S. Augers	0 HOUR DTW:	NE	BORING DEPTH:	5.0
START DATE:	11/17/08	FINISH DATE:	11/17/08	24 HOUR DTW:	FIAD	ROCK DEPTH:	--

DEPTH	BLOW COUNT 0.5 0.5 0.5 0.5	MOI.	OVA RESULTS (ppm)				LAB.	U S C S	L O G	SOIL AND ROCK DESCRIPTION	
			0	1000	2000	3000				4000	DEPTH
									0.0	LAND SURFACE	15.161
									0.2	ASPHALT	15.0
1.0									1.0		14.2
	4 2 2 2	M				UST G480- SB01 (1-3)	SM		2.5	Brown to dark brown, Silty, vf. SAND. Moist. No HCO.	12.7
3.0											
	2 1 3 2	M					CL		5.0	Lt. brown to orange-brown, mottled, Silty CLAY. Low plasticity. Moist. No HCO. Lighter in color than above.	10.2
5.0										Boring Terminated at Elevation 10.2 ft	

CATLIN ENVIRO. LOG 205-077 G-480 LSA.GPJ.CATLIN.GDT 12/11/08

▽ = 0hr. DTW

▼ = 24hr. DTW

BORING LOG



SHEET 1 of 1

PROJECT NO.: 205-077	STATE: NC	COUNTY: Onslow	LOCATION: MCB, Camp Lejeune
PROJECT NAME: UST G-480 LSA		LOGGED BY: Tom Stetler	BORING ID: USTG480-SB02
NORTHING: 3,846,807.13	EASTING: 275,490.74	DRILLER: Bobbie D. Fowler	
SYSTEM: UTM NAD83 (m)		CREW: John Wood	
BORING LOCATION: Rear of G-480 compound.			LAND ELEV.: 15.2
DRILL MACHINE: Diedrich D-50	METHOD: H.S. Augers	0 HOUR DTW: NE	BORING DEPTH: 5.0
START DATE: 11/17/08	FINISH DATE: 11/17/08	24 HOUR DTW: FIAD	ROCK DEPTH: --

DEPTH	BLOW COUNT	MOI.	OVA RESULTS (ppm)	LAB.	U S C S	L O G	SOIL AND ROCK		
							DEPTH	DESCRIPTION	ELEVATION
	0.5 0.5 0.5 0.5		0 1000 2000 3000 4000				0.0	LAND SURFACE	15.239
							0.2	ASPHALT	15.0
1.0							1.0		14.2
	5 3 4 5	M	▲146.4	UST G480-SB02 (1-3)	SC/SM		2.0	Lt. grayish brown, Silty to Clayey, vf. SAND. Moist. No HCO.	13.2
3.0					CL			Lt. brown to orange-brown, low plasticity, mottled, Silty CLAY. Moist.	
	3 3 3 4	W	▲1503				4.0		11.2
					SC/SM			Grayish-brown, Silty to Clayey, vf. SAND. Wet at base.	
5.0							5.0		10.2
							Boring Terminated at Elevation 10.2 ft		

CATLIN\ENVIRO.LOG 205-077 G-480 LSA.GPJ CATLIN.GDT 12/11/08

▽ = 0hr. DTW ▼ = 24hr. DTW

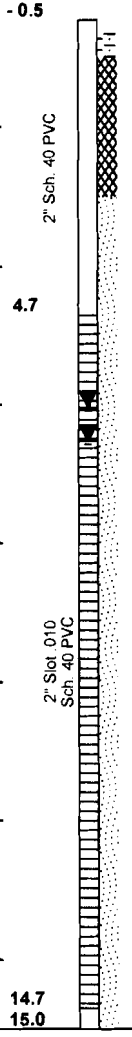
WELL LOG

CATLIN
ENGINEERS and SCIENTISTS
205-077
Wilmington, NC

SHEET 1 OF 1

PROJECT NO.: 205-077	STATE: NC	COUNTY: Onslow	LOCATION: MCB, Camp Lejeune
PROJECT NAME: UST G-480 LSA		LOGGED BY: Tom Stetler	WELL ID: USTG480-MW23
DRILLER: Bobbie D. Fowler			
NORTHING: 3846806.7	EASTING: 275486.2	CREW: John Wood	
SYSTEM: UTM NAD83 (m)		BORING LOCATION: Corner of excavated area.	T.O.C. ELEV.: 14.79
DRILL MACHINE: Diedrich D-50	METHOD: H.S. Augers	0 HOUR DTW: 6.0	TOTAL DEPTH: 15.0
START DATE: 11/17/08	FINISH DATE: 11/17/08	24 HOUR DTW: 6.1	WELL DEPTH: 15.0

DEPTH	BLOW COUNT				OVA (ppm)	LAB.	U S C S	L O G	SOIL AND ROCK DESCRIPTION			WELL DETAIL
	6in	6in	6in	6in					DEPTH	DESCRIPTION	ELEVATION	
									0.0	LAND SURFACE	15.3	0.0
1.0									1.0		14.3	1.0
	6	5	2	2	537.1		SM		2.0	Brown to gray, Silty, vf. SAND. Moist. No HCO.	13.3	1.0
3.0							CL		4.0	Brown to orange-brown, Silty CLAY. Med. to low plasticity. Moist. Soft. Mottled. No HCO.	11.3	3.0
	0	1	3	4	1972		SM		5.0	Gray, Silty, vf. SAND. Tr. clay. Wet at base of interval. Mod. HCO.	10.3	4.7
8.0							CL		8.0		7.3	
	2	3	3	4	1503		CL		10.0	Orange-brown to gray, mottled, low plasticity, Silty CLAY. Moist. Strong HCO at top of interval.	5.3	
13.0							SP		13.0		2.3	
	1	1	1	1	236.3		SP		15.0	Gray, f. to vf. SAND. Tr. silt. Saturated. Slight HCO.	0.3	14.7
										Boring Terminated at Elevation 0.3 ft in SAND.	0.3	15.0



CATLIN BORING LOG 205-077 G-480 LSA G.P.L. CATLIN.GDI_1211/08

Portland Cement
 Bentonite Pellets
 #2 Medium Sand

APPENDIX C
MONITORING WELL SAMPLING RECORD

APPENDIX C
MONITORING WELL SAMPLING RECORDS

UST G480 LSA

**Marine Corps Base
Camp Lejeune, NC**

WELL IDENTIFICATION	USTG480-MW23				
DATE SAMPLED	11/18/08				
TIME SAMPLED	13:00				
SAMPLED BY	Tom Stetler				
WELL DIAMETER	2"				
WELL DEPTH - (A)*	14.54				
DEPTH TO WATER - (B)	6.06'				
(A-B) FT. WATER IN WELL - (C)	8.48				
VOLUME PER FT. - (D)	0.163 gal.				
(CxD) ONE WELL VOLUME - (E)	1.38 gal.				
(3xE) THREE WELL VOLUMES - (F)	4.14 gal.				
BAILER VOLUME** - (G)	0.24 gal.				
(F/G) BAILS REQUIRED**	17.3				
AMOUNT REMOVED	19 bails				
TURBIDITY (clear, slight, moderate, high)	MODERATE				
ANALYSIS and / or COMMENTS	EPA 602				
	EPA 625				
	MADEP EPH				
	MADEP VPH				

WELL VOLUMES gal/ft

1" WELL = 0.045
2" WELL = 0.163
4" WELL = 0.661
6" WELL = 1.501

BAILER VOLUMES gal/bail

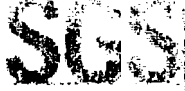
3' x 1.5" = 0.24
4' x 1.5" = 0.37

* - Includes adjustment of casing height/depth.

** - 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



Steve Hudson
Richard Catlin & Associates
P.O. Box 10279
Wilmington, NC 28404-0279

Report Number: G128-2278

Client Project: UST G-480 LSA

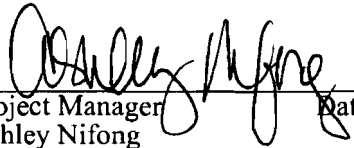
Dear Steve Hudson,

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

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

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

Sincerely,
SGS Environmental Services, Inc.

 12/1/08
Project Manager Date
Ashley Nifong

List of Reporting Abbreviations
And Data Qualifiers

B = Compound also detected in batch blank

BQL = Below Quantification Limit (RL or MDL)

DF = Dilution Factor

Dup = Duplicate

P/D = Detected, but RPD is > 25/40% between results in dual column method.

E = Estimated concentration, exceeds calibration range.

J = Estimated concentration, below calibration range and above MDL

LCS(D) = Laboratory Control Spike (Duplicate)

MDL = Method Detection Limit

MS(D) = Matrix Spike (Duplicate)

PQL = Practical Quantitation Limit

RL/CL = Reporting Limit / Control Limit

RPD = Relative Percent Difference

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

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

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

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

% Rec = Percent Recovery

% 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 8260-5035**

Client Sample ID: USTG480-SB01 (1-3)
 Client Project ID: UST G-480 LSA
 Lab Sample ID G128-2278-1A
 Lab Project ID: G128-2278
 Report Basis: Dry Weight

Analyzed By: MJC
 Date Collected: 11-17-2008 13:50
 Date Received: 11/18/2008
 Matrix: Soil
 Sample Amount: 6.63 g
 %Solids: 85.7

Report Name Compound	Result MG/KG	Quantitation Limit MG/KG	Dilution Factor	Date Analyzed
Acetone	BQL	0.0440	1	11/20/2008
Benzene	BQL	0.00440	1	11/20/2008
Bromobenzene	BQL	0.00440	1	11/20/2008
Bromochloromethane	BQL	0.00440	1	11/20/2008
Bromodichloromethane	BQL	0.00440	1	11/20/2008
Bromoform	BQL	0.00440	1	11/20/2008
Bromomethane	BQL	0.00440	1	11/20/2008
2-Butanone	BQL	0.0220	1	11/20/2008
n-Butylbenzene	BQL	0.00440	1	11/20/2008
sec-Butylbenzene	BQL	0.00440	1	11/20/2008
tert-Butylbenzene	BQL	0.00440	1	11/20/2008
Carbon disulfide	BQL	0.00440	1	11/20/2008
Carbon tetrachloride	BQL	0.00440	1	11/20/2008
Chlorobenzene	BQL	0.00440	1	11/20/2008
Chloroethane	BQL	0.00440	1	11/20/2008
Chloroform	BQL	0.00440	1	11/20/2008
Chloromethane	BQL	0.00440	1	11/20/2008
2-Chlorotoluene	BQL	0.00440	1	11/20/2008
4-Chlorotoluene	BQL	0.00440	1	11/20/2008
Dibromochloromethane	BQL	0.00440	1	11/20/2008
1,2-Dibromo-3-chloropropane	BQL	0.0220	1	11/20/2008
Dibromomethane	BQL	0.00440	1	11/20/2008
1,2-Dibromoethane (EDB)	BQL	0.00440	1	11/20/2008
1,2-Dichlorobenzene	BQL	0.00440	1	11/20/2008
1,3-Dichlorobenzene	BQL	0.00440	1	11/20/2008
1,4-Dichlorobenzene	BQL	0.00440	1	11/20/2008
trans-1,4-Dichloro-2-butene	BQL	0.0220	1	11/20/2008
1,1-Dichloroethane	BQL	0.00440	1	11/20/2008
1,1-Dichloroethene	BQL	0.00440	1	11/20/2008
1,2-Dichloroethane	BQL	0.00440	1	11/20/2008
cis-1,2-Dichloroethene	BQL	0.00440	1	11/20/2008
trans-1,2-dichloroethene	BQL	0.00440	1	11/20/2008
1,2-Dichloropropane	BQL	0.00440	1	11/20/2008
1,3-Dichloropropane	BQL	0.00440	1	11/20/2008
2,2-Dichloropropane	BQL	0.00440	1	11/20/2008
1,1-Dichloropropene	BQL	0.00440	1	11/20/2008
cis-1,3-Dichloropropene	BQL	0.00440	1	11/20/2008
trans-1,3-Dichloropropene	BQL	0.00440	1	11/20/2008
Dichlorodifluoromethane	BQL	0.00440	1	11/20/2008
Diisopropyl ether (DIPE)	BQL	0.00440	1	11/20/2008
Ethylbenzene	BQL	0.00440	1	11/20/2008
Hexachlorobutadiene	BQL	0.00440	1	11/20/2008
2-Hexanone	BQL	0.0110	1	11/20/2008
Iodomethane	BQL	0.00440	1	11/20/2008

**Results for Volatiles
by GCMS 8260-5035**

Client Sample ID: USTG480-SB02 (1-3)
 Client Project ID: UST G-480 LSA
 Lab Sample ID G128-2278-2A
 Lab Project ID: G128-2278
 Report Basis: Dry Weight

Analyzed By: MJC
 Date Collected: 11-17-2008 14:05
 Date Received: 11/18/2008
 Matrix: Soil
 Sample Amount: 7.05 g
 %Solids: 84.1

Report Name Compound	Result MG/KG	Quantitation Limit MG/KG	Dilution Factor	Date Analyzed
Acetone	BQL	0.0422	1	11/20/2008
Benzene	BQL	0.00422	1	11/20/2008
Bromobenzene	BQL	0.00422	1	11/20/2008
Bromochloromethane	BQL	0.00422	1	11/20/2008
Bromodichloromethane	BQL	0.00422	1	11/20/2008
Bromoform	BQL	0.00422	1	11/20/2008
Bromomethane	BQL	0.00422	1	11/20/2008
2-Butanone	BQL	0.0211	1	11/20/2008
n-Butylbenzene	BQL	0.00422	1	11/20/2008
sec-Butylbenzene	BQL	0.00422	1	11/20/2008
tert-Butylbenzene	BQL	0.00422	1	11/20/2008
Carbon disulfide	BQL	0.00422	1	11/20/2008
Carbon tetrachloride	BQL	0.00422	1	11/20/2008
Chlorobenzene	BQL	0.00422	1	11/20/2008
Chloroethane	BQL	0.00422	1	11/20/2008
Chloroform	BQL	0.00422	1	11/20/2008
Chloromethane	BQL	0.00422	1	11/20/2008
2-Chlorotoluene	BQL	0.00422	1	11/20/2008
4-Chlorotoluene	BQL	0.00422	1	11/20/2008
Dibromochloromethane	BQL	0.00422	1	11/20/2008
1,2-Dibromo-3-chloropropane	BQL	0.0211	1	11/20/2008
Dibromomethane	BQL	0.00422	1	11/20/2008
1,2-Dibromoethane (EDB)	BQL	0.00422	1	11/20/2008
1,2-Dichlorobenzene	BQL	0.00422	1	11/20/2008
1,3-Dichlorobenzene	BQL	0.00422	1	11/20/2008
1,4-Dichlorobenzene	BQL	0.00422	1	11/20/2008
trans-1,4-Dichloro-2-butene	BQL	0.0211	1	11/20/2008
1,1-Dichloroethane	BQL	0.00422	1	11/20/2008
1,1-Dichloroethene	BQL	0.00422	1	11/20/2008
1,2-Dichloroethane	BQL	0.00422	1	11/20/2008
cis-1,2-Dichloroethene	BQL	0.00422	1	11/20/2008
trans-1,2-dichloroethene	BQL	0.00422	1	11/20/2008
1,2-Dichloropropane	BQL	0.00422	1	11/20/2008
1,3-Dichloropropane	BQL	0.00422	1	11/20/2008
2,2-Dichloropropane	BQL	0.00422	1	11/20/2008
1,1-Dichloropropene	BQL	0.00422	1	11/20/2008
cis-1,3-Dichloropropene	BQL	0.00422	1	11/20/2008
trans-1,3-Dichloropropene	BQL	0.00422	1	11/20/2008
Dichlorodifluoromethane	BQL	0.00422	1	11/20/2008
Diisopropyl ether (DIPE)	BQL	0.00422	1	11/20/2008
Ethylbenzene	BQL	0.00422	1	11/20/2008
Hexachlorobutadiene	BQL	0.00422	1	11/20/2008
2-Hexanone	BQL	0.0105	1	11/20/2008
Iodomethane	BQL	0.00422	1	11/20/2008

**Results for Volatiles
by GCMS 8260-5035**

Client Sample ID: USTG480-SB03 (1-3)
Client Project ID: UST G-480 LSA
Lab Sample ID G128-2278-3A
Lab Project ID: G128-2278
Report Basis: Dry Weight

Analyzed By: MJC
Date Collected: 11-17-2008 14:15
Date Received: 11/18/2008
Matrix: Soil
Sample Amount: 6.73 g
%Solids: 84.4

Report Name Compound	Result MG/KG	Quantitation Limit MG/KG	Dilution Factor	Date Analyzed
Acetone	BQL	0.0439	1	11/20/2008
Benzene	BQL	0.00439	1	11/20/2008
Bromobenzene	BQL	0.00439	1	11/20/2008
Bromochloromethane	BQL	0.00439	1	11/20/2008
Bromodichloromethane	BQL	0.00439	1	11/20/2008
Bromoform	BQL	0.00439	1	11/20/2008
Bromomethane	BQL	0.00439	1	11/20/2008
2-Butanone	BQL	0.0220	1	11/20/2008
n-Butylbenzene	BQL	0.00439	1	11/20/2008
sec-Butylbenzene	BQL	0.00439	1	11/20/2008
tert-Butylbenzene	BQL	0.00439	1	11/20/2008
Carbon disulfide	BQL	0.00439	1	11/20/2008
Carbon tetrachloride	BQL	0.00439	1	11/20/2008
Chlorobenzene	BQL	0.00439	1	11/20/2008
Chloroethane	BQL	0.00439	1	11/20/2008
Chloroform	BQL	0.00439	1	11/20/2008
Chloromethane	BQL	0.00439	1	11/20/2008
2-Chlorotoluene	BQL	0.00439	1	11/20/2008
4-Chlorotoluene	BQL	0.00439	1	11/20/2008
Dibromochloromethane	BQL	0.00439	1	11/20/2008
1,2-Dibromo-3-chloropropane	BQL	0.0220	1	11/20/2008
Dibromomethane	BQL	0.00439	1	11/20/2008
1,2-Dibromoethane (EDB)	BQL	0.00439	1	11/20/2008
1,2-Dichlorobenzene	BQL	0.00439	1	11/20/2008
1,3-Dichlorobenzene	BQL	0.00439	1	11/20/2008
1,4-Dichlorobenzene	BQL	0.00439	1	11/20/2008
trans-1,4-Dichloro-2-butene	BQL	0.0220	1	11/20/2008
1,1-Dichloroethane	BQL	0.00439	1	11/20/2008
1,1-Dichloroethene	BQL	0.00439	1	11/20/2008
1,2-Dichloroethane	BQL	0.00439	1	11/20/2008
cis-1,2-Dichloroethene	BQL	0.00439	1	11/20/2008
trans-1,2-dichloroethene	BQL	0.00439	1	11/20/2008
1,2-Dichloropropane	BQL	0.00439	1	11/20/2008
1,3-Dichloropropane	BQL	0.00439	1	11/20/2008
2,2-Dichloropropane	BQL	0.00439	1	11/20/2008
1,1-Dichloropropene	BQL	0.00439	1	11/20/2008
cis-1,3-Dichloropropene	BQL	0.00439	1	11/20/2008
trans-1,3-Dichloropropene	BQL	0.00439	1	11/20/2008
Dichlorodifluoromethane	BQL	0.00439	1	11/20/2008
Diisopropyl ether (DIPE)	BQL	0.00439	1	11/20/2008
Ethylbenzene	BQL	0.00439	1	11/20/2008
Hexachlorobutadiene	BQL	0.00439	1	11/20/2008
2-Hexanone	BQL	0.0110	1	11/20/2008
Iodomethane	BQL	0.00439	1	11/20/2008

**Results for Volatiles
by GCMS 8260-5035**

Client Sample ID: USTG480-SB01 (1-3) DUP
 Client Project ID: UST G-480 LSA
 Lab Sample ID G128-2278-4A
 Lab Project ID: G128-2278
 Report Basis: Dry Weight

Analyzed By: MJC
 Date Collected: 11-17-2008 13:50
 Date Received: 11/18/2008
 Matrix: Soil
 Sample Amount: 6.53 g
 %Solids: 86.5

Report Name Compound	Result MG/KG	Quantitation Limit MG/KG	Dilution Factor	Date Analyzed
Acetone	BQL	0.0443	1	11/20/2008
Benzene	BQL	0.00443	1	11/20/2008
Bromobenzene	BQL	0.00443	1	11/20/2008
Bromochloromethane	BQL	0.00443	1	11/20/2008
Bromodichloromethane	BQL	0.00443	1	11/20/2008
Bromoform	BQL	0.00443	1	11/20/2008
Bromomethane	BQL	0.00443	1	11/20/2008
2-Butanone	BQL	0.0221	1	11/20/2008
n-Butylbenzene	BQL	0.00443	1	11/20/2008
sec-Butylbenzene	BQL	0.00443	1	11/20/2008
tert-Butylbenzene	BQL	0.00443	1	11/20/2008
Carbon disulfide	BQL	0.00443	1	11/20/2008
Carbon tetrachloride	BQL	0.00443	1	11/20/2008
Chlorobenzene	BQL	0.00443	1	11/20/2008
Chloroethane	BQL	0.00443	1	11/20/2008
Chloroform	BQL	0.00443	1	11/20/2008
Chloromethane	BQL	0.00443	1	11/20/2008
2-Chlorotoluene	BQL	0.00443	1	11/20/2008
4-Chlorotoluene	BQL	0.00443	1	11/20/2008
Dibromochloromethane	BQL	0.00443	1	11/20/2008
1,2-Dibromo-3-chloropropane	BQL	0.0221	1	11/20/2008
Dibromomethane	BQL	0.00443	1	11/20/2008
1,2-Dibromoethane (EDB)	BQL	0.00443	1	11/20/2008
1,2-Dichlorobenzene	BQL	0.00443	1	11/20/2008
1,3-Dichlorobenzene	BQL	0.00443	1	11/20/2008
1,4-Dichlorobenzene	BQL	0.00443	1	11/20/2008
trans-1,4-Dichloro-2-butene	BQL	0.0221	1	11/20/2008
1,1-Dichloroethane	BQL	0.00443	1	11/20/2008
1,1-Dichloroethene	BQL	0.00443	1	11/20/2008
1,2-Dichloroethane	BQL	0.00443	1	11/20/2008
cis-1,2-Dichloroethene	BQL	0.00443	1	11/20/2008
trans-1,2-dichloroethene	BQL	0.00443	1	11/20/2008
1,2-Dichloropropane	BQL	0.00443	1	11/20/2008
1,3-Dichloropropane	BQL	0.00443	1	11/20/2008
2,2-Dichloropropane	BQL	0.00443	1	11/20/2008
1,1-Dichloropropene	BQL	0.00443	1	11/20/2008
cis-1,3-Dichloropropene	BQL	0.00443	1	11/20/2008
trans-1,3-Dichloropropene	BQL	0.00443	1	11/20/2008
Dichlorodifluoromethane	BQL	0.00443	1	11/20/2008
Diisopropyl ether (DIPE)	BQL	0.00443	1	11/20/2008
Ethylbenzene	BQL	0.00443	1	11/20/2008
Hexachlorobutadiene	BQL	0.00443	1	11/20/2008
2-Hexanone	BQL	0.0111	1	11/20/2008
Iodomethane	BQL	0.00443	1	11/20/2008

**Results for Semivolatiles
by GCMS 8270**

Client Sample ID: USTG480-SB01 (1-3)
 Client Project ID: UST G-480 LSA
 Lab Sample ID: G128-2278-1H
 Lab Project ID: G128-2278
 Report Basis: Dry weight
 Initial Weight: 32.5 g

Analyzed By: DES
 Date Collected: 11/17/2008 13:50
 Date Received: 11/18/2008
 Date Extracted: 11/20/2008
 Matrix: Soil
 % Solids: 85.66

Compound	Result mg/Kg	RL mg/Kg	MDL mg/Kg	Dilution Factor	Date Analyzed	Flag
Acenaphthene	BQL	0.359	0.055	1	11/26/2008	
Acenaphthylene	BQL	0.359	0.050	1	11/26/2008	
Anthracene	BQL	0.359	0.049	1	11/26/2008	
Benzo[a]anthracene	BQL	0.359	0.049	1	11/26/2008	
Benzo[a]pyrene	BQL	0.359	0.052	1	11/26/2008	
Benzo[b]fluoranthene	BQL	0.359	0.050	1	11/26/2008	
Benzo[g,h,i]perylene	BQL	0.359	0.063	1	11/26/2008	
Benzo[k]fluoranthene	BQL	0.359	0.051	1	11/26/2008	
Benzoic Acid	BQL	0.718	0.444	1	11/26/2008	
Bis(2-chloroethoxy)methane	BQL	0.359	0.053	1	11/26/2008	
Bis(2-chloroethyl)ether	BQL	0.359	0.073	1	11/26/2008	
Bis(2-chloroisopropyl)ether	BQL	0.359	0.058	1	11/26/2008	
Bis(2-ethylhexyl)phthalate	BQL	0.359	0.055	1	11/26/2008	
4-bromophenyl phenyl ether	BQL	0.359	0.064	1	11/26/2008	
Butylbenzylphthalate	BQL	0.359	0.053	1	11/26/2008	
2-Chloronaphthalene	BQL	0.359	0.050	1	11/26/2008	
2-Chlorophenol	BQL	0.359	0.046	1	11/26/2008	
4-Chloro-3-methylphenol	BQL	0.359	0.052	1	11/26/2008	
4-Chloroaniline	BQL	1.80	0.059	1	11/26/2008	
4-Chlorophenyl phenyl ether	BQL	0.359	0.053	1	11/26/2008	
Chrysene	BQL	0.359	0.035	1	11/26/2008	
Dibenzo[a,h]anthracene	BQL	0.359	0.046	1	11/26/2008	
Dibenzofuran	BQL	0.359	0.051	1	11/26/2008	
Di-n-Butylphthalate	BQL	0.359	0.052	1	11/26/2008	
1,2-Dichlorobenzene	BQL	0.359	0.061	1	11/26/2008	
1,3-Dichlorobenzene	BQL	0.359	0.058	1	11/26/2008	
1,4-Dichlorobenzene	BQL	0.359	0.052	1	11/26/2008	
3,3'-Dichlorobenzidine	BQL	0.718	0.059	1	11/26/2008	
2,4-Dichlorophenol	BQL	0.359	0.039	1	11/26/2008	
Diethylphthalate	BQL	0.359	0.048	1	11/26/2008	
Dimethylphthalate	BQL	0.359	0.056	1	11/26/2008	
2,4-Dimethylphenol	BQL	0.359	0.065	1	11/26/2008	
Di-n-octylphthalate	BQL	0.359	0.055	1	11/26/2008	
4,6-Dinitro-2-methylphenol	BQL	1.80	0.043	1	11/26/2008	
2,4-Dinitrophenol	BQL	1.80	0.047	1	11/26/2008	
2,4-Dinitrotoluene	BQL	0.359	0.055	1	11/26/2008	
2,6-Dinitrotoluene	BQL	0.359	0.059	1	11/26/2008	
Diphenylamine *	BQL	0.359	0.045	1	11/26/2008	
Fluoranthene	BQL	0.359	0.058	1	11/26/2008	
Fluorene	BQL	0.359	0.056	1	11/26/2008	
Hexachlorobenzene	BQL	0.359	0.078	1	11/26/2008	
Hexachlorocyclopentadiene	BQL	0.359	0.065	1	11/26/2008	
Hexachlorocyclopentadiene	BQL	0.718	0.070	1	11/26/2008	
Hexachloroethane	BQL	0.359	0.056	1	11/26/2008	
Indeno(1,2,3-c,d)pyrene	BQL	0.359	0.042	1	11/26/2008	
Isophorone	BQL	0.359	0.052	1	11/26/2008	
2-Methylnaphthalene	BQL	0.359	0.059	1	11/26/2008	

**Results for Semivolatiles
by GCMS 8270**

Client Sample ID: USTG480-SB01 (1-3)
 Client Project ID: UST G-480 LSA
 Lab Sample ID: G128-2278-1H
 Lab Project ID: G128-2278
 Report Basis: Dry weight
 Initial Weight: 32.5 g

Analyzed By: DES
 Date Collected: 11/17/2008 13:50
 Date Received: 11/18/2008
 Date Extracted: 11/20/2008
 Matrix: Soil
 % Solids: 85.66

Compound	Result mg/Kg	RL mg/Kg	MDL mg/Kg	Dilution Factor	Date Analyzed	Flag
2-Methylphenol	BQL	0.359	0.055	1	11/26/2008	
3- & 4-Methylphenol	BQL	0.359	0.047	1	11/26/2008	
Naphthalene	BQL	0.359	0.050	1	11/26/2008	
2-Nitroaniline	BQL	0.359	0.048	1	11/26/2008	
3-Nitroaniline	BQL	1.80	0.053	1	11/26/2008	
4-Nitroaniline	BQL	1.80	0.048	1	11/26/2008	
Nitrobenzene	BQL	0.359	0.048	1	11/26/2008	
2-Nitrophenol	BQL	0.359	0.052	1	11/26/2008	
4-Nitrophenol	BQL	1.80	0.063	1	11/26/2008	
N-Nitrosodi-n-propylamine	BQL	0.359	0.058	1	11/26/2008	
Pentachlorophenol	BQL	1.80	0.033	1	11/26/2008	
Phenanthrene	BQL	0.359	0.050	1	11/26/2008	
Phenol	BQL	0.359	0.049	1	11/26/2008	
Pyrene	BQL	0.359	0.049	1	11/26/2008	
1,2,4-Trichlorobenzene	BQL	0.359	0.065	1	11/26/2008	
2,4,5-Trichlorophenol	BQL	0.359	0.054	1	11/26/2008	
2,4,6-Trichlorophenol	BQL	0.359	0.032	1	11/26/2008	
		Spike Added	Spike Result	Percent Recovered		
2-Fluorobiphenyl		10	8.9	88		
2-Fluorophenol		10	8.2	82		
Nitrobenzene-d5		10	9.2	92		
Phenol-d6		10	8.8	88		
2,4,6-Tribromophenol		10	7.2	72		
4-Terphenyl-d14		10	9.2	92		

Comments:

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

Flags:

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

Reviewed By: 

Results of Library Search for Semivolatile Compounds
by GCMS

Client Sample ID: USTG480-SB01 (1-3)
 Client Project ID: UST G-480 LSA
 Lab Sample ID: G128-2278-1H
 Lab Project ID: G128-2278
 Sample Wt/Vol: 32.5 g
 Dilution: 1


Analyzed By: DES
 Date Collected: 11/17/2008 13:50
 Date Received: 11/18/2008
 Date Extracted: 11/20/2008
 Date Analyzed: 11/26/2008
 Matrix: Soil
 % Solids: 85.7

No.	Compound	Retention Time	CAS#	Match Probability	Result (ug/KG)
1	Unknown	11.12			1110
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: 

**Results for Semivolatiles
by GCMS 8270**

Client Sample ID: USTG480-SB02 (1-3)
 Client Project ID: UST G-480 LSA
 Lab Sample ID: G128-2278-2H
 Lab Project ID: G128-2278
 Report Basis: Dry weight
 Initial Weight: 31.96 g

Analyzed By: DES
 Date Collected: 11/17/2008 14:05
 Date Received: 11/18/2008
 Date Extracted: 11/20/2008
 Matrix: Soil
 % Solids: 84.09

Compound	Result mg/Kg	RL mg/Kg	MDL mg/Kg	Dilution Factor	Date Analyzed	Flag
Acenaphthene	BQL	0.372	0.057	1	11/25/2008	
Acenaphthylene	BQL	0.372	0.052	1	11/25/2008	
Anthracene	BQL	0.372	0.051	1	11/25/2008	
Benzo[a]anthracene	BQL	0.372	0.051	1	11/25/2008	
Benzo[a]pyrene	BQL	0.372	0.054	1	11/25/2008	
Benzo[b]fluoranthene	BQL	0.372	0.052	1	11/25/2008	
Benzo[g,h,i]perylene	BQL	0.372	0.065	1	11/25/2008	
Benzo[k]fluoranthene	BQL	0.372	0.053	1	11/25/2008	
Benzoic Acid	BQL	0.744	0.460	1	11/25/2008	
Bis(2-chloroethoxy)methane	BQL	0.372	0.055	1	11/25/2008	
Bis(2-chloroethyl)ether	BQL	0.372	0.076	1	11/25/2008	
Bis(2-chloroisopropyl)ether	BQL	0.372	0.060	1	11/25/2008	
Bis(2-ethylhexyl)phthalate	BQL	0.372	0.057	1	11/25/2008	
4-bromophenyl phenyl ether	BQL	0.372	0.066	1	11/25/2008	
Butylbenzylphthalate	BQL	0.372	0.055	1	11/25/2008	
2-Chloronaphthalene	BQL	0.372	0.052	1	11/25/2008	
2-Chlorophenol	BQL	0.372	0.047	1	11/25/2008	
4-Chloro-3-methylphenol	BQL	0.372	0.054	1	11/25/2008	
4-Chloroaniline	BQL	1.86	0.061	1	11/25/2008	
4-Chlorophenyl phenyl ether	BQL	0.372	0.055	1	11/25/2008	
Chrysene	BQL	0.372	0.036	1	11/25/2008	
Dibenzo[a,h]anthracene	BQL	0.372	0.048	1	11/25/2008	
Dibenzofuran	BQL	0.372	0.053	1	11/25/2008	
Di-n-Butylphthalate	BQL	0.372	0.054	1	11/25/2008	
1,2-Dichlorobenzene	BQL	0.372	0.063	1	11/25/2008	
1,3-Dichlorobenzene	BQL	0.372	0.060	1	11/25/2008	
1,4-Dichlorobenzene	BQL	0.372	0.054	1	11/25/2008	
3,3'-Dichlorobenzidine	BQL	0.744	0.061	1	11/25/2008	
2,4-Dichlorophenol	BQL	0.372	0.041	1	11/25/2008	
Diethylphthalate	BQL	0.372	0.050	1	11/25/2008	
Dimethylphthalate	BQL	0.372	0.058	1	11/25/2008	
2,4-Dimethylphenol	BQL	0.372	0.067	1	11/25/2008	
Di-n-octylphthalate	BQL	0.372	0.057	1	11/25/2008	
4,6-Dinitro-2-methylphenol	BQL	1.86	0.044	1	11/25/2008	
2,4-Dinitrophenol	BQL	1.86	0.048	1	11/25/2008	
2,4-Dinitrotoluene	BQL	0.372	0.057	1	11/25/2008	
2,6-Dinitrotoluene	BQL	0.372	0.061	1	11/25/2008	
Diphenylamine *	BQL	0.372	0.047	1	11/25/2008	
Fluoranthene	BQL	0.372	0.060	1	11/25/2008	
Fluorene	BQL	0.372	0.058	1	11/25/2008	
Hexachlorobenzene	BQL	0.372	0.081	1	11/25/2008	
Hexachlorobutadiene	BQL	0.372	0.068	1	11/25/2008	
Hexachlorocyclopentadiene	BQL	0.744	0.073	1	11/25/2008	
Hexachloroethane	BQL	0.372	0.058	1	11/25/2008	
Indeno(1,2,3-c,d)pyrene	BQL	0.372	0.044	1	11/25/2008	
Isophorone	BQL	0.372	0.054	1	11/25/2008	
2-Methylnaphthalene	BQL	0.372	0.061	1	11/25/2008	

**Results for Semivolatiles
by GCMS 8270**

Client Sample ID: USTG480-SB02 (1-3)
 Client Project ID: UST G-480 LSA
 Lab Sample ID: G128-2278-2H
 Lab Project ID: G128-2278
 Report Basis: Dry weight
 Initial Weight: 31.96 g

Analyzed By: DES
 Date Collected: 11/17/2008 14:05
 Date Received: 11/18/2008
 Date Extracted: 11/20/2008
 Matrix: Soil
 % Solids: 84.09

Compound	Result mg/Kg	RL mg/Kg	MDL mg/Kg	Dilution Factor	Date Analyzed	Flag
2-Methylphenol	BQL	0.372	0.057	1	11/25/2008	
3- & 4-Methylphenol	BQL	0.372	0.048	1	11/25/2008	
Naphthalene	BQL	0.372	0.052	1	11/25/2008	
2-Nitroaniline	BQL	0.372	0.050	1	11/25/2008	
3-Nitroaniline	BQL	1.86	0.055	1	11/25/2008	
4-Nitroaniline	BQL	1.86	0.050	1	11/25/2008	
Nitrobenzene	BQL	0.372	0.050	1	11/25/2008	
2-Nitrophenol	BQL	0.372	0.054	1	11/25/2008	
4-Nitrophenol	BQL	1.86	0.065	1	11/25/2008	
N-Nitrosodi-n-propylamine	BQL	0.372	0.060	1	11/25/2008	
Pentachlorophenol	BQL	1.86	0.034	1	11/25/2008	
Phenanthrene	BQL	0.372	0.052	1	11/25/2008	
Phenol	BQL	0.372	0.051	1	11/25/2008	
Pyrene	BQL	0.372	0.051	1	11/25/2008	
1,2,4-Trichlorobenzene	BQL	0.372	0.067	1	11/25/2008	
2,4,5-Trichlorophenol	BQL	0.372	0.055	1	11/25/2008	
2,4,6-Trichlorophenol	BQL	0.372	0.033	1	11/25/2008	
		Spike Added	Spike Result	Percent Recovered		
2-Fluorobiphenyl		10	8.7	87		
2-Fluorophenol		10	8.5	85		
Nitrobenzene-d5		10	9.8	98		
Phenol-d6		10	9.3	93		
2,4,6-Tribromophenol		10	7.1	71		
4-Terphenyl-d14		10	10.2	102		

Comments:

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

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: USTG480-SB02 (1-3)
 Client Project ID: UST G-480 LSA
 Lab Sample ID: G128-2278-2H
 Lab Project ID: G128-2278
 Sample Wt/Vol: 31.96 g
 Dilution: 1


Analyzed By: DES
 Date Collected: 11/17/2008 14:05
 Date Received: 11/18/2008
 Date Extracted: 11/20/2008
 Date Analyzed: 11/25/2008
 Matrix: Soil
 % Solids: 84.1

No.	Compound	Retention Time	CAS#	Match Probability	Result (ug/KG)
1	No library search compounds detected.				
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: 

**Results for Semivolatiles
by GCMS 8270**

Client Sample ID: USTG480-SB03 (1-3)
 Client Project ID: UST G-480 LSA
 Lab Sample ID: G128-2278-3H
 Lab Project ID: G128-2278
 Report Basis: Dry weight
 Initial Weight: 33.79 g

Analyzed By: DES
 Date Collected: 11/17/2008 14:15
 Date Received: 11/18/2008
 Date Extracted: 11/20/2008
 Matrix: Soil
 % Solids: 84.42

Compound	Result mg/Kg	RL mg/Kg	MDL mg/Kg	Dilution Factor	Date Analyzed	Flag
Acenaphthene	BQL	0.351	0.054	1	11/25/2008	
Acenaphthylene	BQL	0.351	0.049	1	11/25/2008	
Anthracene	BQL	0.351	0.048	1	11/25/2008	
Benzo[a]anthracene	BQL	0.351	0.048	1	11/25/2008	
Benzo[a]pyrene	BQL	0.351	0.051	1	11/25/2008	
Benzo[b]fluoranthene	BQL	0.351	0.049	1	11/25/2008	
Benzo[g,h,i]perylene	BQL	0.351	0.061	1	11/25/2008	
Benzo[k]fluoranthene	BQL	0.351	0.050	1	11/25/2008	
Benzoic Acid	BQL	0.701	0.433	1	11/25/2008	
Bis(2-chloroethoxy)methane	BQL	0.351	0.052	1	11/25/2008	
Bis(2-chloroethyl)ether	BQL	0.351	0.071	1	11/25/2008	
Bis(2-chloroisopropyl)ether	BQL	0.351	0.056	1	11/25/2008	
Bis(2-ethylhexyl)phthalate	BQL	0.351	0.054	1	11/25/2008	
4-bromophenyl phenyl ether	BQL	0.351	0.062	1	11/25/2008	
Butylbenzylphthalate	BQL	0.351	0.052	1	11/25/2008	
2-Chloronaphthalene	BQL	0.351	0.049	1	11/25/2008	
2-Chlorophenol	BQL	0.351	0.045	1	11/25/2008	
4-Chloro-3-methylphenol	BQL	0.351	0.051	1	11/25/2008	
4-Chloroaniline	BQL	1.75	0.057	1	11/25/2008	
4-Chlorophenyl phenyl ether	BQL	0.351	0.052	1	11/25/2008	
Chrysene	BQL	0.351	0.034	1	11/25/2008	
Dibenzo[a,h]anthracene	BQL	0.351	0.045	1	11/25/2008	
Dibenzofuran	BQL	0.351	0.049	1	11/25/2008	
Di-n-Butylphthalate	BQL	0.351	0.051	1	11/25/2008	
1,2-Dichlorobenzene	BQL	0.351	0.059	1	11/25/2008	
1,3-Dichlorobenzene	BQL	0.351	0.057	1	11/25/2008	
1,4-Dichlorobenzene	BQL	0.351	0.051	1	11/25/2008	
3,3'-Dichlorobenzidine	BQL	0.701	0.058	1	11/25/2008	
2,4-Dichlorophenol	BQL	0.351	0.038	1	11/25/2008	
Diethylphthalate	BQL	0.351	0.047	1	11/25/2008	
Dimethylphthalate	BQL	0.351	0.054	1	11/25/2008	
2,4-Dimethylphenol	BQL	0.351	0.064	1	11/25/2008	
Di-n-octylphthalate	BQL	0.351	0.054	1	11/25/2008	
4,6-Dinitro-2-methylphenol	BQL	1.75	0.042	1	11/25/2008	
2,4-Dinitrophenol	BQL	1.75	0.046	1	11/25/2008	
2,4-Dinitrotoluene	BQL	0.351	0.053	1	11/25/2008	
2,6-Dinitrotoluene	BQL	0.351	0.058	1	11/25/2008	
Diphenylamine *	BQL	0.351	0.044	1	11/25/2008	
Fluoranthene	BQL	0.351	0.056	1	11/25/2008	
Fluorene	BQL	0.351	0.055	1	11/25/2008	
Hexachlorobenzene	BQL	0.351	0.076	1	11/25/2008	
Hexachlorobutadiene	BQL	0.351	0.064	1	11/25/2008	
Hexachlorocyclopentadiene	BQL	0.701	0.068	1	11/25/2008	
Hexachloroethane	BQL	0.351	0.055	1	11/25/2008	
Indeno(1,2,3-c,d)pyrene	BQL	0.351	0.041	1	11/25/2008	
Isophorone	BQL	0.351	0.051	1	11/25/2008	
2-Methylnaphthalene	BQL	0.351	0.057	1	11/25/2008	

**Results for Semivolatiles
by GCMS 8270**

Client Sample ID: USTG480-SB03 (1-3)
 Client Project ID: UST G-480 LSA
 Lab Sample ID: G128-2278-3H
 Lab Project ID: G128-2278
 Report Basis: Dry weight
 Initial Weight: 33.79 g

Analyzed By: DES
 Date Collected: 11/17/2008 14:15
 Date Received: 11/18/2008
 Date Extracted: 11/20/2008
 Matrix: Soil
 % Solids: 84.42

Compound	Result mg/Kg	RL mg/Kg	MDL mg/Kg	Dilution Factor	Date Analyzed	Flag
2-Methylphenol	BQL	0.351	0.054	1	11/25/2008	
3- & 4-Methylphenol	BQL	0.351	0.046	1	11/25/2008	
Naphthalene	BQL	0.351	0.049	1	11/25/2008	
2-Nitroaniline	BQL	0.351	0.047	1	11/25/2008	
3-Nitroaniline	BQL	1.75	0.052	1	11/25/2008	
4-Nitroaniline	BQL	1.75	0.047	1	11/25/2008	
Nitrobenzene	BQL	0.351	0.047	1	11/25/2008	
2-Nitrophenol	BQL	0.351	0.051	1	11/25/2008	
4-Nitrophenol	BQL	1.75	0.061	1	11/25/2008	
N-Nitrosodi-n-propylamine	BQL	0.351	0.056	1	11/25/2008	
Pentachlorophenol	BQL	1.75	0.032	1	11/25/2008	
Phenanthrene	BQL	0.351	0.049	1	11/25/2008	
Phenol	BQL	0.351	0.048	1	11/25/2008	
Pyrene	BQL	0.351	0.048	1	11/25/2008	
1,2,4-Trichlorobenzene	BQL	0.351	0.063	1	11/25/2008	
2,4,5-Trichlorophenol	BQL	0.351	0.052	1	11/25/2008	
2,4,6-Trichlorophenol	BQL	0.351	0.031	1	11/25/2008	
		Spike Added	Spike Result	Percent Recovered		
2-Fluorobiphenyl		10	8.8	88		
2-Fluorophenol		10	8	80		
Nitrobenzene-d5		10	9.4	94		
Phenol-d6		10	9.2	92		
2,4,6-Tribromophenol		10	7.6	76		
4-Terphenyl-d14		10	10.5	105		

Comments:

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

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: USTG480-SB03 (1-3)
 Client Project ID: UST G-480 LSA
 Lab Sample ID: G128-2278-3H
 Lab Project ID: G128-2278
 Sample Wt/Vol: 37.9 g
 Dilution: 1

Analyzed By: DES
 Date Collected: 11/17/2008 14:15
 Date Received: 11/18/2008
 Date Extracted: 11/20/2008
 Date Analyzed: 11/25/2008
 Matrix: Soil
 % Solids: 84.4

No.	Compound	Retention Time	CAS#	Match Probability	Result (ug/KG)
1	Unknown	11.13			397
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: 

EPH (Aliphatics/Aromatics) Laboratory Reporting Form

Client Name: Richard Catlin & Associates

Project Name: UST G-480 LSA

Sample Information	
Sample Identification	USTG480-SB01 (1-3)
Sample Matrix	SOIL
Date Collected	11/17/08
Date Received	11/18/08
Date Extracted	11/20/08
Date Analyzed	11/26/08 00:36 - 11/26/08 01:04
Dry Weight	85.7
Dilution Factor	1 - 1
Initial weight (g)	12.25
Final Volume (mL)	10.0

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

Surrogates	Percent Recovery	Flags	Limits	
			Lower	Upper
Aliphatic (tricosane)	106		40	140
Aromatic (ortho-terphenyl)	73.6		40	140
Fractionation 1 (2-bromonaphthalene)	92.2		40	140
Fractionation 2 (2-fluorobiphenyl)	84.5		40	140

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

Lab Info: G128-2278-1I	Lab Info: G128-2278-1I
Aliphatic: EP112508/029F3501.D	Aromatic: EP112508/030F3601.D

Reviewed By: 

EPH (Aliphatics/Aromatics) Laboratory Reporting Form

Client Name: Richard Catlin & Associates

Project Name: UST G-480 LSA

Sample Information	
Sample Identification	USTG480-SB02 (1-3)
Sample Matrix	SOIL
Date Collected	11/17/08
Date Received	11/18/08
Date Extracted	11/20/08
Date Analyzed	11/26/08 01:32 - 11/26/08 01:59
Dry Weight	84.1
Dilution Factor	1 - 1
Initial weight (g)	13.81
Final Volume (mL)	10.0

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

Surrogates	Percent Recovery	Flags	Limits	
			Lower	Upper
Aliphatic (tricosane)	105		40	140
Aromatic (ortho-terphenyl)	101		40	140
Fractionation 1 (2-bromonaphthalene)	101		40	140
Fractionation 2 (2-fluorobiphenyl)	96.5		40	140

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

Lab Info: G128-2278-2I	Lab Info: G128-2278-2I
Aliphatic: EP112508/031F3701.D	Aromatic: EP112508/032F3801.D

Reviewed By: 

EPH (Aliphatics/Aromatics) Laboratory Reporting Form

Client Name: Richard Catlin & Associates

Project Name: UST G-480 LSA

Sample Information	
Sample Identification	USTG480-SB03 (1-3)
Sample Matrix	SOIL
Date Collected	11/17/08
Date Received	11/18/08
Date Extracted	11/20/08
Date Analyzed	11/26/08 13:11 - 11/26/08 13:11
Dry Weight	84.4
Dilution Factor	1 - 1
Initial weight (g)	12.51
Final Volume (mL)	10.0

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

Surrogates	Percent Recovery	Flags	Limits	
			Lower	Upper
Aliphatic (tricosane)	93.1		40	140
Aromatic (ortho-terphenyl)	89.7		40	140

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

Lab Info: G128-2278-3I	Lab Info: G128-2278-3I
Aliphatic: EP112608/098F1001.D	Aromatic: EP112608/098F1001.D

Reviewed By: *ML*

Attachment 3

EPH Laboratory Reporting Form

Calibration and QA/QC Information

Initial Calibration Date: 10/22/08

Calibration Ranges and Limits

Range	MDL		ML		RL	
	(02/15/08) (µg/L)	(02/11/08) (mg/Kg)	(µg/L)	(mg/Kg)	(µg/L)	(mg/Kg)
C9-C18 Aliphatics	1.66	0.274	5.28	0.871	100	10
C19-C36 Aliphatics	2.79	0.201	8.87	0.639	100	10
C11-C22 Aromatics	2.64	0.110	8.40	0.350	100	10

Calibration Concentration Levels

Range	Levels (µg/L)	Levels (mg/Kg)	%RSD if CF r if LR	Method of Quantitation
C ₉ -C ₁₈ Aliphatics	200	33.3	17.73	Calibration Factor
	100	16.7		
	50	8.33		
	25	4.17		
	5	0.833		
C ₁₉ -C ₃₆ Aliphatics	200	33.3	10.65	Calibration Factor
	100	16.7		
	50	8.33		
	25	4.17		
	5	0.833		
C ₁₁ -C ₂₂ Aromatics	200	33.3	10.39	Calibration Factor
	100	16.7		
	50	8.33		
	25	4.17		
	5	0.833		

Calibration Check Date: 11/25/08
11/25/08

Filenames: ep112508/001f1601.d
ep112508/002f1701.d

Calibration Check

Range	Levels (µg/L)	Levels (mg/Kg)	%Difference if CF %Drift if LR	Limits
C9-C18 Aliphatics	100	16.7	22.3 ✓	≤±25%
C19-C36 Aliphatics	100	16.7	18.4 ✓	≤±25%
C11-C22 Aromatics	100	16.7	13.2 ✓	≤±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 3

EPH Laboratory Reporting Form

Calibration and QA/QC Information

Initial Calibration Date: 10/22/08

Calibration Ranges and Limits

Range	MDL		ML		RL	
	(02/15/08) (µg/L)	(02/11/08) (mg/Kg)	(µg/L)	(mg/Kg)	(µg/L)	(mg/Kg)
C9-C18 Aliphatics	1.66	0.274	5.28	0.871	100	10
C19-C36 Aliphatics	2.79	0.201	8.87	0.639	100	10
C11-C22 Aromatics	2.64	0.110	8.40	0.350	100	10

Calibration Concentration Levels

Range	Levels (µg/L)	Levels (mg/Kg)	%RSD if CF r if LR	Method of Quantitation
C ₉ -C ₁₈ Aliphatics	200	33.3	17.73	Calibration Factor
	100	16.7		
	50	8.33		
	25	4.17		
	5	0.833		
C ₁₉ -C ₃₆ Aliphatics	200	33.3	10.65	Calibration Factor
	100	16.7		
	50	8.33		
	25	4.17		
	5	0.833		
C ₁₁ -C ₂₂ Aromatics	200	33.3	10.39	Calibration Factor
	100	16.7		
	50	8.33		
	25	4.17		
	5	0.833		

Calibration Check Date: 11/26/08 Filenames: ep112608/001f0101.d
11/26/08 ep112608/002f0201.d

Calibration Check

Range	Levels (µg/L)	Levels (mg/Kg)	%Difference if CF %Drift if LR	Limits
C9-C18 Aliphatics	100	16.7	14.9 ✓	≤±25%
C19-C36 Aliphatics	100	16.7	9.3 ✓	≤±25%
C11-C22 Aromatics	100	16.7	3.8 ✓	≤±25%

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

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

Attachment 3

EPH Laboratory Reporting Form

Calibration and QA/QC Information

Initial Calibration Date: 10/22/08

Calibration Ranges and Limits

Range	MDL		ML		RL	
	(02/15/08) (µg/L)	(02/11/08) (mg/Kg)	(µg/L)	(mg/Kg)	(µg/L)	(mg/Kg)
C9-C18 Aliphatics	1.66	0.274	5.28	0.871	100	10
C19-C36 Aliphatics	2.79	0.201	8.87	0.639	100	10
C11-C22 Aromatics	2.64	0.110	8.40	0.350	100	10

Calibration Concentration Levels

Range	Levels (µg/L)	Levels (mg/Kg)	%RSD if CF r if LR	Method of Quantitation
C ₉ -C ₁₈ Aliphatics	200	33.3	17.73	Calibration Factor
	100	16.7		
	50	8.33		
	25	4.17		
	5	0.833		
C ₁₉ -C ₃₆ Aliphatics	200	33.3	10.65	Calibration Factor
	100	16.7		
	50	8.33		
	25	4.17		
	5	0.833		
C ₁₁ -C ₂₂ Aromatics	200	33.3	10.39	Calibration Factor
	100	16.7		
	50	8.33		
	25	4.17		
	5	0.833		

Calibration Check Date: 11/26/08
11/26/08

Filenames: ep112608/022f1401.d
ep112608/023f1501.d

Calibration Check

Range	Levels (µg/L)	Levels (mg/Kg)	%Difference if CF %Drift if LR	Limits
C9-C18 Aliphatics	100	16.7	16.1 ✓	≤±25%
C19-C36 Aliphatics	100	16.7	11.4 ✓	≤±25%
C11-C22 Aromatics	100	16.7	4.1 ✓	≤±25%

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

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

VPH (Aliphatics/Aromatics) Laboratory Reporting Form

Client Name: Richard Catlin & Associates

Project Name: UST G-480 LSA

Sample Information	
Sample Identification	USTG480-SB01 (1-3)
Sample Matrix	Soil
Collection Option (for Soil)*	2
Date Collected	11/17/08
Date Received	11/18/08
Date Extracted	11/20/08
Date Analyzed	11/25/08 04:46 - 11/25/08 04:46
Dry Weight	85.7
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**	BQL	10.0		
C ₉ -C ₁₀ Aromatics**	BQL	10.0		
	Percent Recovery	Flags	Limits Lower Upper	
Surrogate % Recovery - PID	108		70	130
Surrogate % Recovery - FID	109		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: g128-2278-1e	Lab Info: g128-2278-1e
FID Info: VP112408/043F0101.D	PID Info: VP112408/043R0101.D

Reviewed By: MD

VPH (Aliphatics/Aromatics) Laboratory Reporting Form

Client Name: Richard Catlin & Associates

Project Name: UST G-480 LSA

Sample Information	
Sample Identification	USTG480-SB02 (1-3)
Sample Matrix	Soil
Collection Option (for Soil)*	2
Date Collected	11/17/08
Date Received	11/18/08
Date Extracted	11/20/08
Date Analyzed	11/25/08 05:12 - 11/25/08 05:12
Dry Weight	84.1
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**	BQL	10.0	
C ₈ -C ₁₀ Aromatics**	BQL	10.0	
	Percent Recovery	Flags	Limits Lower Upper
Surrogate % Recovery - PID	96.2		70 130
Surrogate % Recovery - FID	98.9		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: g128-2278-2e	Lab Info: g128-2278-2e
FID Info: VP112408/044F0101.D	PID Info: VP112408/044R0101.D

Reviewed By: ME

VPH (Aliphatics/Aromatics) Laboratory Reporting Form

Client Name: Richard Catlin & Associates

Project Name: UST G-480 LSA

Sample Information	
Sample Identification	USTG480-SB03 (1-3)
Sample Matrix	Soil
Collection Option (for Soil)*	2
Date Collected	11/17/08
Date Received	11/18/08
Date Extracted	11/20/08
Date Analyzed	11/25/08 05:39 - 11/25/08 05:39
Dry Weight	84.4
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**	BQL	10.0	
C ₉ -C ₁₀ Aromatics**	BQL	10.0	
	Percent Recovery	Flags	Limits Lower Upper
Surrogate % Recovery - PID	97.6		70 130
Surrogate % Recovery - FID	99.1		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: g128-2278-3e	Lab Info: g128-2278-3e
FID Info: VP112408/045F0101.D	PID Info: VP112408/045R0101.D

Reviewed By: MRE

Attachment 2

VPH Laboratory Reporting Form

Calibration and QA/QC Information

FID Initial Calibration Date: 11/18/08 PID Initial Calibration Date: 11/18/08

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	2.02	0.175	6.42	0.557	100	10
C ₉ -C ₁₂ Aliphatics	1.51	0.118	4.80	0.375	100	10
C ₉ -C ₁₀ Aromatics	0.902	0.132	2.87	0.420	100	10

Calibration Concentration Levels

Range	Levels (µg/L)	Levels (mg/Kg)	%RSD if CF r if LR	Method of Quantitation
C ₅ -C ₈ Aliphatics	10	0.8	4.30	Calibration Factor
	50	4		
	100	8		
	200	16		
	500	40		
C ₉ -C ₁₂ Aliphatics	10	0.8	1.00	Linear Regression
	50	4		
	100	8		
	200	16		
	500	40		
C ₉ -C ₁₀ Aromatics	10	0.8	14.21	Calibration Factor
	50	4		
	100	8		
	200	16		
	500	40		

Calibration Check Date: 11/24/08 Filename: VP112408/015F0101.d

Calibration Check

Range	Levels (µg/L)	Levels (mg/Kg)	%Difference if CF %Drift if LR	Limits
C ₅ -C ₈ Aliphatics	200	16	6.9 ✓	±25%
C ₉ -C ₁₂ Aliphatics	200	16	1.1 ✓	±25%
C ₉ -C ₁₀ Aromatics	200	16	9.6 /	±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

Attachment 2

VPH Laboratory Reporting Form

Calibration and QA/QC Information

FID Initial Calibration Date: 11/18/08 PID Initial Calibration Date: 11/18/08

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	2.02	0.175	6.42	0.557	100	10
C ₉ -C ₁₂ Aliphatics	1.51	0.118	4.80	0.375	100	10
C ₉ -C ₁₀ Aromatics	0.902	0.132	2.87	0.420	100	10

Calibration Concentration Levels

Range	Levels (µg/L)	Levels (mg/Kg)	%RSD if CF r if LR	Method of Quantitation
C ₅ -C ₈ Aliphatics	10	0.8	4.30	Calibration Factor
	50	4		
	100	8		
	200	16		
	500	40		
C ₉ -C ₁₂ Aliphatics	10	0.8	1.00	Linear Regression
	50	4		
	100	8		
	200	16		
	500	40		
C ₉ -C ₁₀ Aromatics	10	0.8	14.21	Calibration Factor
	50	4		
	100	8		
	200	16		
	500	40		

Calibration Check Date: 11/24/08 Filename: VP112408/047F0101.d

Calibration Check

Range	Levels (µg/L)	Levels (mg/Kg)	%Difference if CF %Drift if LR	Limits
C ₅ -C ₈ Aliphatics	200	16	-1.1 /	±25%
C ₉ -C ₁₂ Aliphatics	200	16	-12.4 /	±25%
C ₉ -C ₁₀ Aromatics	200	16	2.5 /	±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



SGS Environmental Services Inc. CHAIN OF CUSTODY RECORD

- Locations Nationwide
- Alaska
 - Maryland
 - New Jersey
 - New York
 - Ohio
 - North Carolina
 - West Virginia
- www.us.sgs.com

SGS Reference #: **G128-2278**

page 1 of 1

CLIENT: Callin
CONTACT: Steve Hudson
PHONE NO: 910-452-5661
PROJECT: UST G-480 LSA
REPORTS TO: Steve Hudson @ Callin
EMAIL:
INVOICE TO: Callin @ Callin
QUOTE #: D0D101
PO #: 28114-3

LAB NO.	SAMPLE IDENTIFICATION	DATE	TIME	MATRIX CODE	#	TYPE	Analysis Required	Preservatives Used	REMARKS/LOC ID
	USTG480-S801(1-3)	11-17-08	13:50	Soil	7	G	✓	✓	- Leaking and
	USTG480-SB02(1-3)	11-17-08	14:05	Soil	7	G	✓	✓	Summary ED
	USTG480-SB03(1-3)	11-17-08	14:15	Soil	7	G	✓	✓	format
	USTG480-S801(1-3) dup	11-17-08	13:50	Soil	6	G	✓	✓	- report low conc

Collected/Relinquished By: (1) Callin	Date 11/18/08	Time 16:20	Received By: Steve Hudson	DOD Project? NO	Special Deliverable Requirements:	Requested Turnaround Time and/or Special Instructions: Standard Turnaround	Samples Received Cold? YES	Cooler TB	Temperature °C: 10	Chain of Custody Seal: (Circle) INTACT
Relinquished By: (2)	Date	Time	Received By:							
Relinquished By: (3)	Date	Time	Received By:							
Relinquished By: (4)	Date	Time	Received For Laboratory By:							

SGS ENVIRONMENTAL SERVICES, INC.

N.C. CERTIFICATION #481

31 of 31

Steve Hudson
Richard Catlin & Associates
P.O. Box 10279
Wilmington, NC 28404-0279

Report Number: G128-2279

Client Project: UST G-480 LSA


Dear Steve Hudson,

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

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

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

Sincerely,
SGS Environmental Services, Inc.


Project Manager Date
Ashley Nifong 12/3/08

List of Reporting Abbreviations
And Data Qualifiers

B = Compound also detected in batch blank

BQL = Below Quantification Limit (RL or MDL)

DF = Dilution Factor

Dup = Duplicate

P/D = Detected, but RPD is > 25/40% between results in dual column method.

E = Estimated concentration, exceeds calibration range.

J = Estimated concentration, below calibration range and above MDL

LCS(D) = Laboratory Control Spike (Duplicate)

MDL = Method Detection Limit

MS(D) = Matrix Spike (Duplicate)

PQL = Practical Quantitation Limit

RL/CL = Reporting Limit / Control Limit

RPD = Relative Percent Difference

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

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

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

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

% Rec = Percent Recovery

% 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 GC 602

Client Sample ID: USTG480-MW23
 Client Project ID: UST G-480 LSA
 Lab Sample ID: G128-2279-1A
 Lab Project ID: G128-2279

Analyzed By: RSB
 Date Collected: 11/18/2008 13:00
 Date Received: 11/18/2008
 Matrix: Water

Analyte	Result ug/L	RL ug/L	MDL ug/L	Dilution Factor	Date Analyzed	Flags
Benzene	9.80	1.00	0.177	1	11/25/2008	
Diisopropyl ether (DIPE)	BQL	1.00	0.253	1	11/25/2008	
Ethylbenzene	59.6	8.00	1.52	8	11/23/2008	
Methyl-tert butyl ether (MTBE)	BQL	2.00	0.306	1	11/25/2008	
Toluene	BQL	1.00	0.313	1	11/25/2008	
m/p-Xylene	34.0	16.0	3.85	8	11/23/2008	
o-Xylene	7.86	2.00	0.405	1	11/25/2008	

Surrogate Spike Recoveries

	Spike Added	Spike Result	Percent Recovery
Trifluorotoluene	40	36.5	91.2

Comments:

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

Results for Volatiles

by GC 602

Client Sample ID: USTG480-MW23 DUP

Analyzed By: RSB

Client Project ID: UST G-480 LSA

Date Collected: 11/18/2008 13:00

Lab Sample ID: G128-2279-2A

Date Received: 11/18/2008

Lab Project ID: G128-2279

Matrix: Water

Analyte	Result ug/L	RL ug/L	MDL ug/L	Dilution Factor	Date Analyzed	Flags
Benzene	9.56	1.00	0.177	1	11/25/2008	
Diisopropyl ether (DIPE)	BQL	1.00	0.253	1	11/25/2008	
Ethylbenzene	64.9	10.0	1.9	10	11/23/2008	
Methyl-tert butyl ether (MTBE)	BQL	2.00	0.306	1	11/25/2008	
Toluene	BQL	1.00	0.313	1	11/25/2008	
m/p-Xylene	38.7	20.0	4.81	10	11/23/2008	
o-Xylene	11.4	2.00	0.405	1	11/25/2008	

Surrogate Spike Recoveries

	Spike Added	Spike Result	Percent Recovery
Trifluorotoluene	40	36.6	91.5

Comments:

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

**Results for Semivolatiles
by GCMS 625**

Client Sample ID: USTG480-MW23
 Client Project ID: UST G-480 LSA
 Lab Sample ID: G128-2279-1J
 Lab Project ID: G128-2279

Analyzed By: DES
 Date Collected: 11/18/2008 13:00
 Date Received: 11/18/2008
 Date Extracted: 11/21/2008
 Matrix: Water

Initial/Final Amt: 960 mL / 5.0 mL

Compound	Result ug/L	RL ug/L	MDL ug/L	Dilution Factor	Date Analyzed	Flag
Acenaphthene	7.81	52.1	7.76	10	11/26/2008	J
Acenaphthylene	BQL	52.1	7.76	10	11/26/2008	
Anthracene	BQL	52.1	9.11	10	11/26/2008	
Benzo[a]anthracene	BQL	52.1	7.08	10	11/26/2008	
Benzo[a]pyrene	BQL	52.1	6.61	10	11/26/2008	
Benzo[b]fluoranthene	BQL	52.1	7.45	10	11/26/2008	
Benzo[g,h,i]perylene	BQL	52.1	6.41	10	11/26/2008	
Benzo[k]fluoranthene	BQL	52.1	5.73	10	11/26/2008	
Bis(2-chloroethoxy)methane	BQL	52.1	10.7	10	11/26/2008	
Bis(2-chloroethyl)ether	BQL	52.1	10.8	10	11/26/2008	
Bis(2-chloroisopropyl)ether	BQL	52.1	10.2	10	11/26/2008	
Bis(2-ethylhexyl)phthalate	BQL	52.1	4.27	10	11/26/2008	
4-bromophenyl phenyl ether	BQL	52.1	8.12	10	11/26/2008	
Butylbenzylphthalate	BQL	52.1	4.64	10	11/26/2008	
2-Chloronaphthalene	BQL	52.1	9.01	10	11/26/2008	
2-Chlorophenol	BQL	52.1	12.2	10	11/26/2008	
4-Chloro-3-methylphenol	BQL	52.1	8.28	10	11/26/2008	
4-Chlorophenyl phenyl ether	BQL	52.1	33.9	10	11/26/2008	
Chrysene	BQL	52.1	5.78	10	11/26/2008	
Dibenzo[a,h]anthracene	BQL	52.1	4.58	10	11/26/2008	
Di-n-Butylphthalate	BQL	52.1	8.59	10	11/26/2008	
3,3'-Dichlorobenzidine	BQL	104	12.7	10	11/26/2008	
2,4-Dichlorophenol	BQL	52.1	11.7	10	11/26/2008	
Diethylphthalate	BQL	52.1	7.71	10	11/26/2008	
Dimethylphthalate	BQL	52.1	5.78	10	11/26/2008	
2,4-Dimethylphenol	BQL	52.1	16.9	10	11/26/2008	
Di-n-octylphthalate	BQL	52.1	6.04	10	11/26/2008	
4,6-Dinitro-2-methylphenol	BQL	260	5.73	10	11/26/2008	
2,4-Dinitrophenol	BQL	260	6.67	10	11/26/2008	
2,4-Dinitrotoluene	BQL	52.1	5.57	10	11/26/2008	
2,6-Dinitrotoluene	BQL	52.1	6.77	10	11/26/2008	
Diphenylamine *	BQL	52.1	5.94	10	11/26/2008	
Fluoranthene	BQL	52.1	7.34	10	11/26/2008	
Fluorene	16.1	52.1	7.55	10	11/26/2008	J
Hexachlorobenzene	BQL	52.1	5.26	10	11/26/2008	
Hexachlorobutadiene	BQL	52.1	7.92	10	11/26/2008	
Hexachlorocyclopentadiene	BQL	104	104	10	11/26/2008	
Hexachloroethane	BQL	52.1	7.76	10	11/26/2008	
Indeno(1,2,3-c,d)pyrene	BQL	52.1	23.8	10	11/26/2008	
Isophorone	BQL	52.1	9.22	10	11/26/2008	
Naphthalene	259	52.1	9.48	10	11/26/2008	
Nitrobenzene	BQL	52.1	10.9	10	11/26/2008	
2-Nitrophenol	BQL	52.1	12.8	10	11/26/2008	
4-Nitrophenol	BQL	260	11.3	10	11/26/2008	
N-Nitrosodi-n-propylamine	BQL	52.1	15.6	10	11/26/2008	
Pentachlorophenol	BQL	260	14.7	10	11/26/2008	
Phenanthrene	24.0	52.1	4.64	10	11/26/2008	J

**Results for Semivolatiles
by GCMS 625**

Client Sample ID: USTG480-MW23
 Client Project ID: UST G-480 LSA
 Lab Sample ID: G128-2279-1J
 Lab Project ID: G128-2279

Analyzed By: DES
 Date Collected: 11/18/2008 13:00
 Date Received: 11/18/2008
 Date Extracted: 11/21/2008
 Matrix: Water

Initial/Final Amt: 960 mL / 5.0 mL

Compound	Result ug/L	RL ug/L	MDL ug/L	Dilution Factor	Date Analyzed	Flag
Phenol	BQL	52.1	11.0	10	11/26/2008	
Pyrene	BQL	52.1	21.5	10	11/26/2008	
1,2,4-Trichlorobenzene	BQL	52.1	7.50	10	11/26/2008	
2,4,6-Trichlorophenol	BQL	52.1	9.64	10	11/26/2008	
		Spike Added	Spike Result	Percent Recovered		
2-Fluorobiphenyl		1	NA	NA		
2-Fluorophenol		1	NA	NA		
Nitrobenzene-d5		1	NA	NA		
Phenol-d6		1	NA	NA		
2,4,6-Tribromophenol		1	NA	NA		
4-Terphenyl-d14		1	NA	NA		

Comments:

Flags:

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

Reviewed By: 

Results of Library Search for Semivolatile Compounds
by GCMS

Client Sample ID: USTG480-MW23
 Client Project ID: UST G-480 LSA
 Lab Sample ID: G128-2279-1J
 Lab Project ID: G128-2279
 Sample Wt/Vol: 960 ML
 Dilution: 1


Analyzed By: DES
 Date Collected: 11/18/2008 13:00
 Date Received: 11/18/2008
 Date Extracted: 11/21/2008
 Date Analyzed: 11/26/2008
 Matrix: Water

No.	Compound	Retention Time	CAS#	Match Probability	Result (ug/L)
1	Heptadecane	8.31	000629-78-7	95	90.6
2	Nonane, 5-butyl-	8.78	017312-63-9	93	54
3	Pentadecane	7.28	000629-62-9	97	52.2
4	Tridecane	6.12	000629-50-5	96	48.6
5	Hexadecane	7.81	000544-76-3	93	45.2
6	Eicosane	9.24	000112-95-8	91	40.8
7	Tetradecane	6.71	000629-59-4	95	26.5
8	Decane	4.13	000124-18-5	91	22
9	Hexatriacontane	8.82	000630-06-8	90	15.5
10	Eicosane	9.67	000112-95-8	91	15.2

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: 

EPH (Aliphatics/Aromatics) Laboratory Reporting Form

Client Name: Richard Catlin & Associates

Project Name: UST G-480 LSA

Sample Information	
Sample Identification	USTG480-MW23
Sample Matrix	WATER
Date Collected	11/18/08
Date Received	11/18/08
Date Extracted	12/01/08
Date Analyzed	12/03/08 10:42 - 12/03/08 11:10
Dry Weight	NA
Dilution Factor	10 - 2
Initial Volume (mL)	949
Final Volume (mL)	5.0

Analytical Results			
Analytes**	Result µg/L	Report Limit µg/L	Flags
C9-C18 Aliphatics	12300	100	
C19-C36 Aliphatics	837	100	
C11-C22 Aromatics	5550	100	

Surrogates	Percent Recovery	Flags	Limits	
			Lower	Upper
Aliphatic (tricosane)	52.4		40	140
Aromatic (ortho-terphenyl)	69.5		40	140
Fractionation 1 (2-bromonaphthalene)	102		40	140
Fractionation 2 (2-fluorobiphenyl)	94.6		40	140

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

Lab Info: G128-2279-1M	Lab Info: G128-2279-1M
Aliphatic: EP120308/003F0101.D	Aromatic: EP120308/004F0201.D

Reviewed By: SA

Attachment 3

EPH Laboratory Reporting Form

Calibration and QA/QC Information

Initial Calibration Date: 10/22/08

Calibration Ranges and Limits

Range	MDL		ML		RL	
	(02/15/08) (µg/L)	(02/11/08) (mg/Kg)	(µg/L)	(mg/Kg)	(µg/L)	(mg/Kg)
C9-C18 Aliphatics	1.66	0.274	5.28	0.871	100	10
C19-C36 Aliphatics	2.79	0.201	8.87	0.639	100	10
C11-C22 Aromatics	2.64	0.110	8.40	0.350	100	10

Calibration Concentration Levels

Range	Levels (µg/L)	Levels (mg/Kg)	%RSD if CF r if LR	Method of Quantitation
C ₉ -C ₁₈ Aliphatics	200	33.3	17.73	Calibration Factor
	100	16.7		
	50	8.33		
	25	4.17		
	5	0.833		
C ₁₉ -C ₃₆ Aliphatics	200	33.3	10.65	Calibration Factor
	100	16.7		
	50	8.33		
	25	4.17		
	5	0.833		
C ₁₁ -C ₂₂ Aromatics	200	33.3	10.39	Calibration Factor
	100	16.7		
	50	8.33		
	25	4.17		
	5	0.833		

Calibration Check Date: 12/03/08
12/03/08

Filenames: ep120308/001f0101.d
ep120308/002f0201.d

Calibration Check

Range	Levels (µg/L)	Levels (mg/Kg)	%Difference if CF %Drift if LR	Limits
C9-C18 Aliphatics	100	16.7	17.6	±25%
C19-C36 Aliphatics	100	16.7	15.1	±25%
C11-C22 Aromatics	100	16.7	4.8	±25%

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

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

Attachment 3

EPH Laboratory Reporting Form

Calibration and QA/QC Information

Initial Calibration Date: 10/22/08

Calibration Ranges and Limits

Range	MDL		ML		RL	
	(02/15/08) (µg/L)	(02/11/08) (mg/Kg)	(µg/L)	(mg/Kg)	(µg/L)	(mg/Kg)
C9-C18 Aliphatics	1.66	0.274	5.28	0.871	100	10
C19-C36 Aliphatics	2.79	0.201	8.87	0.639	100	10
C11-C22 Aromatics	2.64	0.110	8.40	0.350	100	10

Calibration Concentration Levels

Range	Levels (µg/L)	Levels (mg/Kg)	%RSD if CF r if LR	Method of Quantitation
C ₉ -C ₁₈ Aliphatics	200	33.3	17.73	Calibration Factor
	100	16.7		
	50	8.33		
	25	4.17		
	5	0.833		
C ₁₉ -C ₃₆ Aliphatics	200	33.3	10.65	Calibration Factor
	100	16.7		
	50	8.33		
	25	4.17		
	5	0.833		
C ₁₁ -C ₂₂ Aromatics	200	33.3	10.39	Calibration Factor
	100	16.7		
	50	8.33		
	25	4.17		
	5	0.833		

Calibration Check Date: 12/03/08
12/03/08

Filenames: ep120308/001f0501.d
ep120308/002f0601.d

Calibration Check

Range	Levels (µg/L)	Levels (mg/Kg)	%Difference if CF %Drift if LR	Limits
C9-C18 Aliphatics	100	16.7	-10.9	±25%
C19-C36 Aliphatics	100	16.7	-2.8	±25%
C11-C22 Aromatics	100	16.7	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

VPH (Aliphatics/Aromatics) Laboratory Reporting Form

Client Name: Richard Catlin & Associates

Project Name: UST G-480 LSA

Sample Information	
Sample Identification	USTG480-MW23
Sample Matrix	Water
Collection Option (for Soil)*	NA
Date Collected	11/18/08
Date Received	11/18/08
Date Extracted	11/28/08 15:43 - 11/28/08 15:43
Date Analyzed	11/28/08 15:43 - 11/28/08 15:43
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**	446	100		
C ₉ -C ₁₀ Aromatics**	885	100		
	Percent Recovery	Flags	Limits Lower Upper	
Surrogate % Recovery - PID	101		70	130
Surrogate % Recovery - FID	109		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: g128-2279-1b	Lab Info: g128-2279-1b
FID Info: VP112808/030F0101.D	PID Info: VP112808/030R0101.D

Reviewed By: 

Attachment 2

VPH Laboratory Reporting Form

Calibration and QA/QC Information

FID Initial Calibration Date: 11/18/08 PID Initial Calibration Date: 11/18/08

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	2.02	0.175	6.42	0.557	100	10
C ₉ -C ₁₂ Aliphatics	1.51	0.118	4.80	0.375	100	10
C ₉ -C ₁₀ Aromatics	0.902	0.132	2.87	0.420	100	10

Calibration Concentration Levels

Range	Levels (µg/L)	Levels (mg/Kg)	%RSD if CF r if LR	Method of Quantitation
C ₅ -C ₈ Aliphatics	10	0.8	4.30	Calibration Factor
	50	4		
	100	8		
	200	16		
	500	40		
C ₉ -C ₁₂ Aliphatics	10	0.8	1.00	Linear Regression
	50	4		
	100	8		
	200	16		
	500	40		
C ₉ -C ₁₀ Aromatics	10	0.8	14.21	Calibration Factor
	50	4		
	100	8		
	200	16		
	500	40		

Calibration Check Date: 11/28/08 Filename: VP112808/002F0101.d

Calibration Check

Range	Levels (µg/L)	Levels (mg/Kg)	%Difference if CF %Drift if LR	Limits
C ₅ -C ₈ Aliphatics	200	16	1.4 ✓	±25%
C ₉ -C ₁₂ Aliphatics	200	16	-2.5 ✓	±25%
C ₉ -C ₁₀ Aromatics	200	16	3.8 ✓	±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: 11/18/08 PID Initial Calibration Date: 11/18/08

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	2.02	0.175	6.42	0.557	100	10
C ₉ -C ₁₂ Aliphatics	1.51	0.118	4.80	0.375	100	10
C ₉ -C ₁₀ Aromatics	0.902	0.132	2.87	0.420	100	10

Calibration Concentration Levels

Range	Levels (µg/L)	Levels (mg/Kg)	%RSD if CF r if LR	Method of Quantitation
C ₅ -C ₈ Aliphatics	10	0.8	4.30	Calibration Factor
	50	4		
	100	8		
	200	16		
	500	40		
C ₉ -C ₁₂ Aliphatics	10	0.8	1.00	Linear Regression
	50	4		
	100	8		
	200	16		
	500	40		
C ₉ -C ₁₀ Aromatics	10	0.8	14.21	Calibration Factor
	50	4		
	100	8		
	200	16		
	500	40		

Calibration Check Date: 11/28/08 Filename: VP112808/037F0101.d

Calibration Check

Range	Levels (µg/L)	Levels (mg/Kg)	%Difference if CF %Drift if LR	Limits
C ₅ -C ₈ Aliphatics	200	16	-5.9 ✓	±25%
C ₉ -C ₁₂ Aliphatics	200	16	-10.5 ✓	±25%
C ₉ -C ₁₀ Aromatics	200	16	-2.2 ✓	±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



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1 CLIENT: <u>Catlin</u>					SGS Reference #: <u>0128-2279</u>					page <u>1</u> of <u>1</u>					
CONTACT: <u>Steve Hudson</u> PHONE NO: <u>910-452-5861</u>					# C O N T A I N E R S	PROJECT: <u>VST G-480 LSA</u> SITE/PWSID#:					PRESERVATIVES USED: <u>HK1</u> <u>1</u> <u>HK1</u> <u>HK1</u>				
REPORTS TO: <u>Steve Hudson @ Catlin</u> EMAIL:						ANALYSIS REQUIRED: <u>3</u> <u>EPA 602 + 1PE + MTBE + Xylenes</u> <u>EPA 625 + TICS</u> <u>MADEP EPH</u> <u>MADEP VPH</u>					MATRIX/MATRIX CODE:				
INVOICE TO: <u>Shaile @ Catlin</u> QUOTE #: <u>DOD 101</u>						P.O. #: <u>28114-3</u>					REMARKS/LOC ID:				
2 LAB NO.						SAMPLE IDENTIFICATION					DATE				
TIME					MATRIX/MATRIX CODE					# CONTAINERS					
<u>1</u>					<u>USTG480-MW23</u>					<u>11-18-08</u>					
<u>13:00</u>					<u>GW</u>					<u>9</u>					
<u>G</u>					<u>USTG480-MW23 DUP</u>					<u>11-18-08</u>					
<u>13:00</u>					<u>GW</u>					<u>3</u>					
<u>G</u>					- Lejeune and Summary EDD format - report law run - soils for this submitted and separate COC.					4					
5 Collected/Relinquished By: (1) <u>Tom Burt</u>					Date: <u>11-18-08</u>					Time: <u>4:20p</u>					
Received By: <u>[Signature]</u>					DOD Project? YES NO					Special Deliverable Requirements:					
Relinquished By: (2)					Date					Time					
Received By:					Cooler ID					Requested Turnaround Time and-or Special Instructions:					
Relinquished By: (3)					Date					Time					
Received By:					Samples Received Cold? <u>YES</u> NO					Chain of Custody Seal: (Circle)					
Relinquished By: (4)					Date					Time					
Received For Laboratory By:					Temperature °C: <u>15c</u>					INTACT <input type="checkbox"/> BROKEN <input type="checkbox"/> ABSENT <input type="checkbox"/>					

N.C. CERTIFICATION #481

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SGS ENVIRONMENTAL SERVICES INC