

PHASE I LIMITED SITE ASSESSMENT REPORT

FOR

**BUILDING TT-48 UST#1 AND UST#3
MARINE CORPS BASE
CAMP LEJEUNE, NORTH CAROLINA**

NCDENR UST INCIDENT NO. PENDING

May 7, 2007

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



PREPARED BY:

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

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LIST OF ACRONYMS

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

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

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

PHASE I LIMITED SITE ASSESSMENT REPORT

FOR

BUILDING TT-48 UST#1 AND UST#3 MARINE CORPS BASE CAMP LEJEUNE, NORTH CAROLINA

NCDENR UST INCIDENT NO. PENDING

May 7, 2007

PURPOSE OF INVESTIGATION

The purpose of this Phase I Limited Site Assessment (LSA) is to provide the necessary information for NCDENR to classify the level of risk to human health and the environment resulting from suspected fuel oil releases at the Building TT-48 UST #1 and TT-48 UST #3 project sites. CATLIN Engineers and Scientists (CATLIN) was authorized to perform this Phase I Limited Site Assessment (LSA) by the NAVFAC Mid-Atlantic in accordance with the Order of Supplies Contract Number N62470-05-D-6200, Delivery Order Number 0016. The project sites are located at the former Tarawa Terrace School Building TT-48 UST #1 and TT-48 UST #3 project sites in the Tarawa Terrace residential area of MCB, Camp Lejeune, North Carolina. Figure 1 illustrates the general site location within the local USGS topographic quadrangle map.

TT-48 UST #1

On October 3, 2006, a 500 gallon steel heating oil tank labeled UST #1 was removed from the Building TT-48 project site. During UST removal activities, minor soil staining and a slight petroleum hydrocarbon odor was observed. According to the UST Closure Report prepared by Shaw Environmental, Inc. (Shaw) the groundwater sample collected revealed contaminant concentrations above the NCAC T15A:02L Groundwater Quality Standards (2L GWQS).

Based upon a review of the UST Closure Report prepared by Shaw, an Organic Vapor Analyzer (OVA) was used to screen soil removed from the excavation area, in which organic vapors ranging from 11 parts per million (ppm) to 150 ppm were detected. Analytical results from post removal soil samples indicated that Total Petroleum Hydrocarbons (TPH) as Diesel Range Organics (DRO) and TPH-Gasoline Range Organics (GRO) were detected at concentrations greater than the 10 mg/kg, NCDENR Action Level, in all of the soil samples (TT-001 through TT-005) collected from the sidewalls and beneath the UST.

On October 13, 2006, Shaw re-excavated soils from the UST area. Soils were removed from each sidewall from three feet to six feet below land surface (BLS). Groundwater was observed at approximately 6.5 feet BLS, which ceased the excavation process at 6.0 feet BLS. No soil samples were obtained from the base of the excavation due to the presence of groundwater. Analytical results for the soil samples collected revealed no contaminants above NCDENR's Residential or Soil-to-Groundwater Maximum Soil Contaminant Concentrations (MSCCs).

On November 2, 2006, one temporary monitoring well was installed at the south (downgradient) end of the backfilled excavation area and one groundwater sample (TT-TW-001) was collected for laboratory analysis per EPA Methods 602, 625 and MADEP VPH/EPH. Analytical results for TT-TW-001 indicated that Benzene, Ethylbenzene, Bis(2-ethylhexyl)phthalate and MADEP VPH (C9-C22 Aromatics) were detected at concentrations above the 2L GWQS.

TT-48 UST #3

On October 4, 2006, a 1,000 gallon steel heating oil tank labeled UST #3 was also removed from the Building TT-48 project site. The removal activity of the UST revealed minor soil staining and a slight petroleum hydrocarbon odor. Based on the UST Closure Report prepared by Shaw, the groundwater sample collected revealed contaminant concentrations above the 2L GWQS.

Based upon a review of Shaw's UST Closure Report, an OVA was used to screen soil removed from the excavation area, in which organic vapors ranging from 4 ppm to 100 ppm were detected. Analytical results from post removal soil samples indicated that TPH DRO and GRO were detected at concentrations greater than the 10 mg/kg, NCDENR Action Level, in all of the soil samples collected from the sidewalls and beneath the UST (TT-006 through TT-010).

On October 16, 2006, Shaw re-excavated soils from the UST area. An additional three to six feet of soil on the north and west walls, five feet of soil on the east wall and seven feet of soil on the south wall was removed. Groundwater was observed at approximately 9.0 ft BLS, which ceased the excavation process at 8.0 feet BLS. No soil samples were obtained from the base of the excavation due to the presence of groundwater. The results for the soil sample collected from the east wall were above NCDENR's Residential and Soil-to-Groundwater MSCCs for MADEP fractions. Therefore, removal of an additional three feet of soil on the east wall was conducted on October 27, 2006, to 8.0 feet BLS. A second set of soil samples were collected from the east wall from the new excavation limits for MADEP analysis. The analytical results for the second excavation of the east wall were below NCDENR's Residential and Soil-to-Groundwater MSCCs.

On November 2, 2006, one temporary monitoring well was installed at the south (downgradient) end of the backfilled excavation site and a groundwater sample (TT-TW-002) was collected for laboratory analysis per EPA Methods 602, 625 and MADEP VPH/EPH.

Analytical results indicated that Naphthalene, 2-Methylnaphthalene and MADEP VPH (C9-C22 Aromatics) were detected at concentrations above their corresponding 2L GWQS.

Based on the analytical results from the TT-48 UST #1 and TT-48 UST #3 project sites, Shaw recommended that a Limited Site Assessment report with respect to the groundwater be prepared. This LSA was conducted in response to a correspondence dated December 14, 2006 involving a Notice of Regulatory Requirements (NORR) issued by the North Carolina Department of Environmental and Natural Resources (NCDENR) Underground Storage Tank (UST) Section. This Phase I LSA will help assess the likely factors that could pose an imminent danger to the public or environment and will also collect necessary information to assign land use classifications for the TT-48 UST #1 and TT-48 UST #3 project sites.

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

PHASE I LIMITED SITE ASSESSMENT REPORT

A. SITE IDENTIFICATION

DATE OF REPORT: May 7, 2007
Facility ID: N/A **UST Incident Number (if known):** Pending
Site Name: Building TT-48 UST#1 and UST#3
Site Location: Marine Corps Base, Camp Lejeune
Nearest City/Town: Jacksonville **County:** Onslow
UST Owner: Commanding Officer – MCB Camp Lejeune
Address: I&E/EMD/EQB
PSC 20004 **Phone:** (910) 451-
MCB Camp Lejeune, NC 28542 5068
UST Operator: Same as above (see Tables 1 and 2)
Address: Same as above **Phone:** Same as above
Property Owner: Same as above (see Table 2)
Address: Same as above **Phone:** Same as above
Property Occupant: Unknown
Address: Building TT-48, Tarawa Terrace **Phone:**
Consultant/Contractor: CATLIN Engineers and Scientists
220 Old Dairy Road, Wilmington, North Carolina **Phone:** (910) 452-
Address: 28405 5861

Release Information

Date Discovered: October 2006
Easting: UST #1 – 282293.74 **Northing:** UST #1 – 3846305.00
UST #3 – 282472.13 UST #3 – 3846265.23
Estimated Quantity of Release: Unknown
Cause of Release: Unknown
Source of Release (e.g. Piping/UST): The source of the release is unknown; however, the removed USTs and associated piping appeared to be in good condition.

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

One 500-gallon and one 1,000 gallon, double wall, polyethylene coated, steel fuel oil USTs.

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

(Please Affix Seal and Signature)



B. RISK CHARACTERIZATION

Limited Site Assessment Risk Classification and Land Use Form

Part I - Groundwater/Surface Water/Vapor Impacts

High Risk

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

No information provided indicates a water supply well has been contaminated as a result of the release from the TT-48 UST #1 and UST #3 potential source areas.

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 Figures 1A and 1B).

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 Figures 1A and 1B).

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 Figures 1A and 1B).

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

No evidence of vapor accumulations has been reported.

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

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

Intermediate Risk

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

The nearest mapped surface water body is a tributary to Northeast Creek located approximately 850 feet north of site TT-48 UST #1 and approximately 750 feet north of site TT-48 UST #3 (see Figures 1A and 1B).

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

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

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

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

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

If YES, is the source area of the release located in an area in which there is recharge to an unconfined or semi-confined deeper aquifer that is being used or may be used as a source of drinking water? YES NO
If YES describe

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

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

Surficial groundwater samples from site monitoring wells USTTT48-MW01 and USTTT48-MW02 were analyzed per EPA Method 602 + Xylenes, EPA Method 625+TICs and MADEP VPH/EPH parameters. A review of laboratory analysis results indicates no subject analyte concentrations were detected in excess of applicable GCLs. These findings are discussed in greater detail in Section E of this report.

Part II - Land Use

Property Containing Source Area of Release

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

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

TT-48 UST #1 and TT-48 UST #3 (Project sites) are located within the Tarawa Terrace residential area of MCB, Camp Lejeune. The area is currently being developed as part of new housing construction.

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.

TT-48 UST #1 and TT-48 UST #3 (Project sites) are located in the Tarawa Terrace residential area of MCB, Camp Lejeune; however, none of the subject properties contain any places of public assembly (refer to Figure 1A and 1B).

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

TT-48 UST #1 and TT-48 UST #3 (Project sites) are located in the Tarawa Terrace residential area of MCB, Camp Lejeune. The area is currently being developed as part of new housing construction.

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

Due to the subject sites lying in a residential area, children most likely will visit the subject properties.

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

As a result of the subject properties being under heavy construction, the area is temporarily fenced in and restricted from the public.

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

Project sites TT-48 UST #1 and TT-48 UST #3 are located within areas of construction; in which soils are not currently capped with pavement and/or structures.

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

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

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

The MCB, Camp Lejeune is not subject to local or county-zoning requirements; however, Building TT-48 is located within a Residential use zone.

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

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

Property Surrounding Source Area of Release

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

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

The project sites TT-48 UST #1 and TT-48 UST #3 are located less than 250 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?*

TT-48 UST #1 and TT-48 UST #3 project sites are located in the Tarawa Terrace residential area of MCB, Camp Lejeune. Athletic Courts are located approximately 700 feet south of TT-48 UST #1 and approximately 900 feet southwest of TT-48 UST #3.

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

As stated previously, sites TT-48-1 and TT-48-3 are located within a Residential use zone.

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

Residential

C. RECEPTOR INFORMATION

1. Water Supply Wells

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

2. Public Water Supplies

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

YES

NO

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

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

3. Surface Water

As stated previously, the nearest mapped surface water body is a tributary to Northeast Creek located approximately 850 feet north of site TT-48 UST #1 and approximately 750 feet north of site TT-48 UST #3.

4. Wellhead Protection Areas

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

5. Deep Aquifers in the Coastal Plain Physiographic Region

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

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

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

6. Subsurface Structures

Numerous underground utilities are present throughout MCB, Camp Lejeune. These utilities are reportedly located above the surficial groundwater table (± 7 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.

D. SITE GEOLOGY AND HYDROGEOLOGY

D.1 Site Geology

The following site geology description is based on visual description of the soil split spoon samples obtained while installing the borehole for site groundwater monitoring wells USTTT48-MW-01(TT-48 UST #1) and USTTT48-MW02 (TT-48 UST #3). The encountered site soils can be summarized as follows:

TT-48 UST #1 (USTTT48-MW01)		
Depth in feet BLS	Soil Description	USCS
0-1	Asphalt – crushed rock	
1-2	Brown, silty to very fine clayey sand w/ medium plasticity	SC
2-3	No split spoon sample	
3-4	Orange - Brown, silty to very fine clayey sand w/ medium plasticity	SC
4-5	Brown to Gray, silty fine to very fine sand w/medium density	SM
5-8	No split spoon sample	
8-10	Dark gray, high plasticity clay w/ trace of rotten wood fragments	CH
11-13	Dark-brown, fine clayey sand w/ trace of rotten wood fragments	SC

TT-48 UST #3 (USTTT48-MW02)		
Depth in feet BLS	Soil Description	USCS
0-3	No split spoon sample	
3-5	Gray, silty to very fine sandy clay w/ trace of orange-brown mottling	CL
5-8	No split spoon sample	
8-10	Gray to tan, fine to very fine sand	SP
10-13	No split spoon sample	
13-14	Tan, fine to very fine sand	SP
14-15	Tan to gray, silty to clayey fine to very fine sand, dense	SM

The soils described above are consistent with undivided surficial deposits typically encountered within the area Coastal Plain Physiographic Province. A copy of the USTTT48-MW01 and USTTT48-MW02 boring logs, monitoring well as-builts and North Carolina Well Construction Records have been provided in Appendix A.

D.2 Site Hydrogeology

During the February 16, 2007 site visit, CATLIN personnel obtained depth to water data from site-monitoring wells USTTT48-MW01 and USTTT48-MW02. Depth to surficial groundwater at well USTTT48-MW01 was 7.49 feet below top of casing. Depth to surficial groundwater at well USTTT48-MW02 was 9.27 feet below top of casing. Review of the data generated during this investigation, indicates the surficial groundwater encountered below the potential source area is part of an unconfined surficial aquifer. Site monitoring well details and the groundwater gauging data has been summarized on Table 3. The location of the monitoring wells has been illustrated on Figures 2A and 2B.

E. SAMPLING RESULTS

The initial findings of the Shaw "TT-48 UST #1 and UST #3 Closure Reports" indicated potential areas of concern in the site groundwater. Soil laboratory data obtained during the closure activities was sufficient to assess on-site soils. To assess the potential impact to the site surficial aquifer permanent Type II monitoring wells (USTTT48-MW01 and USTTT48-MW02) were installed at the locations where soil staining was noted during the UST closure activities. All surficial groundwater assessment fieldwork methods were conducted in general accordance with CATLIN's Standard Methods of Investigation. A copy of the CATLIN Standard Methods of Investigation has been provided in Appendix B.

E.1 Soil Sampling

During the TT-48 UST #1 and TT-48 UST #3 closure activities, minor soil staining and a slight petroleum hydrocarbon odor was detected. Shaw obtained soil samples from the former UST locations for analysis per TPH-DRO/GRO per EPA Method 3550 and 5030. Laboratory analysis detected TPH concentrations greater than 10 mg/kg, NCDENR Action Level, in all of the soil samples collected from beneath the UST basin and the four side walls. The following information was obtained from the Shaw TT-48 UST #1 and TT-48 UST #3 closure reports.

TT-48 UST #1

On October 13, 2006, Shaw removed an additional three to six feet of soil from the four sides of the excavation. Only 0.5 foot was removed from the bottom of the excavation due to groundwater being encountered at approximately 6.5 feet BLS. Confirmation soil samples were collected from each sidewall and were laboratory analyzed per EPA Methods 8260, 8270 and MADEP VPH/EPH. A soil sample was not collected from the bottom of the tank basin since groundwater was present at the bottom of the excavation. Laboratory results did not detect any EPA Methods 8260, 8270 or MADEP VPH/EPH compounds in excess of North Carolina's Residential and Soil-to-Groundwater MSCCs.

TT-48 UST #3

On October 16, 2006, Shaw removed an additional three to seven feet of soil from each side wall of the excavation. However, only one foot was removed from the bottom of the excavation (9.0 feet BLS) before groundwater was encountered. Confirmation soil samples were then collected from each side wall (approximately 8.0 feet BLS) and were laboratory analyzed per EPA Methods 8260, 8270 and MADEP VPH/EPH. All analytical results from three of the four side wall samples were less than the North Carolina's Residential and Soil-to-Groundwater MSCCs. The east side wall sample was above the NCDENR Action Levels. Therefore, removal of an additional three feet of soil on the east wall was conducted on October 27, 2006, down to 8.0 feet BLS. A second set of soil samples were collected from the east wall at the new excavation limits for EPA Methods 8260, 8270 and MADEP VPH/EPH analysis. The analytical results for the second over excavation of the east wall were below North Carolina's Residential and Soil-to-Groundwater MSCCs.

No soil samples were collected for laboratory analysis from the TT-48 UST #1 and TT-48 UST #3 project sites during this Phase I LSA investigation.

E.2 Groundwater Sampling

The following information was obtained from the Shaw TT-48 UST #1 and TT-48 UST #3 closure reports.

TT-48 UST #1 – UST Closure

On November 2, 2006, a temporary monitoring well was installed at the south end of the backfilled excavation area and a groundwater sample was collected for laboratory analysis. Analytical results revealed Benzene, Ethylbenzene, Bis(2-ethylhexyl)phthalate and MADEP-VPH (C9-C22 Aromatics) concentrations in excess of their corresponding 2L GWQS.

TT-48 UST #3 – UST Closure

On November 2, 2006, a temporary monitoring well was installed at the south end of the backfilled excavation area and a groundwater sample was collected for laboratory analysis. Analytical results revealed Naphthalene, 2-Methylnaphthalene and MADEP-VPH (C9-C22 Aromatics) concentrations in excess of their corresponding 2L GWQS.

TT-48 UST #1 and TT-48 UST #3 – LSA Investigation

CATLIN personnel installed Type II monitoring wells USTTT48-MW01 (TT-48 UST #1 site) and USTTT48-MW02 (TT-48 UST #3 site) on February 13, 2007. The groundwater was allowed to equilibrate and the wells were gauged for depth to water, potential free-phase product thickness, and to determine well volume. CATLIN purged a minimum of three well volumes from each monitoring well prior to collecting representative groundwater samples. Groundwater samples were placed directly into laboratory provided glassware.

A copy of the Sampling Field Data Worksheet has been provided in Appendix C. All groundwater samples were labeled with the monitoring well identification, sample date, site name, sampler, and placed in an iced cooler prior to transporting to the laboratory.

Samples were then delivered to SGS Environmental Services, Inc. (North Carolina Certification #481) in Wilmington, North Carolina. In accordance with Table 10 of the *2001 Guidelines*, site groundwater samples were analyzed for suspected fuel oil contamination per EPA Method 602 + Xylenes, EPA Method 625 (+ 10 largest non-target peaks) and MADEP VPH/EPH. A copy of the resulting groundwater sample laboratory analysis report and proper Chain-of-Custody has been provided in Appendix D. For regulatory compliance, the resulting laboratory analysis data has been compared to applicable 2L GWQS and GCL listed in the *2001 Guidelines*. Analysis of the groundwater samples submitted for laboratory analysis can be summarized as follows:

TT-48 UST #1

EPA METHOD 625 + TICs

Analysis of the monitoring well USTTT48-MW01 groundwater sample revealed Di-n-Butylphthalate at a concentration of 1.8 J ug/L. There is no established 2L GWQS or GCL for this compound. All other remaining EPA Method 625 compounds were either below the laboratory quantitation limit or their respective 2L GWQS. EPA Method 625 laboratory report data has been summarized in Table 4A. Figure 3A shows a summary of the data in relation to the site map.

In accordance with the *2001 Guidelines* EPA Method 625 sample(s) are also analyzed for the ten (10) largest (peak area) non-target compounds, or Tentatively Identified Compounds (TICs). TICs refer to detected compounds, which are not present in the EPA Method 625 list of target compounds. Therefore, not all TICs are identified and quantitated using individual standards. TIC listings are prepared using a computerized library search of electron impact mass spectral data and evaluation of the relevant data by a mass spectral data specialist. Quantitation was accomplished by relative peak height of the compound compared to that of the nearest internal standard from the total ion chromatogram. TICs are identified and quantitated only if the peak height is equal to or greater than 10% of that of the nearest internal standard. The quantitation standard provided is an estimate. There are no established 2L GWQS or GCL Standards for any of these TICs. Laboratory analysis revealed four TICs in the USTTT48-MW01 groundwater sample.

EPA METHOD 602 + XYLENES

Analysis of monitoring well USTTT48-MW01 groundwater sample revealed all EPA Method 602 compounds below the laboratory quantitation limits or below the 2L GWQS. EPA Method 602 laboratory report data has been summarized in Table 4B. Figure 4A shows a summary of the data in relation to the site map.

MADEP VPH/EPH

Analysis of the monitoring well USTTT48-MW01 groundwater sample revealed that the C9-C22 Aromatic hydrocarbon fraction concentration (<620 ug/L) was above the 2L GWQS of 210 ug/L. A GCL has not been established for this hydrocarbon fraction. MADEP VPH/EPH laboratory report data has been summarized in Table 4C. Figure 5A shows a summary of the data in relation to the site map.

TT-48 UST #3

EPA METHOD 625 + TICs

Laboratory analysis of monitoring well USTTT48-MW02 detected a concentration of Naphthalene (462 ug/L), which exceeds the 2L GWQS of 21 ug/L, but is well below the GCL of 15,500 ug/L. All other remaining EPA Method 625 compounds were either below the laboratory quantitation limit or their respective 2L GWQS. EPA Method 625 laboratory report data has been summarized in Table 4A. Figure 3B shows a summary of the data in relation to the site map. Laboratory analysis revealed ten TICs in the USTTT48-MW02 groundwater sample.

EPA METHOD 602 + XYLENES

Analysis of monitoring well USTTT18-MW02 groundwater sample revealed all EPA Method 602 compounds below the laboratory quantitation limits or below the 2L GWQS.

EPA Method 602 laboratory report data has been summarized in Table 4B. Figure 4B shows a summary of the data in relation to the site map.

MADEP VPH/EPH

Analysis of the monitoring well USTTT48-MW02 groundwater sample revealed that C9-C22 Aromatic (13,000 ug/L) and C9-C18 Aliphatic (8,200 ug/L) hydrocarbon fraction concentrations were above the 2L GWQS of 4,200 ug/L and 210 ug/L, respectively. GCLs have not been established for these hydrocarbon fractions. MADEP VPH/EPH laboratory report data has been summarized in Table 4C. Figure 5B shows a summary of the data in relation to the site map.

E.3 Free-Phase Product

No measurable thickness of free-phase product was detected in the site groundwater monitoring wells USTTT48-MW01 and USTTT48-MW02 during this Phase I LSA.

F. CONCLUSIONS AND RECOMMENDATIONS

F.1 Conclusions

LSA field and laboratory findings can be summarized as follows:

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

TT-48 UST #1

- Monitoring well USTTT48-MW01 groundwater sample was analyzed per EPA Method 602 + Xylenes, EPA Method 625 (+ 10 largest non-target peaks) and MADEP VPH/EPH. Laboratory analyses revealed that all analyte concentrations were either below quantitation limits or below applicable 2L GWQS and GCLs, except as follows:
 - USTTT48-MW01 groundwater samples exhibited detectable levels of Di-n-Butylphthalate (1.8 J ug/L) however; a 2L GWQS or GCL has not been established for this compound. The hydrocarbon fraction C9-C22 Aromatics was detected above the 2L GWQS; however, a GCL has not been established for this hydrocarbon fraction.

TT-48 UST #3

- Monitoring well USTTT48-MW02 groundwater sample was analyzed per EPA Method 602 + Xylenes, EPA Method 625 (+ 10 largest non-target peaks) and MADEP VPH/EPH. Laboratory analyses revealed that all analyte concentrations were either below quantitation limits or below applicable 2L GWQS and GCLs, except as follows:
 - USTTT48-MW02 groundwater samples exhibited detectable levels of Naphthalene above the 2L GWQS, but well below the GCL. C9-C22 Aromatics and C9-C18 Aliphatics were also detected above the 2L GWQS; however, GCLs have not been established for these hydrocarbon fractions.

F.2 Recommendations

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

TT-48 UST #1

There were no soil contaminants identified in excess of the most restrictive MSCCs. Groundwater contamination was identified in excess of the 2L GWQS; however, no contamination was identified in excess of any established GCL (GCLs have not been established for Di-n-Butylphthalate or the C9-C22 Aromatics). It is recommended that the site be considered for No-Further-Action (NFA). Additionally, it is recommended that monitoring well USTTT48-MW01 be abandoned, as the well is within the footprint of a proposed slab on grade house to be constructed within the near future.

TT-48UST #3

There also were no soil contaminants identified in excess of the most restrictive MSCCs. Groundwater contamination was identified in excess of the 2L GWQS; however, no contamination was detected in excess of any established GCLs (GCLs have not been established for MADEP fractions). It is recommended that the site be considered for NFA with a "Notice of Residual Petroleum" or Land Use Restriction for groundwater only. The monitoring well USTTT48-MW02 is recommended to be sampled on a two year basis until contaminants are reduced to below the 2L GWQS at which time the site will be considered for NFA without Land Use Restriction.

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

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

G. REFERENCES

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

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

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

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

Shaw Environmental, Inc. *Former Tarawa Terrace School Building TT-48 UST #1 Closure Report, Marine Corps Base Camp Lejeune, Onslow County North Carolina*, November, 2006.

Shaw Environmental, Inc. *Former Tarawa Terrace School Building TT-48 UST #3 Closure Report, Marine Corps Base Camp Lejeune, Onslow County North Carolina*, November, 2006.

TABLES

TABLE 1

**SITE HISTORY
UST SYSTEM INFORMATION**

**BUILDING TT-48 UST#1 and UST#3
PHASE I LIMITED SITE ASSESSMENT
MCB, CAMP LEJEUNE, NORTH CAROLINA**

UST ID Number	Product	Capacity (gallons)	Date Installed	Date Permanently Closed
1	Heating Oil	500	Unknown	Unknown
3	Heating Oil	1,000	Unknown	Unknown

**TABLE 2
SITE HISTORY**

UST OWNER/OPERATOR INFORMATION

**BUILDING TT-48 UST #1 and UST #3
PHASE I LIMITED SITE ASSESSMENT
MCB, CAMP LEJEUNE, NORTH CAROLINA**

Dates of Ownership/Operation	UST ID Number	Name of Owner/ Operator	Address	Telephone Number
Unknown	1	Commanding Officer Attn: Director I&E/EMD/EQB	PSC Box 20004 Marine Corps Base Camp Lejeune, NC 28542-0004	(910) 451-5068
Unknown	3	Commanding Officer Attn: Director I&E/EMD/EQB	PSC Box 20004 Marine Corps Base Camp Lejeune, NC 28542-0004	(910) 451-5068

TABLE 3

WELL CONSTRUCTION INFORMATION

BUILDING TT-48 UST#1 and UST#3
 PHASE I LIMITED SITE ASSESSMENT
 MCB, CAMP LEJEUNE, NORTH CAROLINA

Well ID	Date Installed (m/dd/yy)	Date Water Level Measured (m/dd/yy)	Well Casing Depth (ft. BGS)	Screened Interval (x to y ft. BGS)	Bottom of Well (ft. BGS)	Top of Casing Elevation (ft.)	Depth to Water from Top of Casing (ft.)	Free Product Thickness (ft.)	Ground Water Elevation (ft.)	Comments
USTTT48-MW01	2/13/2007	2/16/2007	3.5	3.5-13.5	13.5	24.76	7.49	0.00	17.27	Monitoring
USTTT48-MW02	2/13/2007	2/16/2007	4	4-14	14	26.09	9.27	0.00	16.82	Monitoring

ft BGS = feet below ground surface

TABLE 4A SUMMARY OF GROUNDWATER LABORATORY RESULTS

Date: February 2007

Name: Building TT-48 UST#1 and UST#3

Analytical Method: EPA Method 625

Well ID	Contaminant of Concern →		Di-n-Butylphthalate	Fluorene	Naphthalene	Phenanthrene	All Other Remaining EPA Method 625 Compounds
	Sample ID	Date Collected					
2L GWQS GCL			NE NE	280 950	21 15,500	210 410	Varies Varies
USTTT48-MW01	USTTT48-MW01	2/16/2007	1.8 J	<10	<10	<10	BQL
USTTT48-MW02	USTTT48-MW02	2/16/2007	<100	55 J	462	119	BQL

BQL = Below quantitation limit

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

NE = None Established

Shaded concentration exceeds 2L GWQS.

J = Below calibration limit, concentration is an estimated value.

TABLE 4B
SUMMARY OF GROUNDWATER LABORATORY RESULTS

Date: February 2007

Name: Building TT-48 UST#1 and UST#3

Analytical Method: EPA Method 602 + Xylenes

Well ID	Contaminant of Concern →		Benzene	Ethylbenzene	m/p-Xylene	o-Xylene	Remaining EPA Method 602 Compounds
	Sample ID	Date Collected					
2L GWQS GCL			1 5,000	550 84,500	530* 87,500*		Varies Varies
USTTT48-MW01	USTTT48-MW01	2/16/2007	<1.0	<1.0	<2.0	<2.0	BQL
USTTT48-MW02	USTTT48-MW02	2/16/2007	0.257 J	61.3	1.13 J	<2.0	BQL

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

* = Total Xylenes limit

J Below calibration limit, concentration is an estimated value

BQL - Below Quantitation Limit

TABLE 4C SUMMARY OF GROUNDWATER LABORATORY RESULTS

Date: February 2007

Name: Building TT-48 UST#1 and UST#3

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

Well ID	Hydrocarbon Fraction of Concern →		C5-C8 Aliphatics	C9-C18 Aliphatics	C19-C36 Aliphatics	C9-C22 Aromatics
	Sample ID	Date Collected				
GCL 2L GWQS			NE 420	NE 4,200	NE 42,000	NE 210
USTTT48-MW-01	USTTT48-MW-01	2/16/2007	<100	<200	<100	<620*
USTTT48-MW-02	USTTT48-MW-02	2/16/2007	<100	13,000	<1,000	8,200

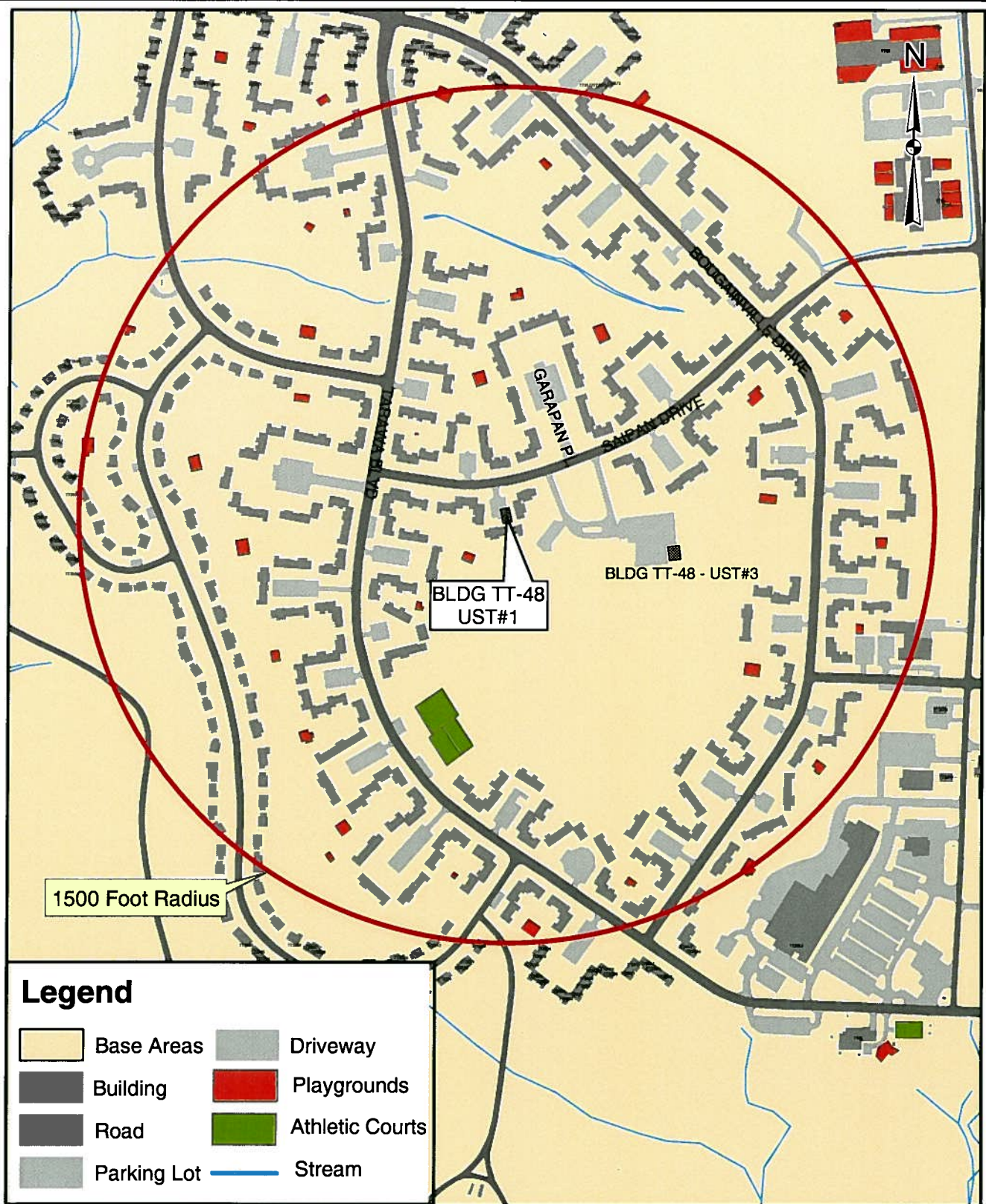
* The value represents the sum of the reported practical quantitation limit of one fraction and the detected concentration of the other fraction.

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

NE - None Established

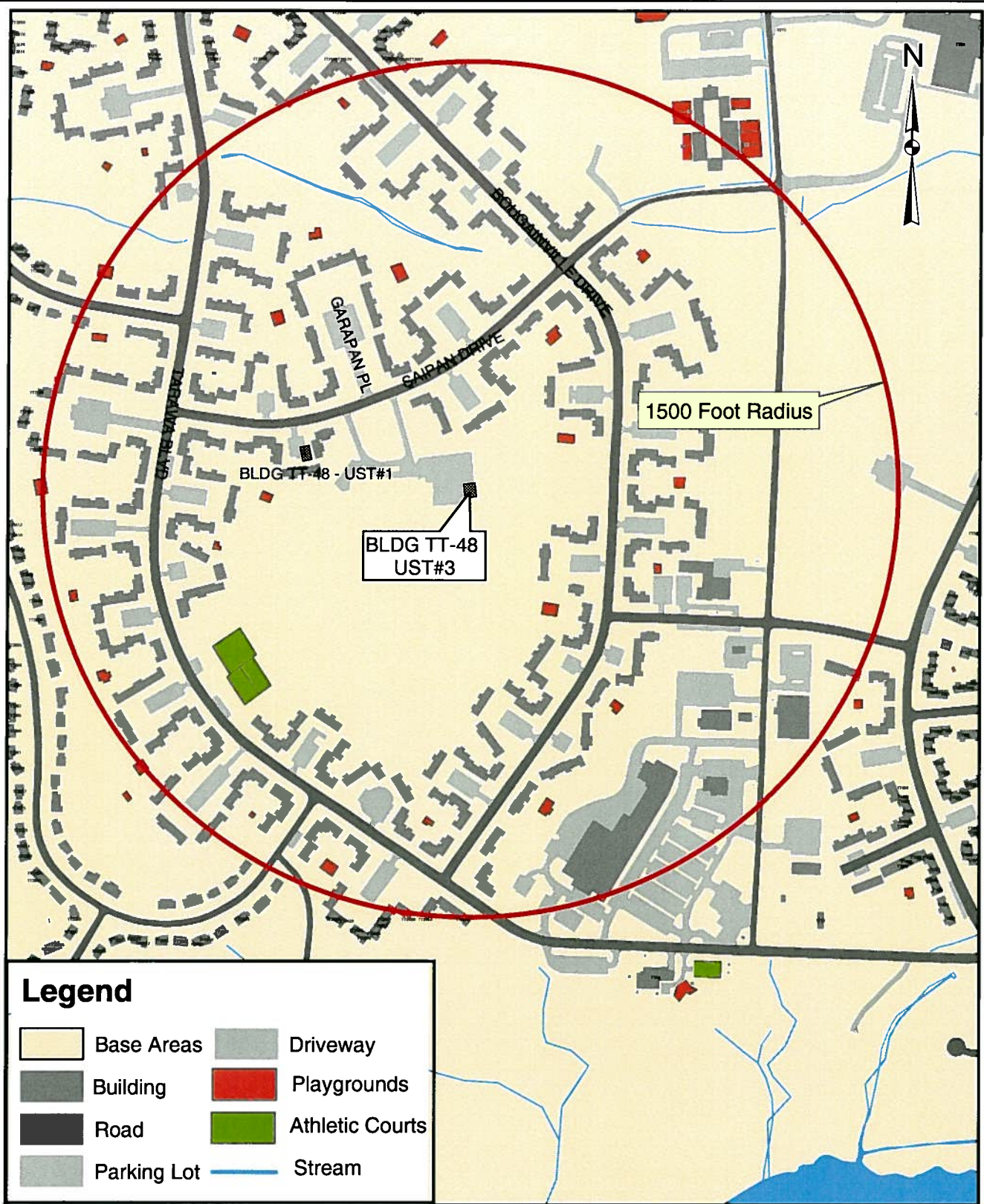
Shaded concentrations exceed 2L GWQS.

FIGURES



Data Source: GIS Data provided by MCB Camp Lejeune GIS Department.

 ENGINEERS and SCIENTISTS WIMINGTON, NORTH CAROLINA	PROJECT BLDG TT-48 UST #1 & #3 PHASE 1 LIMITED SITE ASSESSMENT MCB CAMP LEJEUNE, N.C.		TITLE TT-48 UST #1 1500' Radius with Water Well Survey and Places of Public Assembly		FIGURE 1A
	JOB NO. 205-077	DATE APR 2007	SCALE AS SHOWN	DRAWN BY KAWS	CHECKED BY JAC



Data Source: GIS Data provided by MCB Camp Lejeune GIS Department.

 CATLIN ENGINEERS and SCIENTISTS WIMINGTON, NORTH CAROLINA	PROJECT BLDG TT-48 UST #1 & #3 PHASE 1 LIMITED SITE ASSESSMENT MCB CAMP LEJEUNE, N.C.		TITLE TT-48 UST #3 1500' Radius with Water Well Survey and Places of Public Assembly			FIGURE 1B
	JOB NO. 205-077	DATE APR 2007	SCALE AS SHOWN	DRAWN BY KAWS	CHECKED BY JAC	

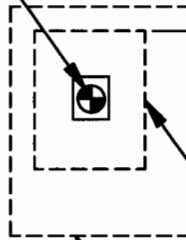
SAIPAN DRIVE

(Edge of Road)



85' (to edge of pavement)

USTTT48-MW01



EXCAVATION LIMITS FOR UST #1
(EXCAVATION 6 FT DEEP)

OVER EXCAVATION LIMITS
(FINAL EXCAVATION 6.5 FT DEEP)

LEGEND

DESCRIPTION
TYPE II WELL



NOTES:
1. SITE MAP ADAPTED FROM SHAW ENVIRONMENTAL, INC.

	PROJECT BUILDING TT-48 UST #1 & #3 PHASE 1 LIMITED SITE ASSESSMENT MCB CAMP LEJEUNE, N.C.		TITLE TT-48 UST #1 SITE PLAN WITH MONITORING WELL LOCATION		FIGURE
	JOB NO: 205-077	DATE: APR 2007	SCALE: 1"=20'	DRAWN BY: KAWS	CHECKED BY: JAC

2A

205077-TT48-FIG02A

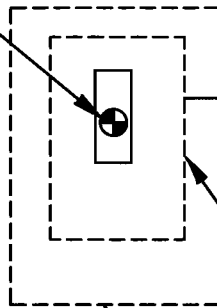
SAIPAN DRIVE

(Edge of Road)



400' (to edge of pavement)

USTTT48-MW02



EXCAVATION LIMITS FOR UST #3
(EXCAVATION 8 FT DEEP)

OVER EXCAVATION LIMITS
(FINAL EXCAVATION 9 FT DEEP)

LEGEND

- | | |
|--|--------------|
| | DESCRIPTION |
| | TYPE II WELL |

NOTES:

1. SITE MAP ADAPTED FROM SHAW ENVIRONMENTAL, INC.



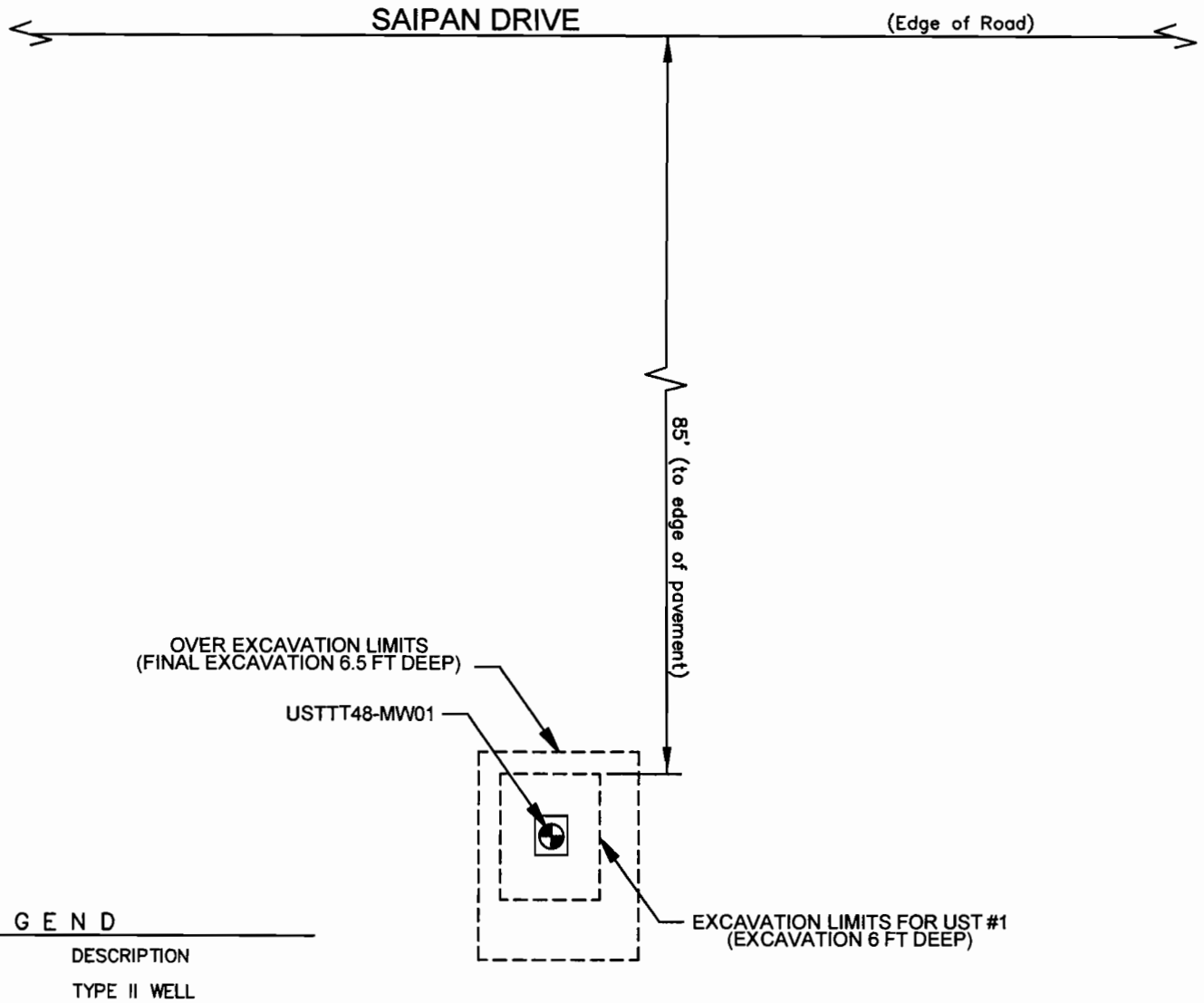
WILMINGTON, NORTH CAROLINA	PROJECT BUILDING TT-48 UST #1 & #3 PHASE 1 LIMITED SITE ASSESSMENT MCB CAMP LEJEUNE, N.C. JOB NO: 205-077 DATE: APR 2007	TITLE TT-48 UST #3 SITE PLAN WITH MONITORING WELL LOCATION SCALE: 1"=20' DRAWN BY: KAWS CHECKED BY: JAC	FIGURE 2B
			205077-TT48-FIG02B



Analytical Method: EPA Method 625

Well ID	Contaminant of Concern →		Di-n-Butylphthalate	Fluorene	Naphthalene	Phenanthrene	All Other Remaining EPA Method 625 Compounds
	Sample ID	Date Collected					
	2L GWQS GCL		NE NE	280 950	21 15,500	210 410	Varies Varies
USTTT48-MW01	USTTT48-MW01	2/16/2007	1.8 J	<10	<10	<10	BQL

BQL = Below quantitation limit
 All results in micrograms per Liter (ug/L)
 NE = None Established
 Shaded concentration exceeds 2L GWQS
 J = Below calibration limit, concentration is an estimated value.



NOTES:
 1. SITE MAP ADAPTED FROM SHAW ENVIRONMENTAL, INC.

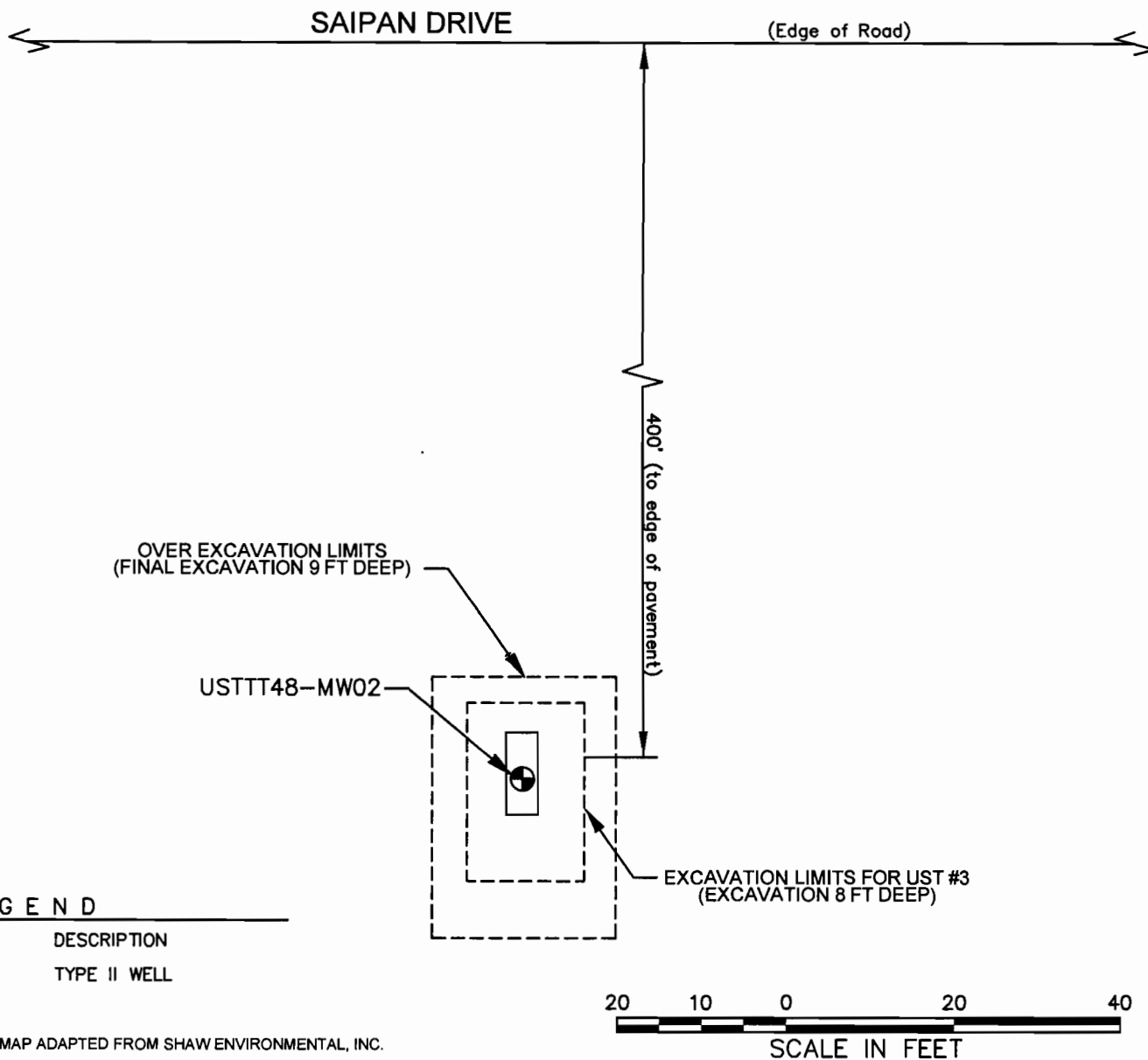
	PROJECT BUILDING TT-48 UST #1 & #3 PHASE 1 LIMITED SITE ASSESSMENT MCB CAMP LEJEUNE, N.C.	TITLE TT-48 UST #1 SITE PLAN WITH GROUNDWATER ANALYSIS RESULTS - EPA METHOD 625		FIGURE 3A
	JOB NO: 205-077	DATE: APR 2007	SCALE: 1"=20'	DRAWN BY: KAWS



Analytical Method: EPA Method 625

Well ID	Contaminant of Concern →		Di-n-Butylphthalate	Fluorene	Naphthalene	Phenanthrene	All Other Remaining EPA Method 625 Compounds
	Sample ID	Date Collected					
2L GWQS GCL			NE	280	21	210	Varies
USTTT48-MW02	USTTT48-MW02	2/16/2007	NE	950	15,500	410	Varies
			<100	55 J	462	119	BQL

BQL = Below quantitation limit
 All results in micrograms per liter (ug/L).
 NE = None Established
 Shaded concentration exceeds 2L GWQS.
 J = Below calibration limit, concentration is an estimated value.



LEGEND

DESCRIPTION
 TYPE II WELL

NOTES:
 1. SITE MAP ADAPTED FROM SHAW ENVIRONMENTAL, INC.

 WILMINGTON, NORTH CAROLINA	PROJECT BUILDING TT-48 UST #1 & #3 PHASE 1 LIMITED SITE ASSESSMENT MCB CAMP LEJEUNE, N.C.	TITLE TT-48 UST #3 SITE PLAN WITH GROUNDWATER ANALYSIS RESULTS - EPA METHOD 625		FIGURE 3B
	JOB NO: 205-077 DATE: APR 2007	SCALE: 1"=20'	DRAWN BY: KAWS	CHECKED BY: JAC



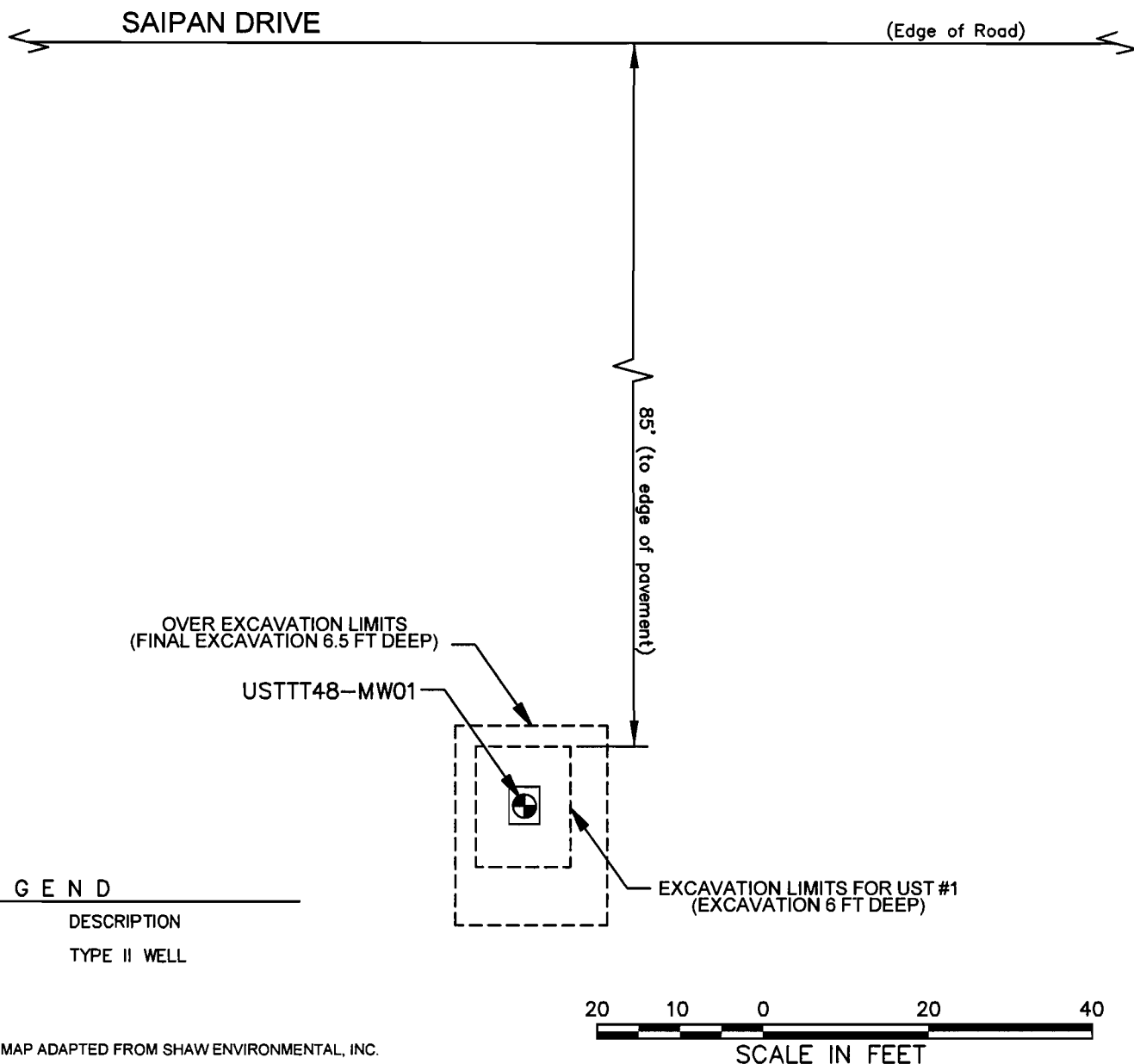
Analytical Method: EPA Method 602 + Xylenes

Well ID	Contaminant of Concern		Benzene	Ethylbenzene	m/p-Xylene	o-Xylene	Remaining EPA Method 602 Compounds
	Sample ID	Date Collected					
2L GWQS GCL			1 5,000	550 84,500	530* 87,500*		Varies Varies
USTTT48-MW01	USTTT48-MW01	2/16/2007	<1.0	<1.0	<2.0	<2.0	BQL

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

* = Total Xylenes limit

BQL - Below Quantitation Limit



NOTES:

1. SITE MAP ADAPTED FROM SHAW ENVIRONMENTAL, INC.

 ENGINEERS and SCIENTISTS WILMINGTON, NORTH CAROLINA	PROJECT BUILDING TT-48 UST #1 & #3 PHASE 1 LIMITED SITE ASSESSMENT MCB CAMP LEJEUNE, N.C.		TITLE TT-48 UST #1 SITE PLAN WITH GROUNDWATER ANALYSIS RESULTS - EPA METHOD 602 + XYLENES			FIGURE 4A
	JOB NO: 205-077	DATE: APR 2007	SCALE: 1"=20'	DRAWN BY: KAWS	CHECKED BY: JAC	205077-TT48-FIG04A

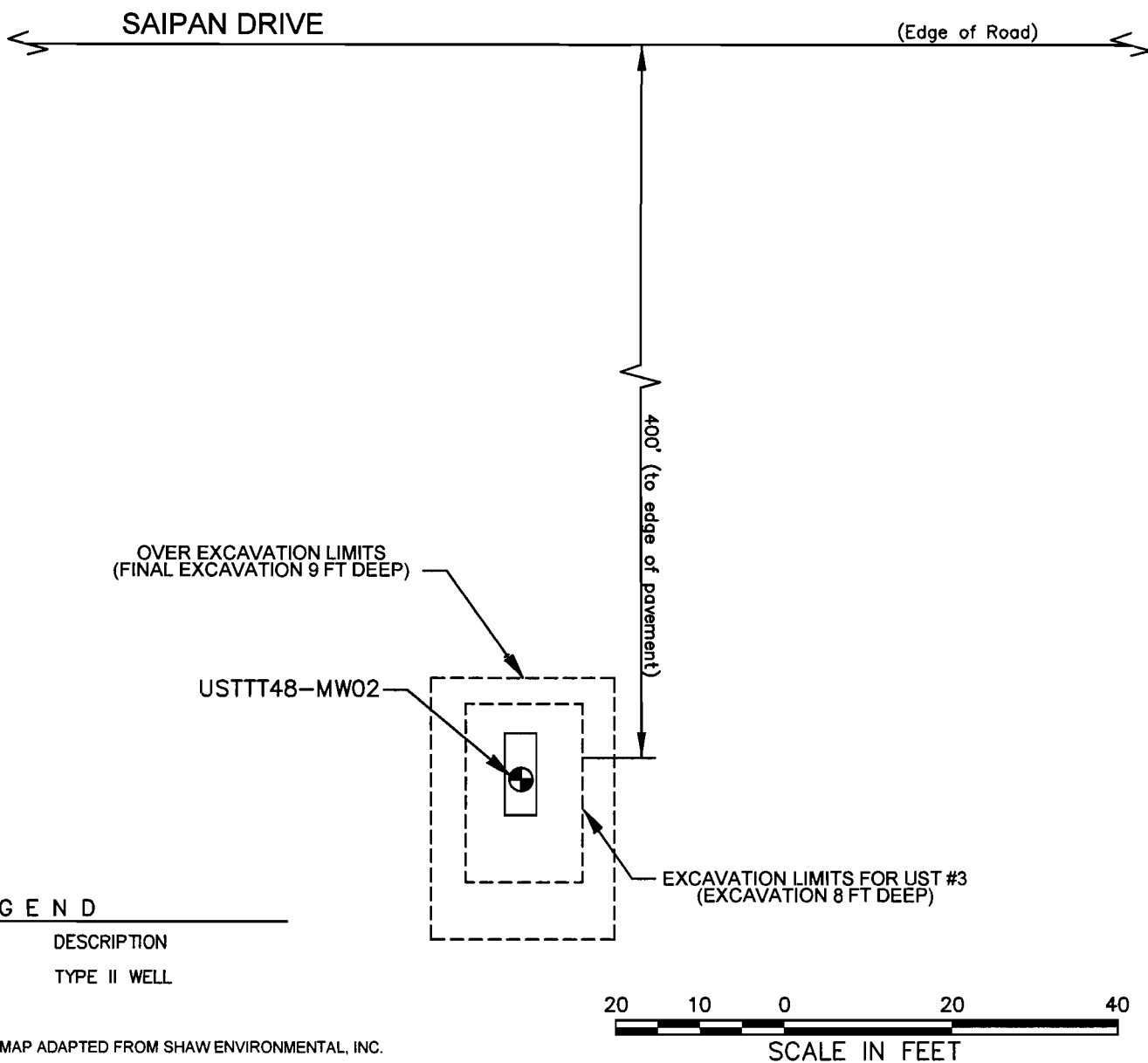
205077-TT48-FIG04A



Analytical Method: EPA Method 602 + Xylenes

Well ID	Contaminant of Concern		Benzene	Ethylbenzene	m/p-Xylene	o-Xylene	Remaining EPA Method 602 Compounds
	Sample ID	Date Collected					
2L GWQS GCL			1 5,000	550 84,500	530* 87,500*		Varies Varies
USTTT48-MW02	USTTT48-MW02	2/16/2007	0.257 J	<1.0	1.13 J	<2.0	BQL

All results in micrograms per liter (ug/L).
 * = Total Xylenes limit
 J Below calibration limit, concentration is an estimated value
 BQL - Below Quantitation Limit



CAELIN ENGINEERS and SCIENTISTS WILMINGTON, NORTH CAROLINA	PROJECT BUILDING TT-48 UST #1 & #3 PHASE 1 LIMITED SITE ASSESSMENT MCB CAMP LEJEUNE, N.C.	TITLE TT-48 UST #3 SITE PLAN WITH GROUNDWATER ANALYSIS RESULTS - EPA METHOD 602 + XYLENES		FIGURE 4B
	JOB NO: 205-077	DATE: APR 2007	SCALE: 1"=20'	DRAWN BY: KAWS



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

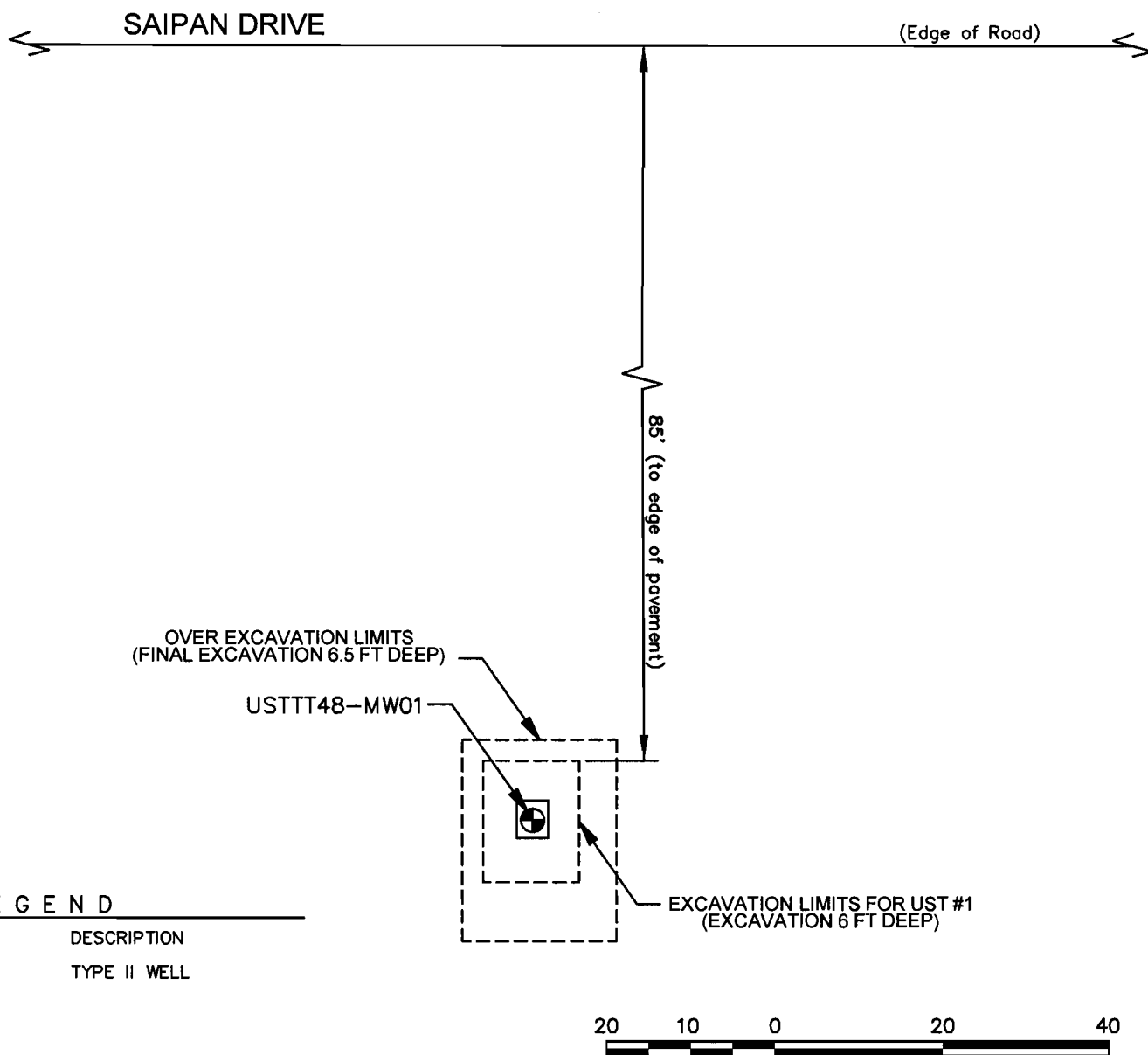
Well ID	Hydrocarbon Fraction of Concern		C5-C8 Aliphatics	C9-C18 Aliphatics	C19-C36 Aliphatics	C9-C22 Aromatics
	Sample ID	Date Collected				
GCL 2L GWQS			NE 420	NE 4,200	NE 42,000	NE 210
USTTT48-MW-01	USTTT48-MW-01	2/16/2007	<100	<200	<100	<620*

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

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

NE - None Established

Shaded concentrations exceed 2L GWQS.



LEGEND

- DESCRIPTION
- TYPE II WELL

NOTES:

1. SITE MAP ADAPTED FROM SHAW ENVIRONMENTAL, INC.

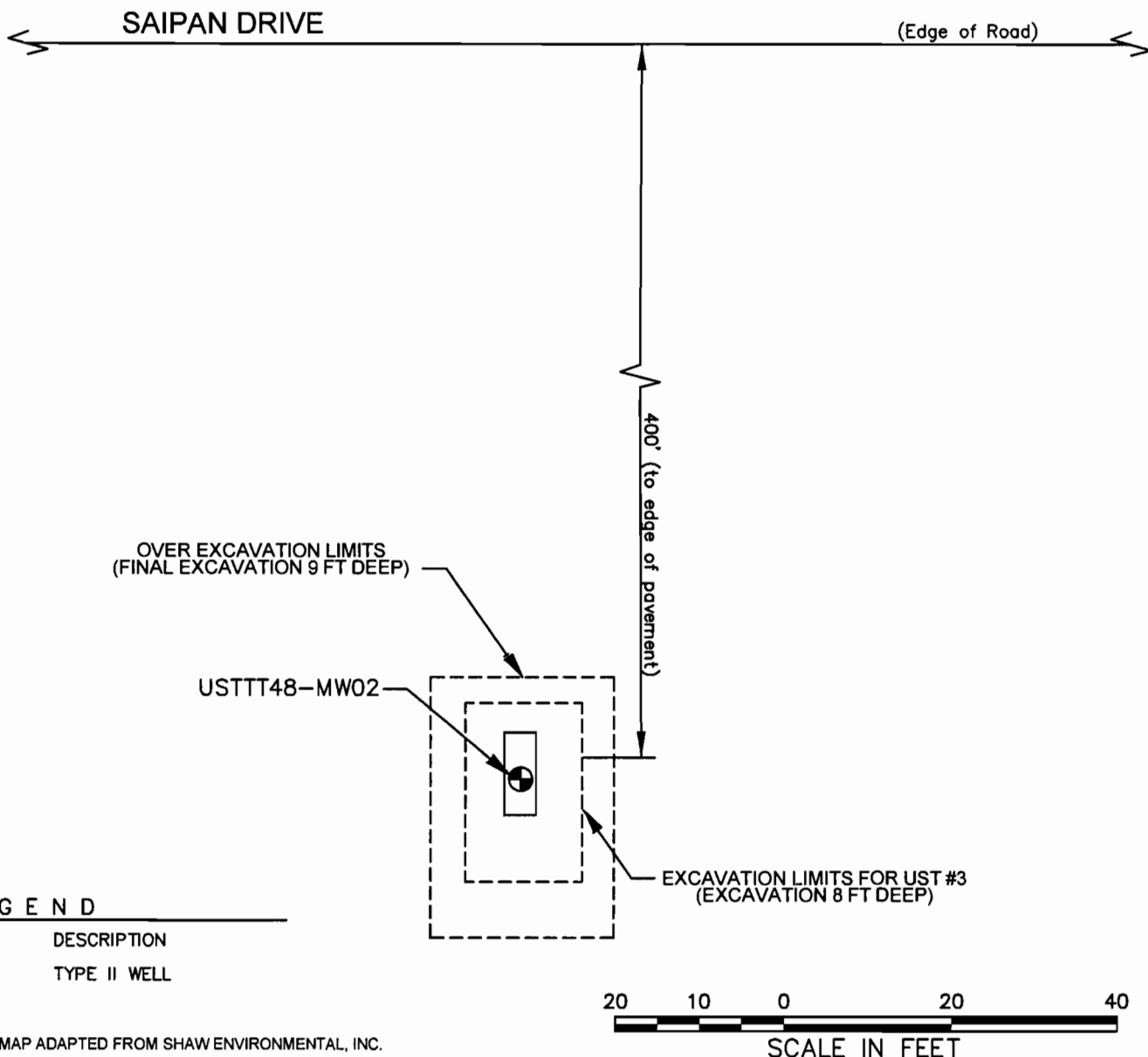
CAELIN ENGINEERS and SCIENTISTS WILMINGTON, NORTH CAROLINA	PROJECT BUILDING TT-48 UST #1 & #3 PHASE 1 LIMITED SITE ASSESSMENT MCB CAMP LEJEUNE, N.C.		TITLE TT-48 UST #1 SITE PLAN WITH GROUNDWATER ANALYSIS RESULTS - MADEP VPH/EPH AS COMPARED TO NCDENR 2L GWQS		FIGURE 5A
	JOB NO: 205-077	DATE: APR 2007	SCALE: 1"=20'	DRAWN BY: KAWS CHECKED BY: JAC	



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

Well ID	Hydrocarbon Fraction of Concern		C5-C8 Aliphatics	C9-C18 Aliphatics	C19-C36 Aliphatics	C9-C22 Aromatics
	Sample ID	Date Collected				
GCL 2L GWQS			NE 420	NE 4,200	NE 42,000	NE 210
USTTT48-MW-02	USTTT48-MW-02	2/16/2007	<100	13,000	<1,000	8,200

All results in micrograms per Liter (ug/L).
NE - None Established
Shaded concentrations exceed 2L GWQS.



 ENGINEERS and SCIENTISTS WILMINGTON, NORTH CAROLINA	PROJECT BUILDING TT-48 UST #1 & #3 PHASE 1 LIMITED SITE ASSESSMENT MCB CAMP LEJEUNE, N.C.	TITLE TT-48 UST #3 SITE PLAN WITH GROUNDWATER ANALYSIS RESULTS - MADEP VPH/EPH AS COMPARED TO NCDENR 2L GWQS		FIGURE 5B
	JOB NO: 205-077	DATE: APR 2007	SCALE: 1"=20'	DRAWN BY: KAWS

APPENDICES

APPENDIX A

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

BORING LOG

CATLIN
ENGINEERS and SCIENTISTS
205-077
Wilmington, NC

SHEET 1 OF 1

PROJECT NO.: 205-077	STATE: NC	COUNTY: Onslow	LOCATION: Jacksonville
PROJECT NAME: Building TT-48 UST#1 and #3	LOGGED BY: T. Stetler	WELL ID: USTTT48-MW01	
	DRILLER: William J. Miller		
NORTHING: 3,846,307.6	EASTING: 282,278.1	CREW: A. Chance	
SYSTEM: UTM NAD83 (m)	BORING LOCATION: Former TT-48 UST #1	LAND ELEV.: NM	
DRILL MACHINE: CME 45B ATV	METHOD: HSA	0 HOUR DTW: 6.2	BORING DEPTH: 13.0
START DATE: 2/13/07	FINISH DATE: 2/13/07	24 HOUR DTW: 7.5	ROCK DEPTH: --

DEPTH	BLOW COUNT	REC.	OVA RESULTS (ppm)	LAB.	USCS	LOG	DEPTH	SOIL AND ROCK DESCRIPTION	ELEVATION
	0.5 0.5 0.5 0.5		0 1000 2000 3000 4000				0.0	LAND SURFACE	
					CL		2.0	1+ top layer crushed rock for parking area. Fill- Brown silty to very fine SANDY CLAY. Med plasticity. No HCO. From auger cuttings.	
3.0	3 3 5 10	WET	▲0.0		CL		4.0	S.A.A. Orange-brown to brown SANDY CLAY.	
5.0					SM		5.0	Brown to gray fine to very fine SILTY SAND. No HCO. Med dense. Wet at ~5' BLS.	
8.0	1 1 1 2	WET	▲0.0		CH		8.0	Dark gray high plasticity CLAY w/ trace rotten wood frag. (up to 0.5" in diameter). Moist to wet. No HCO.	
10.0							10.0		
11.0	0 0 1 2	SAT	▲0.0		CL		11.0	Dark brown SANDY CLAY w/ trace wood. Saturated.	
13.0							13.0	Boring Terminated at Depth 13.0 ft Dark brown SANDY CLAY. Saturated.	

▽ = 0hr. DTW

▼ = 24hr. DTW

CATLIN ENVIRO LOG 2 205-077 TT-48.GPJ CATLIN.GDT 3/21/07

WELL LOG

CATLIN
ENGINEERS and SCIENTISTS
205-077
Wilmington, NC

SHEET 1 OF 1

PROJECT NO.: 205-077	STATE: NC	COUNTY: Onslow	LOCATION: Jacksonville
PROJECT NAME: Building TT-48 UST#1 and #3	LOGGED BY: T. Stetler	WELL ID: USTTT48-MW01	
	DRILLER: William J. Miller		
NORTHING: 3846307.6	EASTING: 282278.1	CREW: A. Chance	
SYSTEM: UTM NAD83 (m)	BORING LOCATION: Former TT-48 UST #1	T.O.C. ELEV.: 24.76	
DRILL MACHINE: CME 45B ATV	METHOD: HSA	0 HOUR DTW: 6.2	TOTAL DEPTH: 13.0
START DATE: 2/13/07	FINISH DATE: 2/13/07	24 HOUR DTW: 7.5	WELL DEPTH: 13.5

DEPTH	BLOW COUNT				OVA (ppm)	LAB.	USCS	LOG	DEPTH	SOIL AND ROCK DESCRIPTION	ELEVATION	WELL DETAIL
6in	6in	6in	6in									
									0.0	LAND SURFACE	24.8	0.0
							CL		2.0	1+ top layer crushed rock for parking area. Fill- Brown silty to very fine SANDY CLAY. Med plasticity. No HCO. From auger cuttings.	22.8	0.5
									3.0		21.8	1.5
3.0							CL		4.0	S.A.A. Orange-brown to brown SANDY CLAY.	20.8	3.5
	3	3	5	10	0.0		SM		5.0	Brown to gray fine to very fine SILTY SAND. No HCO. Med dense. Wet at ~5' BLS.	19.8	
									8.0		16.8	
8.0							CH		10.0	Dark gray high plasticity CLAY w/ trace rotten wood frag. (up to 0.5" in diameter). Moist to wet. No HCO.	14.8	
									11.0		13.8	
11.0							CL		13.0	Dark brown SANDY CLAY w/ trace wood. Saturated.	11.8	
										Boring Terminated at Elevation 11.8 ft Grout and well shield to be installed, and/or well to be abandoned at a later date as allowed by site construction activities. Well location coincides with the location of a planned residential structure.	13.5	13.5

 Bentonite Pellets  #2 Medium Sand

CATLIN BORING LOG 205-077 TT-48 G.P.I. TEST G.D.T. 3/21/07

BORING LOG

CATLIN
ENGINEERS and SCIENTISTS
205-077
Wilmington, NC

SHEET 1 OF 1

PROJECT NO.: 205-077	STATE: NC	COUNTY: Onslow	LOCATION: Jacksonville
PROJECT NAME: Building TT-48 UST#1 and #3		LOGGED BY: T. Stetler	WELL ID: USTTT48
		DRILLER: William J. Miller	-MW02
NORTHING: 3,846,278.1	EASTING: 282,468.8	CREW: A. Chance	
SYSTEM: UTM NAD83 (m)	BORING LOCATION: Former TT-48 UST #3		LAND ELEV.: NM
DRILL MACHINE: CME 45B ATV	METHOD: HSA	0 HOUR DTW: 8.2	BORING DEPTH: 15.0
START DATE: 2/13/07	FINISH DATE: 2/13/07	24 HOUR DTW: 9.3	ROCK DEPTH: --

DEPTH	BLOW COUNT	REC.	OVA RESULTS (ppm)	LAB.	U S C S	LOG	DEPTH	SOIL AND ROCK DESCRIPTION	ELEVATION
	0.5 0.5 0.5 0.5		0 1000 2000 3000 4000				0.0	LAND SURFACE	
								Dirt surface- not up to grade.	
3.0	3 3 3 4	MOI	268.1		CL		3.0	Gray silty to very fine SANDY CLAY with trace orange-brown mottling (native). Moist. No HCO.	
5.0							5.0		
8.0	6 8 8 9	WET			SP		8.0	Gray to tan fine to very fine SAND. Wet. Strong HCO.	
10.0							10.0		
13.0	2 8 16 24	SAT			SP		13.0	S.A.A. but tan in color. Saturated. Strong HCO.	
15.0					SC/SM		14.0	Tan to gray SILTY to CLAYEY fine to very fine SAND. Dense. Wet. Strong HCO.	
							15.0	Boring Terminated at Depth 15.0 ft SILTY to CLAYEY fine to very fine SAND with strong HCO odor. Wet.	

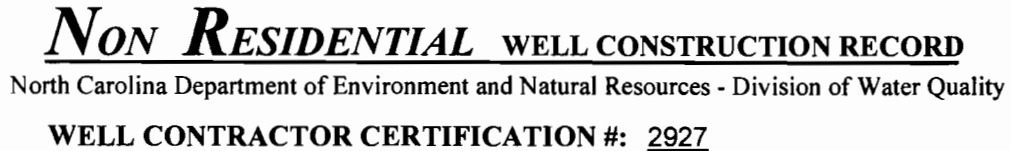
▽ = 0hr. DTW

▼ = 24hr. DTW

CATLIN ENVIRO. LOG 2 205-077 TT-48 GEL CATLIN.GDT 3/21/07

SHEET 1 OF 1

 Bentonite Pellets  #2 Medium Sand



d. TOP OF CASING IS 1 FT. Above Land Surface*
 * Top of casing terminated at/or below land surface requires
 a variance in accordance with 15A NCAC 2C.0118

e. YIELD (gpm): N/A METHOD OF TEST: N/A

f. DISINFECTION: Type N/A Amount: N/A

g. WATER ZONES(depth):
 From _____ To _____ From _____ To _____
 From _____ To _____ From _____ To _____
 From _____ To _____ From _____ To _____

6. CASING:

Depth	Diameter	Thickness/ Weight	Material
From <u>0</u> To <u>4</u> ft.	<u>2</u>	<u>Sch. 40</u>	<u>PVC</u>
From _____ To _____ ft.	_____	_____	_____
From _____ To _____ ft.	_____	_____	_____

7. GROUT:

Depth	Material	Method
From <u>0</u> To <u>1</u> Ft.	<u>Portland Cement</u>	<u>Surface Pour</u>
From <u>1</u> To <u>2.5</u> Ft.	<u>Bent. Pellets</u>	<u>Surface Pour</u>
From _____ To _____ Ft.	_____	_____

8. SCREEN:

Depth	Diameter	Slot Size	Material
From <u>4</u> To <u>14</u> Ft.	<u>2</u> in.	<u>Slot .010</u> in.	<u>PVC</u>
From _____ To _____ Ft.	_____ in.	_____ in.	_____
From _____ To _____ Ft.	_____ in.	_____ in.	_____

9. SAND/GRAVEL PACK:

Depth	Size	Material
From <u>2.5</u> To <u>14</u> Ft.	<u>#2 Medium</u>	<u>Torpedo Sand</u>
From _____ To _____ Ft.	_____	_____
From _____ To _____ Ft.	_____	_____

10. DRILLING LOG

From	To	Formation Description
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

SEE
ATTACHED

11. REMARKS:

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

SIGNATURE OF CERTIFIED WELL CONTRACTOR William J. Miller DATE 4/25/07

PRINTED NAME OF PERSON CONSTRUCTING THE WELL

APPENDIX B

CATLIN STANDARD METHODS OF INVESTIGATION

CATLIN STANDARD METHODS OF INVESTIGATION

(REVISED APRIL 2002)

1.0 DATA COLLECTION

1.1 BACKGROUND DATA

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

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

1.2 SURVEYS AND POTENTIAL RECEPTOR DATA

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

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

1.2.1 Horizontal Survey

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

1.2.2 Vertical Survey

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

1.3 DRILLING AND MONITORING WELL/PIEZOMETER INSTALLATION

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

1.3.1 Drilling Methods and Subsurface Data Collection

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

Auger Drilling

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

Hand Augering

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

Direct Push

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

Other Methods

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

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

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

1.3.2 Hydropunch Installation

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

1.3.3 Well Installation

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

1.3.4 Well Development

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

1.4 HYDROGEOLOGIC DATA COLLECTION

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

1.4.1 Regional Geology

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

1.4.2 Site Geology

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

1.4.3 Groundwater Occurrence and Characteristics

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

Well Water Levels

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

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

Aquifer Testing

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

Other Methods

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

1.5 PETROLEUM HYDROCARBON DATA COLLECTION

1.5.1 Collection Methods

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

Field Analysis

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

Laboratory Analysis

- Laboratory analysis of phase-separated products.

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

1.5.2 Field Sampling

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

Product Samples

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

Vapor Samples

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

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

Soil Samples

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

Groundwater Samples

Groundwater samples are collected in accordance with the following procedures:

- Creeks/Lakes/Etc.

Grab samples are obtained.

- Domestic Wells

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

- Monitoring Wells

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

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

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

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

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

Sampling records are field prepared.

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

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

2.0 DATA EVALUATION

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

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

APPENDIX C

SAMPLING FIELD DATA WORKSHEET

SAMPLING FIELD DATA WORKSHEET

**BUILDING TT-48 UST#1 and UST#3
PHASE I LIMITED SITE ASSESSMENT
MCB, CAMP LEJEUNE, NORTH CAROLINA**

Well No.	Date	Time Sampled	Diameter (in.)	Well Depth (feet)	DTW (feet)	Feet of Water in Well	Gal/Foot	One Volume (gals.)	Three Volumes (gals.)	Volume of Bailer (gals.)	No. Bails Required	No. Bails Taken
USTTT48-MW01	2/16/2007	1400	2	13.5	7.49	6.01	0.163	0.98	2.94	0.24	12.25	30
USTTT48-MW02	2/16/2007	1440	2	14	9.27	4.73	0.163	0.77	2.31	0.24	9.64	30

APPENDIX D

LABORATORY REPORTS
AND
CHAIN-OF-CUSTODY DOCUMENTATION



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

Report Number: G128-1899

Client Project: Bldg. TT-48 UST#1 & #3 Phase I LSA

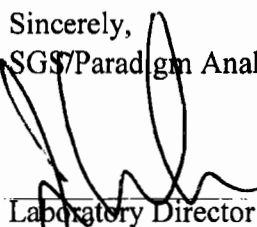
Dear Mr. Mason:

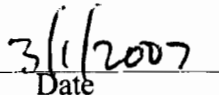
Enclosed are the results of the analytical services performed under the referenced project. The samples are certified to meet the requirements of the National Environmental Laboratory Accreditation Conference Standards. Copies of this report and supporting data will be retained in our files for a period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

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

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

Sincerely,
SGS/Paradigm Analytical Laboratories, Inc.


Laboratory Director
J. Patrick Weaver


Date

**Results for Volatiles**

by GC 602

Client Sample ID: UST TT48-MW01

Analyzed By: RSB

Client Project ID: Bldg. TT-48 UST#1 & #3 Phase I LSA

Date Collected: 2/16/2007 14:00

Lab Sample ID: G128-1899-1A

Date Received: 2/19/2007

Lab Project ID: G128-1899

Matrix: Water

Analyte	Result ug/L	RL ug/L	MDL ug/L	Dilution Factor	Date Analyzed	Flags
Benzene	BQL	1.00	0.183	1	2/26/2007	
Diisopropyl ether (DIPE)	BQL	1.00	0.229	1	2/26/2007	
Ethylbenzene	BQL	1.00	0.181	1	2/26/2007	
Methyl-tert butyl ether (MTBE)	BQL	2.00	0.359	1	2/26/2007	
Toluene	BQL	1.00	0.157	1	2/26/2007	
m/p-Xylene	BQL	2.00	0.481	1	2/26/2007	
o-Xylene	BQL	2.00	0.584	1	2/26/2007	

Surrogate Spike Recoveries

	Spike Added	Spike Result	Percent Recovery
Trifluorotoluene	40	39.6	99.1

Comments:

All values corrected for dilution.

BQL = Below quantitation limit.

**Results for Volatiles**

by GC 602

Client Sample ID: UST TT48-MW02

Analyzed By: RSB

Client Project ID: Bldg. TT-48 UST#1 & #3 Phase I LSA

Date Collected: 2/16/2007 14:40

Lab Sample ID: G128-1899-2A

Date Received: 2/19/2007

Lab Project ID: G128-1899

Matrix: Water

Analyte	Result ug/L	RL ug/L	MDL ug/L	Dilution Factor	Date Analyzed	Flags
Benzene	0.257	1.00	0.183	1	2/27/2007	J
Diisopropyl ether (DIPE)	BQL	1.00	0.229	1	2/27/2007	
Ethylbenzene	61.3	4.00	0.724	4	2/26/2007	
Methyl-tert butyl ether (MTBE)	BQL	2.00	0.359	1	2/27/2007	
Toluene	BQL	1.00	0.157	1	2/27/2007	
m/p-Xylene	1.13	2.00	0.481	1	2/27/2007	J
o-Xylene	BQL	2.00	0.584	1	2/27/2007	

Surrogate Spike Recoveries

	Spike Added	Spike Result	Percent Recovery
Trifluorotoluene	40	41.8	104

Comments:

All values corrected for dilution.

BQL = Below quantitation limit.

**Results for Volatiles**

by GC 602

Client Sample ID: Method Blank

Analyzed By: RSB

Client Project ID:

Date Collected:

Lab Sample ID: VBLK1022607A

Date Received:

Lab Project ID:

Matrix: Water

Analyte	Result ug/L	RL ug/L	MDL ug/L	Dilution Factor	Date Analyzed	Flags
Benzene	BQL	1.00	0.183	1	2/26/2007	
Diisopropyl ether (DIPE)	BQL	1.00	0.229	1	2/26/2007	
Ethylbenzene	BQL	1.00	0.181	1	2/26/2007	
Methyl-tert butyl ether (MTBE)	BQL	2.00	0.359	1	2/26/2007	
Toluene	BQL	1.00	0.157	1	2/26/2007	
m/p-Xylene	BQL	2.00	0.481	1	2/26/2007	
o-Xylene	BQL	2.00	0.584	1	2/26/2007	

Surrogate Spike Recoveries

	Spike Added	Spike Result	Percent Recovery
Trifluorotoluene	40	39.9	99.7

Comments:

All values corrected for dilution.

BQL = Below quantitation limit.



Summary Results for Laboratory Control Spike

Method: 602

Filename: 022607/004R

Compound	SA	Result	Rec	LCS Limits	
	ug/L	ug/L	(%)	Lower	Upper
Benzene	10.0	10.7	107.5	39	150
Chlorobenzene	10.0	10.6	106.2	55	135
1,2-Dichlorobenzene	20.0	22.1	110.6	37	154
1,3-Dichlorobenzene	10.0	10.8	108.1	50	141
1,4-Dichlorobenzene	20.0	21.8	108.9	42	143
Diisopropyl ether	10.0	10.0	100.2	30	170
Ethylbenzene	10.0	11.0	110.1	32	160
MTBE	20.0	20.8	104.0	35	165
Toluene	10.0	10.9	108.6	46	148
m,p-Xylene	20.0	21.9	109.5	0	239
o-Xylene	20.0	21.9	109.7	36	164

Flags :

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



Summary Results for Laboratory Control Spike

Method: 602

Filename: 022607/005R

Compound	SA	Result	Rec	LCS Limits	
	ug/L	ug/L	(%)	Lower	Upper
Benzene	10.0	10.4	104.2	39	150
Chlorobenzene	10.0	10.1	101.0	55	135
1,2-Dichlorobenzene	20.0	20.4	102.0	37	154
1,3-Dichlorobenzene	10.0	10.2	101.9	50	141
1,4-Dichlorobenzene	20.0	20.7	103.5	42	143
• Diisopropyl ether	10.0	9.1	90.7	30	170
Ethylbenzene	10.0	10.6	105.5	32	160
• MTBE	20.0	19.3	96.6	35	165
Toluene	10.0	10.4	104.3	46	148
• m,p-Xylene	20.0	21.0	105.1	0	239
• o-Xylene	20.0	20.8	104.2	36	164

Flags :

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



Summary Results for MS-MSD

Sample : 022607/017F::022607/017R

MS : 022607/019F::022607/019R

MSD : 022607/020F::022607/020R

GC1

Compound	SA	µg/L			REC(%)		REC Limits	
		Sam.	MS	MSD	MS	MSD	Lower	Upper
Benzene	10.0	13.6	11.1	10.7	111	111	39	150
Chlorobenzene	10.0	ND	10.2	9.8	102	102	55	135
1,2-Dichlorobenzene	20.0	1.6	20.8	19.6	104	104	37	154
1,3-Dichlorobenzene	10.0	ND	10.5	9.9	105	105	50	141
1,4-Dichlorobenzene	20.0	ND	19.3	18.3	96	96	42	143
• Diisopropyl ether	10.0	ND	11.0	10.4	110	110	30	170
Ethylbenzene	10.0	16.1	11.3	10.8	113	113	32	160
• MTBE	20.0	121.1	18.7	19.9	94	94	35	165
Toluene	10.0	1.0	11.1	10.6	111	111	46	148
• m,p-Xylene	20.0	47.3	21.5	20.2	107	107	D	239
• o-Xylene	20.0	21.3	21.6	20.5	108	108	36	164

Flags :

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

**Results for Volatiles**

by GC 602

Client Sample ID: Method Blank

Analyzed By: RSB

Client Project ID:

Date Collected:

Lab Sample ID: VBLK1022607B

Date Received:

Lab Project ID:

Matrix: Water

Analyte	Result ug/L	RL ug/L	MDL ug/L	Dilution Factor	Date Analyzed	Flags
Benzene	BQL	1.00	0.183	1	2/26/2007	
Diisopropyl ether (DIPE)	BQL	1.00	0.229	1	2/26/2007	
Ethylbenzene	BQL	1.00	0.181	1	2/26/2007	
Methyl-tert butyl ether (MTBE)	BQL	2.00	0.359	1	2/26/2007	
Toluene	BQL	1.00	0.157	1	2/26/2007	
m/p-Xylene	BQL	2.00	0.481	1	2/26/2007	
o-Xylene	BQL	2.00	0.584	1	2/26/2007	

Surrogate Spike Recoveries

	Spike Added	Spike Result	Percent Recovery
Trifluorotoluene	40	40.4	101

Comments:

All values corrected for dilution.

BQL = Below quantitation limit.



Summary Results for Laboratory Control Spike

Method: 602

Filename : 022607/022R

Compound	SA	Result	Rec	LCS Limits	
	ug/L	ug/L	(%)	Lower	Upper
Benzene	10.0	10.7	107.1	39	150
Chlorobenzene	10.0	10.4	103.9	55	135
1,2-Dichlorobenzene	20.0	21.3	106.5	37	154
1,3-Dichlorobenzene	10.0	10.5	104.9	50	141
1,4-Dichlorobenzene	20.0	21.1	105.6	42	143
• Diisopropyl ether	10.0	9.7	97.2	30	170
Ethylbenzene	10.0	10.9	109.2	32	160
• MTBE	20.0	20.1	100.6	35	165
Toluene	10.0	10.8	107.8	46	148
• m,p-Xylene	20.0	22.0	110.1	0	239
• o-Xylene	20.0	21.7	108.7	36	164

Flags :

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

Summary Results for Laboratory Control Spike

Method: 602

EC1

Filename : 022607/023R

Compound	SA	Result	Rec	LCS Limits	
	ug/L	ug/L	(%)	Lower	Upper
Benzene	10.0	10.6	106.4	39	150
Chlorobenzene	10.0	10.3	102.8	55	135
1,2-Dichlorobenzene	20.0	21.0	105.0	37	154
1,3-Dichlorobenzene	10.0	10.4	103.8	50	141
1,4-Dichlorobenzene	20.0	20.8	103.9	42	143
• Diisopropyl ether	10.0	9.7	96.8	30	170
Ethylbenzene	10.0	10.7	107.5	32	160
• MTBE	20.0	20.2	100.8	35	165
Toluene	10.0	10.6	106.2	46	148
• m,p-Xylene	20.0	21.5	107.6	0	239
• o-Xylene	20.0	21.4	106.9	36	164

Flags :

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



Summary Results for MS-MSD

Sample : 022607/034F::022607/034R

MS : 022607/036F::022607/036R

MSD : 022607/037F::022607/037R

GCI

GC1		µg/L			REC(%)		REC Limits	
Compound	SA	Sam.	MS	MSD	MS	MSD	Lower	Upper
Benzene	10.0	ND	11.8	10.7	118	118	39	150
Chlorobenzene	10.0	ND	11.1	10.1	111	111	55	135
1,2-Dichlorobenzene	20.0	ND	22.7	20.8	114	114	37	154
1,3-Dichlorobenzene	10.0	ND	11.3	10.3	113	113	50	141
1,4-Dichlorobenzene	20.0	5.1	15.7	13.9	79	79	42	143
• Diisopropyl ether	10.0	ND	10.5	9.5	105	105	30	170
Ethylbenzene	10.0	16.3	11.6	10.9	116	116	32	160
• MTBE	20.0	ND	21.8	19.8	109	109	35	165
Toluene	10.0	ND	11.6	10.6	116	116	46	148
• m,p-Xylene	20.0	76.8	19.8	19.0	99	99	D	239
• o-Xylene	20.0	ND	23.4	20.9	117	117	36	164

Flags :

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

**Results for Semivolatiles
by GCMS 625**

Client Sample ID: UST TT48-MW01
Client Project ID: Bldg. TT-48 UST#1 & #3 Phase I LSA
Lab Sample ID: G128-1899-1H
Lab Project ID: G128-1899

Analyzed By: EAW
Date Collected: 2/16/2007 14:00
Date Received: 2/19/2007
Date Extracted: 2/21/2007
Matrix: Water

Compound	Result ug/L	RL ug/L	MDL ug/L	Dilution Factor	Date Analyzed	Flag
Acenaphthene	BQL	10.0	1.22	1	2/23/2007	
Acenaphthylene	BQL	10.0	1.12	1	2/23/2007	
Anthracene	BQL	10.0	1.75	1	2/23/2007	
Benzo[a]anthracene	BQL	10.0	1.36	1	2/23/2007	
Benzo[a]pyrene	BQL	10.0	1.27	1	2/23/2007	
Benzo[b]fluoranthene	BQL	10.0	1.43	1	2/23/2007	
Benzo[g,h,i]perylene	BQL	10.0	4.57	1	2/23/2007	
Benzo[k]fluoranthene	BQL	10.0	1.09	1	2/23/2007	
Bis(2-chloroethoxy)methane	BQL	10.0	1.11	1	2/23/2007	
Bis(2-chloroethyl)ether	BQL	10.0	1.09	1	2/23/2007	
Bis(2-chloroisopropyl)ether	BQL	10.0	1.57	1	2/23/2007	
Bis(2-ethylhexyl)phthalate	BQL	10.0	1.33	1	2/23/2007	
4-bromophenyl phenyl ether	BQL	10.0	1.99	1	2/23/2007	
Butylbenzylphthalate	BQL	10.0	1.53	1	2/23/2007	
2-Chloronaphthalene	BQL	10.0	1.25	1	2/23/2007	
2-Chlorophenol	BQL	10.0	4.22	1	2/23/2007	
4-Chloro-3-methylphenol	BQL	10.0	3.26	1	2/23/2007	
4-Chlorophenyl phenyl ether	BQL	10.0	1.42	1	2/23/2007	
Chrysene	BQL	10.0	1.11	1	2/23/2007	
Dibenzo[a,h]anthracene	BQL	10.0	4.87	1	2/23/2007	
Di-n-Butylphthalate	1.80	10.0	1.65	1	2/23/2007	J
1,2-Dichlorobenzene	BQL	10.0	1.25	1	2/23/2007	
1,3-Dichlorobenzene	BQL	10.0	1.24	1	2/23/2007	
1,4-Dichlorobenzene	BQL	10.0	1.20	1	2/23/2007	
3,3'-Dichlorobenzidine	BQL	20.0	4.10	1	2/23/2007	
2,4-Dichlorophenol	BQL	10.0	3.75	1	2/23/2007	
Diethylphthalate	BQL	10.0	1.48	1	2/23/2007	
Dimethylphthalate	BQL	10.0	1.04	1	2/23/2007	
2,4-Dimethylphenol	BQL	10.0	9.25	1	2/23/2007	
Di-n-octylphthalate	BQL	10.0	1.16	1	2/23/2007	
4,6-Dinitro-2-methylphenol	BQL	50.0	3.71	1	2/23/2007	
2,4-Dinitrophenol	BQL	50.0	4.20	1	2/23/2007	
2,4-Dinitrotoluene	BQL	10.0	1.52	1	2/23/2007	
2,6-Dinitrotoluene	BQL	10.0	1.41	1	2/23/2007	
Diphenylamine *	BQL	10.0	1.53	1	2/23/2007	
Fluoranthene	BQL	10.0	1.41	1	2/23/2007	
Fluorene	BQL	10.0	1.22	1	2/23/2007	
Hexachlorobenzene	BQL	10.0	1.22	1	2/23/2007	
Hexachlorobutadiene	BQL	10.0	1.58	1	2/23/2007	
Hexachlorocyclopentadiene	BQL	20.0	20.0	1	2/23/2007	
Hexachloroethane	BQL	10.0	1.58	1	2/23/2007	
Indeno(1,2,3-c,d)pyrene	BQL	10.0	4.57	1	2/23/2007	
Isophorone	BQL	10.0	1.27	1	2/23/2007	
Naphthalene	BQL	10.0	1.08	1	2/23/2007	

**Results for Semivolatiles
by GCMS 625**

Client Sample ID: UST TT48-MW01
Client Project ID: Bldg. TT-48 UST#1 & #3 Phase I LSA
Lab Sample ID: G128-1899-1H
Lab Project ID: G128-1899

Analyzed By: EAW
Date Collected: 2/16/2007 14:00
Date Received: 2/19/2007
Date Extracted: 2/21/2007
Matrix: Water

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

	Spike Added	Spike Result	Percent Recovered
2-Fluorobiphenyl	10	7	70
2-Fluorophenol	10	6.7	67
Nitrobenzene-d5	10	7.3	73
Phenol-d6	10	7.1	71
2,4,6-Tribromophenol	10	8.5	85
4-Terphenyl-d14	10	7.8	78

Comments:

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

Flags:

BQL = Below Quantitation Limits.

J = Detected below the quantitation limit.

Reviewed By: lma

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

Client Sample ID: UST TT48-MW01

Analyzed By: EAW

Client Project ID: Bldg. TT-48 UST#1 & #3 Phase I LSA Date Collected: 2/16/2007 14:00

Lab Sample ID: G128-1899-1H

Date Received: 2/19/2007

Lab Project ID: G128-1899

Date Extracted: 2/21/2007

Sample Wt/Vol: 500 ML

Date Analyzed: 2/23/2007

Dilution: 1

Matrix: Water

No.	Compound	Retention Time	CAS#	Match Probability	Result (ug/L)
1	Unknown	10.38			29.2
2	Unknown	11.69			13.4
3	Sulfur, mol. (S8)	15.43	010544-50-0	86	7.84
4	Unknown	5.62			4.54
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: lmu

**Results for Semivolatiles
by GCMS 625**

Client Sample ID: UST TT48-MW02
Client Project ID: Bldg. TT-48 UST#1 & #3 Phase I LSA
Lab Sample ID: G128-1899-2H
Lab Project ID: G128-1899

Analyzed By: EAW
Date Collected: 2/16/2007 14:40
Date Received: 2/19/2007
Date Extracted: 2/21/2007
Matrix: Water

Compound	Result ug/L	RL ug/L	MDL ug/L	Dilution Factor	Date Analyzed	Flag
Acenaphthene	BQL	100	12.2	10	2/23/2007	
Acenaphthylene	BQL	100	11.2	10	2/23/2007	
Anthracene	BQL	100	17.5	10	2/23/2007	
Benzo[a]anthracene	BQL	100	13.6	10	2/23/2007	
Benzo[a]pyrene	BQL	100	12.7	10	2/23/2007	
Benzo[b]fluoranthene	BQL	100	14.3	10	2/23/2007	
Benzo[g,h,i]perylene	BQL	100	45.7	10	2/23/2007	
Benzo[k]fluoranthene	BQL	100	10.9	10	2/23/2007	
Bis(2-chloroethoxy)methane	BQL	100	11.1	10	2/23/2007	
Bis(2-chloroethyl)ether	BQL	100	10.9	10	2/23/2007	
Bis(2-chloroisopropyl)ether	BQL	100	15.7	10	2/23/2007	
Bis(2-ethylhexyl)phthalate	BQL	100	13.3	10	2/23/2007	
4-bromophenyl phenyl ether	BQL	100	19.9	10	2/23/2007	
Butylbenzylphthalate	BQL	100	15.3	10	2/23/2007	
2-Chloronaphthalene	BQL	100	12.5	10	2/23/2007	
2-Chlorophenol	BQL	100	42.2	10	2/23/2007	
4-Chloro-3-methylphenol	BQL	100	32.6	10	2/23/2007	
4-Chlorophenyl phenyl ether	BQL	100	14.2	10	2/23/2007	
Chrysene	BQL	100	11.1	10	2/23/2007	
Dibenzo[a,h]anthracene	BQL	100	48.7	10	2/23/2007	
Di-n-Butylphthalate	BQL	100	16.5	10	2/23/2007	
1,2-Dichlorobenzene	BQL	100	12.5	10	2/23/2007	
1,3-Dichlorobenzene	BQL	100	12.4	10	2/23/2007	
1,4-Dichlorobenzene	BQL	100	12.0	10	2/23/2007	
3,3'-Dichlorobenzidine	BQL	200	41.0	10	2/23/2007	
2,4-Dichlorophenol	BQL	100	37.5	10	2/23/2007	
Diethylphthalate	BQL	100	14.8	10	2/23/2007	
Dimethylphthalate	BQL	100	10.4	10	2/23/2007	
2,4-Dimethylphenol	BQL	100	92.5	10	2/23/2007	
Di-n-octylphthalate	BQL	100	11.6	10	2/23/2007	
4,6-Dinitro-2-methylphenol	BQL	500	37.1	10	2/23/2007	
2,4-Dinitrophenol	BQL	500	42.0	10	2/23/2007	
2,4-Dinitrotoluene	BQL	100	15.2	10	2/23/2007	
2,6-Dinitrotoluene	BQL	100	14.1	10	2/23/2007	
Diphenylamine *	BQL	100	15.3	10	2/23/2007	
Fluoranthene	BQL	100	14.1	10	2/23/2007	
Fluorene	55.0	100	12.2	10	2/23/2007	J
Hexachlorobenzene	BQL	100	12.2	10	2/23/2007	
Hexachlorobutadiene	BQL	100	15.8	10	2/23/2007	
Hexachlorocyclopentadiene	BQL	200	200	10	2/23/2007	
Hexachloroethane	BQL	100	15.8	10	2/23/2007	
Indeno(1,2,3-c,d)pyrene	BQL	100	45.7	10	2/23/2007	
Isophorone	BQL	100	12.7	10	2/23/2007	
Naphthalene	462	100	10.8	10	2/23/2007	

**Results for Semivolatiles
by GCMS 625**

Client Sample ID: UST TT48-MW02
Client Project ID: Bldg. TT-48 UST#1 & #3 Phase I LSA
Lab Sample ID: G128-1899-2H
Lab Project ID: G128-1899

Analyzed By: EAW
Date Collected: 2/16/2007 14:40
Date Received: 2/19/2007
Date Extracted: 2/21/2007
Matrix: Water

Compound	Result ug/L	RL ug/L	MDL ug/L	Dilution Factor	Date Analyzed	Flag
Nitrobenzene	BQL	100	13.2	10	2/23/2007	
2-Nitrophenol	BQL	100	35.2	10	2/23/2007	
4-Nitrophenol	BQL	500	31.7	10	2/23/2007	
N-Nitrosodi-n-propylamine	BQL	100	18.7	10	2/23/2007	
Pentachlorophenol	BQL	500	28.3	10	2/23/2007	
Phenanthrene	119	100	13.8	10	2/23/2007	
Phenol	BQL	100	33.8	10	2/23/2007	
Pyrene	BQL	100	20.8	10	2/23/2007	
1,2,4-Trichlorobenzene	BQL	100	13.3	10	2/23/2007	
2,4,6-Trichlorophenol	BQL	100	29.2	10	2/23/2007	

	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:

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

Flags:

BQL = Below Quantitation Limits.

J = Detected below the quantitation limit.

NA = Not Applicable, surrogate diluted out

Reviewed By: EW

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

Client Sample ID: UST TT48-MW02

Analyzed By: EAW

Client Project ID: Bldg. TT-48 UST#1 & #3 Phase I LSA Date Collected: 2/16/2007 14:40

Lab Sample ID: G128-1899-2H

Date Received: 2/19/2007

Lab Project ID: G128-1899

Date Extracted: 2/21/2007

Sample Wt/Vol: 500 ML

Date Analyzed: 2/23/2007

Dilution: 10

Matrix: Water

No.	Compound	Retention Time	CAS#	Match Probability	Result (ug/L)
1	Pentadecane, 2,6,10,14-tetramethyl-	12.75	001921-70-6	98	1020
2	Naphthalene, 1,3-dimethyl-	10.60	000575-41-7	97	559
3	Alkane, Unknown	12.32			504
4	Dodecane, 2,6,10-trimethyl-	10.83	003891-98-3	91	465
5	Naphthalene, 2,3-dimethyl-	10.77	000581-40-8	96	341
6	Naphthalene, 1-ethyl-	10.37	001127-76-0	95	315
7	Naphthalene, 1,6,7-trimethyl-	11.66	002245-38-7	97	312
8	Alkane, Unknown	9.13			282
9	Naphthalene, 2-(1-methylethyl)-	11.33	002027-17-0	96	282
10	Naphthalene, 2,6-dimethyl-	10.47	000581-42-0	98	262

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: RML

**Results for Semivolatiles
by GCMS 625**

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

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

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

**Results for Semivolatiles
by GCMS 625**

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

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

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

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

Comments:

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

Flags:

BQL = Below Quantitation Limits.

J = Detected below the quantitation limit.

Reviewed By: RM



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

Client Sample ID: Batch QC

Date Collected:

Client Project ID:

Date Received:

Lab Sample ID: Batch-7403-MS/MSD/LCS

Date Extracted: 02/23/07

Lab Project ID: G537-293-29

Date Analyzed: 02/25/07

Matrix: WATER

Analyzed By: EAW

Prep Method: 3520

Dilution: 10

	Sample Amount (µg/L)	MS Spike (µg/L)	MS Conc. (µg/L)	MS Spike % Rec.	MSD Spike (µg/L)	MSD Conc. (µg/L)	MSD Conc. % Rec.	RPD	QC Limits	
									RPD	% Rec.
Acenaphthylene	BQL	1000	1120	112	1000	1200	120*	6.90	30	62.0-119
4-Chloro-3-methylphenol	BQL	1000	670	67	1000	690	69.0	2.94	30	67.0-109
2-Chlorophenol	BQL	1000	770	77	1000	810	81.0	5.06	30	59.0-95.0
1,4-Dichlorobenzene	BQL	1000	840	84	1000	890	89*	5.78	30	29.0-86.0
2,4-Dinitrotoluene	BQL	1000	940	94	1000	1080	108*	13.9	30	63.0-103
N-Nitrosodi-n-propylamine	BQL	1000	1280	128*	1000	1350	135*	5.32	30	67.0-107
4-Nitrophenol	BQL	1000	2000	200*	1000	5000	500*	85.7*	30	49.0-146
Pentachlorophenol	BQL	1000	650	65	1000	740	74.0	12.9	30	43.0-106
Phenol	BQL	1000	710	71	1000	780	78.0	9.40	30	61.0-100
Pyrene	BQL	1000	1240	124*	1000	1380	138*	10.7	30	41.0-123
1,2,4-Trichlorobenzene	BQL	1000	1040	104*	1000	1130	113*	8.29	30	41.0-96.0

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

Comments:

Concentrations reflect the spiked sample amounts.

Flags:

* = Out of limits.

NA = Not applicable.

Reviewed By: fm

**VPH (Aliphatics/Aromatics) Laboratory Reporting Form**Client Name: Richard Catlin & AssociatesProject Name: Bldg. TT-48 UST#1 & #3 Phase I LSA

Sample Information and Analytical Results	
Sample Identification	UST TT48-MW01
Sample Matrix	Water
Collection Option (for Soil)*	
Date Collected	02/16/07
Date Received	02/19/07
Date Extracted	02/20/07
Date Analyzed	02/20/07
Dry Weight	
Dilution Factor	1
C ₅ -C ₈ Aliphatics**	< 100 (µg/L)
C ₉ -C ₁₂ Aliphatics**	< 100 (µg/L)
C ₉ -C ₁₀ Aromatics**	< 100 (µg/L)
Surrogate % Recovery - PID	100
Surrogate % Recovery - FID	99

* = Option 1 = Established fill line on vial, Option 2 = Sampling Device/Brand, or Option 3 = Field weight of soil.

** = Excludes any surrogates or internal standards.

Lab Info: g128-1899-1b

Reviewed By: km

**VPH (Aliphatics/Aromatics) Laboratory Reporting Form**Client Name: Richard Catlin & AssociatesProject Name: Bldg. TT-48 UST#1 & #3 Phase I LSA

Sample Information and Analytical Results	
Sample Identification	UST TT48-MW02
Sample Matrix	Water
Collection Option (for Soil)*	
Date Collected	02/16/07
Date Received	02/19/07
Date Extracted	02/19/07
Date Analyzed	02/19/07
Dry Weight	
Dilution Factor	1
C ₅ -C ₈ Aliphatics**	< 100 (µg/L)
C ₉ -C ₁₂ Aliphatics**	1000 (µg/L)
C ₉ -C ₁₀ Aromatics**	500 (µg/L)
Surrogate % Recovery - PID	110
Surrogate % Recovery - FID	120

* = Option 1 = Established fill line on vial, Option 2 = Sampling Device/Brand, or Option 3 = Field weight of soil.

** = Excludes any surrogates or internal standards.

Lab Info: g128-1899-2b

Reviewed By: Am

**VPH (Aliphatics/Aromatics) Laboratory Reporting Form**Client Name: Richard Catlin & AssociatesProject Name: Bldg. TT-48 UST#1 & #3 Phase I LSA

Sample Information and Analytical Results	
Sample Identification	TRIP BLANK
Sample Matrix	Water
Collection Option (for Soil)*	
Date Collected	01/00/00
Date Received	02/19/07
Date Extracted	02/19/07
Date Analyzed	02/19/07
Dry Weight	
Dilution Factor	1
C ₅ -C ₈ Aliphatics**	< 100 (µg/L)
C ₉ -C ₁₂ Aliphatics**	< 100 (µg/L)
C ₉ -C ₁₀ Aromatics**	< 100 (µg/L)
Surrogate % Recovery - PID	97
Surrogate % Recovery - FID	94

* = Option 1 = Established fill line on vial, Option 2 = Sampling Device/Brand, or Option 3 = Field weight of soil.

** = Excludes any surrogates or internal standards.

Lab Info: g128-1899-3b

Reviewed By: fw

Attachment 2

VPH Laboratory Reporting Form

Calibration and QA/QC Information

FID Initial Calibration Date: 01/03/07 PID Initial Calibration Date: 01/03/07

Calibration Ranges and Limits

Range	MDL (07/15/2004) (µg/L)	ML (µg/L)	RL (µg/L) (mg/Kg)	
C ₅ -C ₈ Aliphatics	4.4	14	100	10
C ₉ -C ₁₂ Aliphatics	3.4	11	100	10
C ₉ -C ₁₀ Aromatics	0.13	0.41	100	10

Calibration Concentration Levels

Range	Levels (µg/L)	%RSD or CCC	Method of Quantitation
C ₅ -C ₈ Aliphatics	40	9.7	Calibration Factor
	1000		
	2000		
	3000		
	4000		
C ₉ -C ₁₂ Aliphatics	10	15.00	Calibration Factor
	250		
	500		
	750		
	1000		
C ₉ -C ₁₀ Aromatics	10	23.10	Calibration Factor
	250		
	500		
	750		
	1000		

Calibration Check Date: 02/20/07

Calibration Check

Range	Levels (µg/L) (mg/Kg)		RPD
C ₅ -C ₈ Aliphatics	2000	200	15.0
C ₉ -C ₁₂ Aliphatics	500	50	2.2
C ₉ -C ₁₀ Aromatics	500	50	0.4

MDL = Method Detection Limit

ML = Minimum Limit

RL = Reportable Limit

RPD = Relative Percent Difference

%RSD = Percent Relative Standard Deviation

CCC = Correlation Coefficient of Curve

**EPH (Aliphatics/Aromatics) Results**

by MDEP-EPH

Client Name: Richard Catlin & AssociatesProject Name: Bldg. TT-48 UST#1 & #3 Phase I LSA

Sample Information and Analytical Results	
Sample Identification	UST TT48-MW01
Sample Matrix	Water
Date Collected	02/16/07
Date Received	02/19/07
Date Extracted	02/22/07
Date Analyzed	02/27/07
Dry Weight	
Dilution Factor	1:1
C ₉ -C ₁₈ Aliphatics*	< 100 (ug/L)
C ₁₉ -C ₃₆ Aliphatics*	< 100 (ug/L)
C ₁₁ -C ₂₂ Aromatics*	520 (ug/L)
Aliphatic Surrogate % Recovery	32
Aromatic Surrogate % Recovery	100
Fractionation Surrogate 1 % Recovery	94

Comments:

* = Excludes any surrogates or internal standards.

Duplicate analysis confirms low surrogates.

Lab info: G128-1899-1J

Reviewed By: fm

**EPH (Aliphatics/Aromatics) Results**

by MDEP-EPH

Client Name: Richard Catlin & AssociatesProject Name: Bldg. TT-48 UST#1 & #3 Phase I LSA

Sample Information and Analytical Results	
Sample Identification	UST TT48-MW02
Sample Matrix	Water
Date Collected	02/16/07
Date Received	02/19/07
Date Extracted	02/22/07
Date Analyzed	02/27/07
Dry Weight	
Dilution Factor	10:1
C ₉ -C ₁₈ Aliphatics*	12000 (ug/L)
C ₁₉ -C ₃₆ Aliphatics*	< 1000 (ug/L)
C ₁₁ -C ₂₂ Aromatics*	7700 (ug/L)
Aliphatic Surrogate % Recovery	NA
Aromatic Surrogate % Recovery	100
Fractionation Surrogate 1 % Recovery	86

Comments:

* = Excludes any surrogates or internal standards.

NA = Non-applicable, surrogate diluted out.

Lab info: G128-1899-21

Reviewed By: me



Attachment 3

EPH Laboratory Reporting Form

Calibration and QA/QC Information

Initial Calibration Date: 02/14/07

Calibration Ranges and Limits

Range	MDL (2/2004) (µg/L)	ML (µg/L)	RL (µg/L) (mg/Kg)
C ₉ -C ₁₈ Aliphatics	3.84	12.2	100 10
C ₁₉ -C ₃₆ Aliphatics	0.57	1.8	100 10
C ₁₁ -C ₂₂ Aromatics	4.54	14.4	100 10

Calibration Concentration Levels

Range	Levels (µg/mL)	%RSD or CCC	Method of Quantitation
C ₉ -C ₁₈ Aliphatics	6	4.20	Calibration Factor
	30		
	60		
	120		
	240		
C ₁₉ -C ₃₆ Aliphatics	8	3.6	Calibration Factor
	40		
	80		
	160		
	320		
C ₁₁ -C ₂₂ Aromatics	17	7.2	Calibration Factor
	85		
	170		
	340		
	680		

Calibration Check Date: 02/27/07

Calibration Check

Range	Levels (µg/mL)	RPD
C ₉ -C ₁₈ Aliphatics	120	2.8
C ₁₉ -C ₃₆ Aliphatics	160	4.7
C ₁₁ -C ₂₂ Aromatics	340	11.0

MDL = Method Detection Limit

ML = Minimum Limit

RL = Reportable Limit

RPD = Relative Percent Difference

%RSD = Percent Relative Standard Deviation

CCC = Correlation Coefficient of Curve



List of Reporting Abbreviations and Data Qualifiers

B = Compound also detected in batch blank

BQL = Below Quantitation Limit (RL or MDL)

DF = Dilution Factor

Dup = Duplicate

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

E = Estimated concentration, exceeds calibration range.

J = Estimated concentration, below calibration range and above MDL

LCS(D) = Laboratory Control Spike (Duplicate)

MDL = Method Detection Limit

MS(D) = Matrix Spike (Duplicate)

PQL = Practical Quantitation Limit

RL = Reporting Limit

RPD = Relative Percent Difference

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

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

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

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

% Rec = Percent Recovery

% 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.

DISCUSSION