CATLIN
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July 8, 2003

Commander
Naval Facilities Engineering Command
Atlantic Division
1510 Gilbert Street
Norfolk, Virginia 23511-6287

Attention: EV23JC, Mr. John D. Conway, P.G.

Re: **FINAL** Soil Assessment Report
UST TT-3140/3142 Site, Tarawa Terrace II Housing Area
Marine Corps Base
Camp Lejeune, North Carolina

Navy Contract No. N62470-01-D-3009
Delivery Order No. 0057
CATLIN Project No. 203-014
NCDENR Incident No. 23699

Dear Mr. Conway:

CATLIN Engineers and Scientists (CATLIN) and Mid-Atlantic Associates, P.A. (Mid-Atlantic) are pleased to submit the FINAL Soil Assessment Report for the above referenced site. We have reviewed comments made to the DRAFT document, and where applicable, changes have been incorporated into the FINAL report. A summary of the comments and responses is attached.

As requested by Nikki Hall with the Camp Lejeune Environmental Quality Branch we are delivering a copy of the Final report to the Wilmington Regional Office of the North Carolina Department of Environment and Natural Resources. A copy of the cover letter is attached.

CATLIN and Mid-Atlantic appreciate the opportunity to continue to provide services to LANTDIV and MCB Camp Lejeune on your environmental projects.

Sincerely,

Michael E. Mason, P.E.
CATLIN Program Manager

Attachments: Final SAR
Copy of Cover Letter to NCDENR WiRO

cc: Mr. Roger R. Marce, Jr. - Code AQ 135 Contracts (correspondence only)
Commanding General, Attn: Director I&E/EMD/EQB (1 copy)
Mr. Dan Nielsen, Mid-Atlantic (correspondence only)

203014_RCAP_final ltr

Response to Comments
Draft Soil Assessment Report
UST TT3140/3142
Date of Draft SAR Report: May 6, 2003

Written By: EJM Date: 6/30/03
Reviewed By: DW Date: 7/2/03

Editorial Note: Reviewer comments are noted in courier font and were copied from e-mail responses received from Ms. Kimberly Hakola and Ms.Nikki Hall of MCB Camp Lejeune. Mr. John Conway of LANTDIV did not have further comments on the Draft UST TT-3140/3142 Soil Assessment Report (SAR). Mid-Atlantic received reviewer correspondence from the MCB on June 12, 2003 and LANTDIV on June 30, 2003.

Response to Mr. Conway's Comments:

Mr. Conway did not have comments regarding the Draft SAR, in addition to those provided by the MCB.

Responses to Comments by Ms. Hakola and Ms. Hall:

Comments 1 and 2 (First two cover pages):

1) Page 1
Risk Classification: Low (missing).

2) Page 2
Date Release Discovered: July 31, 2001 (not 8/7/01)

Response:

The report has been revised as requested.

Comments 3 through 8 (Executive Summary, Pages i and ii):

1st paragraph
3) Explain that the UST was non-regulated and non-commercial.
4) Explain the "trigger" for this report.

5) 1st bullet, 1st sentence
Revise to read, " The concentrations...have decreased nearly ten fold since UST closure."

6) 1st bullet, 2nd sentence
The second reference to September 2001 should be March 2003.

7) 2nd bullet, 1st sentence
Include samples taken from the east side (4-6').

8) May want to add that contamination has been delineated (both horizontally and vertically) since that is the main intent of the SAR.

Response

In response to comments 3, 5, and 7 we have modified the text as requested. We revised the second to last sentence of paragraph one to read:

> " On January 9, 2003, DENR requested that the MCB complete a Soil Assessment Report (SAR) for the site in order to comply with the soil assessment and cleanup requirements of 15A NCAC 2L .0115 (i)."

The regulations specified above were included in the January 9, 2003 letter submitted by DENR to the MCB.

In response to Comment No. 6 and Comments 20 and 21 discussed below, we changed the second "September 2001" reference in the first bulleted item to March 2003. We also added the Residential MSCC concentration in parentheses after the March 2003 date (see Comment No. 20) and provided a reason for the ten-fold decrease in contaminant concentrations (see Comment No. 21).

We have added the following text to the end of the second bulleted item in the Executive Summary, and in Section 6.0:

> "The lateral and vertical extent of petroleum-contaminated soils in excess of Residential MSCCs has been delineated."

We also modified the second bullet to be consistent with changes made to the Conclusions and Recommendations section. We deleted "also" from the first sentence of the second bullet and added the sample collected from the east side where petroleum contaminants were detected (Comment No. 22).

Comment No. 9 (Section 1 - Site Identification, Page 1):

9) UST Owner Address
Technically, it is MCB, PSC Box 20004, Camp Lejeune, NC 28542.

Response:

We have modified the text in the report, as requested.

Comment No. 10 (Section 2 - Site History, Page 2):

> 10) 2nd paragraph
> Does the 1965 drawing indicate that USTs were installed much earlier than ' 76?

Response:

The 1965 drawing (MCB Drawing No. 957756) does not show the location of housing units with USTs or housing units where USTs were replaced by above ground heating oil storage tanks (ASTs). Drawing 957756 and accompanying detail sheet 957757 show existing ASTs at numerous housing units and plans for replacing these existing ASTs with new heating oil ASTs. Housing units TT-3140/3142 were not among the locations shown on the drawings where existing tanks were to be replaced.

Based on your comment, we added text to the second paragraph which clarifies that the TT-3140/3142 site was not shown with a UST or existing AST in the drawings. At the end of sentence three in the second paragraph of Section 2.0, we added "...and the building containing TT-3140/3142." We added "... at the TT-3140/3142 site or other buildings" to the last sentence of paragraph two.

Comments 11 through 15 (Section 3.2 - Land Use, Page 3):

> 11) 1st paragraph, 1st sentence
> Replace "base training operations" with "military housing".
>
> 12) 1st paragraph, 2nd sentence
> Instead of *DWM Guidelines*, use *2001 Guidelines* as defined in acronym list.
>
> 13) 2nd paragraph, 4th sentence
> Insert comma after March 2003.
>
> 14) 2nd paragraph, 5th sentence
> Insert "through" or "by" or "near" after "Children often pass".
>
> 15) 4th paragraph, 4th sentence
> Replace comma with semi-colon.

Response:

We have modified the text in the report, as requested.

Comments 16 and 17 (Section 4.0 - Site Geology, Pages 4-5):

16) 3rd paragraph, 3rd sentence
I only count six (instead of seven) borings.

17) 3rd paragraph, 5th sentence
Do you mean USTTT3140/3142-SB01 (instead of MW01)?

Response:

Seven borings were installed at the site by Mid-Atlantic: USTTT3140/3142-SB01, USTTT3140/3142-MW01 (boring for monitoring well of the same name), USTTT3140/3142-SB05, USTTT3140/3142-SB06, USTTT3140/3142-SB07, USTTT3140/3142-SB08 and USTTT3140/3142-SB09. The monitoring well boring was designated USTTT3140/3142-MW01. Boring USTTT3140/3142-SB01 was a hand auger boring advanced near the suspected location of the former fuel oil delivery line.

Comments 18 and 19 (Section 5.0 - Soils Investigation, Pages 6 and 8):

18) 5.1 [*Section*], 3rd paragraph, last sentence
Consider revising "…were not reported with…".

19) 5.2 [*Section*], MADEP VPH/EPH, 2nd sentence
Capitalize residential.

Response:

We revised the last sentence of the third paragraph, Section 5.1, to read "The laboratory did not detect VPH or EPH in the sidewall samples at concentrations above the laboratory reporting limits (PQL)." The word "residential" was capitalized in Section 5.2, as requested.

.

Comments 20 through 22 (Section 6.0 - Conclusions and Recommendations, Pages 9-10):

20) 1st bullet
How do you explain the ten-fold decrease in contaminant concentrations?

21) 1st bullet, 2nd sentence
The second reference to September 2001 should be March 2003. Include Residential MSCC for C9-C22 for reference.

22) 2nd bullet, 1st sentence
Delete "also" and include east side sample.

Response:

No. 20: We stated in the text that degradation of petroleum contaminants through natural attenuation processes since closure of the UST may be a reason for the nearly ten-fold decrease in contaminant concentrations.

No. 21: We added the Residential MSCC for C9-C22 aromatics in the second to last sentence of the first bullet.

No. 22: We modified the text, as requested.

Comments 23 and 24 (Tables 2.2 and 3.1, respectively):

23) Table 2.2
Commanding General is UST owner/operator. Is site use military housing?

24) Table 3.1
Tax Parcel Number is NA.

Response:

No. 23: We have revised Table 2.2 to reflect that "Commanding General, Marine Corps Base" is the UST Owner. Table 2.2 is modified from Table B-2 in the 2001 Guidelines (Page B-66), however the "Site Use" column was added to provide DENR with additional information about the tank's use. The intent of the column is

to provide information about the tank's use at the site, therefore the column heading "Site Use" is not representative. We changed the name of the column to "Usage of UST at Site".

No. 24: We have revised Part A of Table 3.1 to include "N/A" under the column heading "Tax Parcel Number/Map ID". Below the table, we have stated that N/A refers to "Not Applicable. The entire surrounding area is used for military housing."

SOIL ASSESSMENT REPORT (FINAL)
FOR
UST TT-3140/3142
TARAWA TERRACE II HOUSING AREA
MARINE CORPS BASE
CAMP LEJEUNE, NORTH CAROLINA

NCDENR UST INCIDENT NO.: 23699
RISK CLASSIFICATION: LOW
LAND USE CLASSIFICATION: RESIDENTIAL

JULY 3, 2003

CONTRACT NO.: N62470-01-D-3009
DELIVERY ORDER NO.: 0057
MID-ATLANTIC PROJECT NO.: 000R1243.57

Prepared By:

Mid-Atlantic Associates, Inc.
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SOIL ASSESSMENT REPORT (FINAL)
FOR
UST TT-3140/3142
TARAWA TERRACE II HOUSING AREA
MARINE CORPS BASE
CAMP LEJEUNE, NORTH CAROLINA

NCDENR UST Incident No.: 23699
Source of the Release: One 550-Gallon Heating Oil UST System
Date Release Discovered: July 31, 2001
Risk Classification: Low
Land Use Classification: Residential
Latitude: N 34° 44' 7.4" (34.7357 N)
Longitude: W 77° 23' 0.6" (77.3835 W)

Mid-Atlantic Job No. 000R1243.57

July 3, 2003

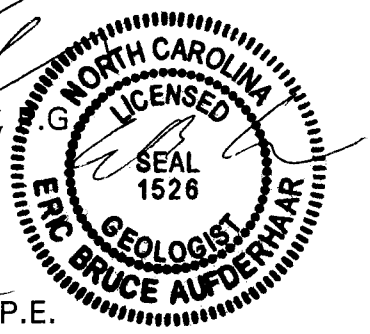
Prepared For:

Commanding General
Naval Facilities Engineering Command
Atlantic Headquarters, Env. Division
Technical Services Branch
1510 Gilbert Street
Norfolk, Virginia 23511-6287

Prepared By:

MID-ATLANTIC ASSOCIATES, INC.

Eric B. Aufderhaar, .G
Project Geologist



Daniel H. Nielsen, P.E.
Principal Engineer

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EXECUTIVE SUMMARY

The subject site is former UST TT-3140/3142 located adjacent to family housing units TT-3140 and TT-3142 in the Tarawa Terrace II Housing Community, Marine Corps Base (MCB), Camp Lejeune, North Carolina. The MCB owned and operated the former UST that was 550-gallons in capacity and contained fuel oil for on-site heat production. The UST was non-regulated and non-commercial. Fuel oil-contaminated soils were first identified in July 2001 following permanent closure of UST TT-3140/3142 by J.A. Jones Environmental Services Company (J.A. Jones). Since this date, soil and groundwater samples were collected for laboratory analyses, a receptor survey was completed and two reports were submitted to the NC DENR by Mid-Atlantic Associates, Inc. (Mid-Atlantic) and J.A. Jones. The DENR reviewed these reports and classified the site as "low risk" with a "residential" land usage. On January 9, 2003, DENR requested that the MCB complete a Soil Assessment Report (SAR) for the site in order to comply with the soil assessment and cleanup requirements of 15A NCAC 2L .0115 (i). DENR subsequently approved a report submission deadline of June 30, 2003.

The Naval Facilities Engineering Command, Atlantic Division (LANTDIV) issued Delivery Order 0057 under Contract N62770-01-D-3009 to Catlin Engineers & Scientists (CATLIN) to complete the SAR. CATLIN retained Mid-Atlantic to complete the SAR. Based upon the results of our SAR, we conclude the following:

- The concentrations of petroleum contaminants at the base of the former UST excavation have decreased nearly ten-fold since UST closure. The concentration of C9-C22 aromatics has decreased from 635.7 mg/Kg in September 2001 to 67 mg/Kg in March 2003 (the Residential MSCC for C9-C22 aromatics is 469 mg/Kg). Both samples were collected from a similar depth. A reason for this decrease in contaminant concentrations may include natural attenuation of petroleum contaminants since the removal of the contaminant source (fuel oil UST) on July 31, 2001.

- Petroleum-contaminated soils were identified in soil samples collected from the north side (6-8 feet BLS), east side (4-6 feet BLS) and west side (5.5-7 feet BLS) of the former UST excavation. However, the detected concentrations of VOCs, SVOCs, and petroleum hydrocarbons (VPH and EPH) are below Residential and Industrial/ Commercial MSCCs. The lateral and vertical extent of petroleum-contaminated soils in excess of the Residential MSCCs has been delineated.

- Depth to groundwater, based on our previous work in July 2002 and March 2003, ranged from 10.7 feet BLS (during drought conditions) to approximately 6 feet BLS (after several rainfall events) within the former UST basin. We noted wet soils at approximately 8 feet BLS outside of the former UST pit during March 2003. The shallower depth to groundwater within the UST pit may be attributable to groundwater preferentially accumulating within the sand backfill, creating a localized mound.

- Based on assessment data collected to date, petroleum contaminants are present in the soils at concentrations less than the Residential and Industrial MSCCs. Therefore, remediation of the soils should not be required by DENR.

Based on our knowledge of the requirements in *Guidelines for Assessment and Corrective Action (DENR, 2001)*, and our experience, Mid-Atlantic recommends the following:

- The MCB should submit this report to the DENR and request that the UST TT-3140/3142 site be considered for no further action status.

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
DENR	Department of Environment and Natural Resources
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

LIST OF ACRONYMS (CON'T.)

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
JA Jones	J.A. Jones Environmental Services Company, Charlotte, NC
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
Mid-Atlantic	Mid-Atlantic Associates, Inc.
MDL	Method Detection Limit
mg/Kg	Milligrams per Kilogram
mg/L	Milligrams per Liter
MRO	Mooresville Regional Office
MSCC	Maximum Soil Contamination Concentration
MSL	Mean Sea Level
MTBE	Methyl tertiary butyl ether
µg/Kg	Micrograms per Kilogram
µg/L	Micrograms per Liter
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
NCGWQS	North Carolina Groundwater Quality Standards
NCSP	North Carolina State Plane
NCSPA	North Carolina State Ports Authority

LIST OF ACRONYMS (CON'T.)

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
PLS	Professional Locating Service, Jacksonville, North Carolina
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

SOIL ASSESSMENT REPORT

1.0 SITE IDENTIFICATION

DATE OF REPORT: July 3, 2003
Facility ID: N/A UST Incident Number (if known): 23699
Site Name: UST TT-3140/3142
Site Location: TT-3140/3142, Bougainville Drive, MCB Camp Lejeune (Drawing 1.1)
Nearest City/Town: Jacksonville County: Onslow

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

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

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

Property Occupant: Two military families, Houses TT-3140 and TT-3142
Address: 3140 Bougainville Drive, Tarawa Terrace, NC 28543
Phone: Same as above

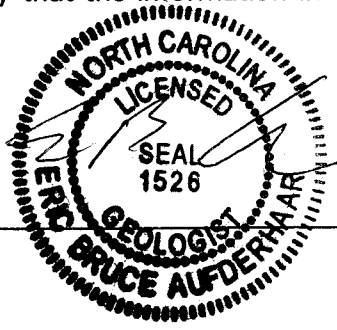
Consultant/Contractor: Mid-Atlantic Associates, Inc.
Address: 409 Rogers View Court, Raleigh, NC 27610 Phone: (919) 250-9918

RELEASE INFORMATION

Date Discovered: July 31, 2001
Longitude: 77.3806 W (W77°22'50.2") Latitude: 34.7411 N (N34°44'28.0" 0
Estimated Quantity of Release: Unknown
Cause of Release: Unknown
Source of Release (e.g. Piping/UST): USTs and associated piping are suspected
Sizes and contents of UST system(s) from which the release occurred:
550-gallon capacity heating oil UST

I Eric B. Aufderhaar a Professional Engineer / Licensed Geologist (**circle one**) for Mid-Atlantic Associates, Inc., do certify that the information in this report is correct and accurate to the best of my knowledge.

(Please Affix Seal and Signature)



2.0 SITE HISTORY

The following sections summarize the UST system previously located at the site along with the owners and operators of the UST system. Available UST history and ownership information is included in Tables 2.1 and 2.2.

The Marine Corps Base has been the sole owner/operator of the UST since it was installed at the TT-3140/3142 facility in approximately 1976. The 550-gallon fuel oil tank supplied fuel to heat the residential units until the tank was abandoned in the early 1990s. The Tarawa Terrace II (TTII) housing area was constructed between 1952 and 1965, based upon our review of a 1952 topographic map showing undeveloped, wooded land and a 1965 historical drawing from the MCB showing the TTII neighborhood and the building containing TT-3140/3142. The latter drawing, No. 957756, is titled "Index and Site Plan, Replace Oil Tanks, Tarawa Terrace II." This project involved replacement of aboveground heating oil tanks at numerous locations within TTII. Underground storage tank locations were not shown on the drawing at the TT-3140/3142 site or other buildings.

The 550-gallon capacity UST was removed by J.A. Jones in July 2001 and a UST closure assessment was performed. Based on the laboratory analysis results, petroleum-contaminated soils were identified. J.A. Jones completed additional sampling in September and October, 2001 (Section 5.1). Mid-Atlantic completed Phase I LSA fieldwork at the site in July 2002. We issued our final Phase I LSA report to the MCB on November 18, 2002. This report was subsequently submitted to DENR by the MCB. The DENR classified the site as "low risk" with "residential" land usage in a January 9, 2003 letter to the MCB. Within this letter, the DENR also requested that the MCB complete a SAR. On April 3, 2002, the DENR approved a June 30, 2003 deadline for submittal of the SAR report. This report fulfills the SAR report submittal request.

3.0 RECEPTOR INFORMATION

3.1 Update of LSA Receptor Survey

Mid-Atlantic conducted a receptor survey in July 2002 during our LSA investigation. The findings of the receptor survey assisted the NCDENR in classifying the site as low risk. A "Limited Site Assessment and Risk Classification and Land Use Form" for the site is provided as Appendix A. We are not aware of changes since July 2002 that would influence the site's risk classification.

3.2 Land Use

The subject site is located on a military reservation within an area used primarily for military housing. Eight questions listed in "Guidelines for Assessment and Corrective Action" prepared by the UST Section, DWM, NCDENR (hereafter 2001 *Guidelines*) were investigated during the LSA to further identify land use pertaining to the property containing the source area of the release. The results of this evaluation are presented in Part II ("Land Use") of the Limited Site Assessment and Risk Classification and Land Use Form (pages 5 - 7 of Appendix A). We did not identify changes in land use since our Phase I LSA land use evaluation in July 2002. A brief summary of our land use evaluation follows. Reference Appendix A for more specific information.

The TT-3140/3142 site contains two residential units for military personnel and their families. The two units are located on the east side of a building that contains four residential units, TT-3140, 3142, 3144 and 3146. The building has been used for housing since at least 1965. During our fieldwork in June 2002 and March 2003, we observed children playing outside or entering/exiting one or more of the four residences in the building. Children often pass by the UST TT-3140/3142 site on their way to nearby buildings and playgrounds. The MCB does not foresee changing the operational use of TT-II from a housing area in the next 20 years. However, individual buildings in TT-II (including the building containing TT-3140 to 3146) may be renovated depending on installation needs.

To further determine the land use of the subject site, four questions are asked about the properties surrounding the source area of the discharge or release. These questions were also investigated during our LSA and the results of this evaluation are presented in Part II ("Land Use") of the "Limited Site Assessment and Risk Classification and Land Use Form" (Pages 7-8 of Appendix A). We did not identify changes in land use since our July 2002 evaluation that would influence the site's risk classification. A brief summary of our land use evaluation follows. Reference Appendix A for more specific information.

Land use in the vicinity of the site is residential. Nearby buildings are used for housing of military personnel and their families. Many children reside in these homes and traverse sidewalks, grass and pavement in the site vicinity. Playgrounds are the closest places of public assembly; the closest playground is approximately 240 feet to the west-northwest. The MCB is not subject to local or county zoning requirements.

3.3 Property Owners and Occupants

The subject site and adjacent buildings are located on government-owned land. Therefore, individual properties are not delineated. Drawing 3.1 shows the location of nearby buildings in the TTII area. The names and usage of nearby buildings are listed in Table 3.1.

4.0 SITE GEOLOGY

According to the 1985 Geologic Map of North Carolina, prepared by the North Carolina Geological Survey Section of NCDENR, the subject site is located in the Coastal Plain physiographic province and is underlain by the "Belgrade Formation, Undivided" (geologic unit Tob). However, the site is within approximately 800 feet of a reported geologic contact between the Belgrade Formation and the River Bend Formation (geologic unit Tor). Therefore, characteristics of both geologic units may underlie the site. The Belgrade Formation consists of unconsolidated, sandy-texture shell beds of two lithologies – tan, somewhat leached, sandy-texture oyster shells and moderately phosphatic, slightly calcareous, silty, sandy-texture shells containing occasional thinly laminated olive clays[3]. The Belgrade Formation unconformably overlies the River Bend Formation and consists of calcarenite limestone overlain by and intercalated with sandy, molluscan-mold limestone (NCGS, 1985).

According to soil type data provided by the MCB[4] and the Onslow Soil and Water Conservation District, NRCS, the project site is located in an area underlain by soil type BaB, the BayMeade Fine Sand. This soil type is considered well drained and is typically found on upland areas.

The migration and attenuation of contaminants in the subsurface are dependent, in part, on soil texture and structure. Soil texture refers to the size and arrangement of particles in the soil matrix and soil structure refers to the arrangement of soil particles into groups (e.g., stratification of sediments). In July 2002 and March 2003, Mid-Atlantic advanced a series of seven borings at the site with a variety of drilling methods (Drawing 4.1). Borings USTTT3140/3142-SB01 and USTTT3140/3142-MW01 were advanced in July 2002 using hand auger and hollow stem auger drilling

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[3] Page 113, Preliminary explanatory text for the 1985 Geologic Map of North Carolina, NC Geological Survey, November 4, 1988.

[4] Digital dataset from MCB GIS Office,"Soil-Soil Unit," created by ESRI, 1982 from hardcopy maps published by the Soil Conservation Service, US Department of agriculture, Scale 1:24,000.

methods, respectively. Boring USTTT3140/3142-MW01 was subsequently converted to a temporary monitoring well. In March 2003, borings USTTT3140/3142-SB05 through USTTT3140/3142-SB09 were advanced with a PowerProbe™ DPT sampling unit. Mid-Atlantic refrained from using identification numbers SB02 through SB04 to prevent confusion with the soil borings advanced by J.A. Jones around the UST excavation in October 2001.

Soil samples were collected from the borings and visually classified to characterize subsurface soil conditions and prepare soil boring logs (Appendix B). In general, the soil borings placed on-site outside of the UST pit encountered dark brown fine sand (USCS soil type SP) and fine sand and silt (SM) soil types to 3 feet BLS, gray brown to brown fine sandy clay or clay (CL) between approximately 3 and 7.5 feet BLS, fine to medium sand (SP) between approximately 7.5 and 12 feet BLS, the maximum termination depth for the PowerProbe™ soil borings. One former soil boring, USTTT3140/3142-MW01 (hereafter MW-1), was advanced within the UST pit to a depth of 19 feet BLS. Soils collected from 13 to 15 feet BLS in the MW-1 boring consisted of white-brown fine sand (SP). Soil samples were not collected between 15 and 19 feet BLS from the MW-1 boring. Similar soil type profiles were encountered in the "background" soil borings, designated BKGD-1 and BKGD-2. Lithologic cross-sections are shown in Drawing 4.2. Drawing 4.1 denotes the starting and end points for the cross-sections.

On July 24, 2002, Mid-Atlantic measured the groundwater table at a depth of 10.7 feet BLS within former temporary monitoring well USTTT3140/3142-MW01. On March 25, 2003, we observed wet soils at depths of 6 feet BLS in the backfilled UST pit and 7.2 to 8 feet BLS in soil borings advanced outside of the UST pit. The March 25, 2003 fieldwork was completed following heavy precipitation the preceding week, while the July 24, 2002 measurement was obtained during drought conditions at the MCB.

5.0 SOIL INVESTIGATION

5.1 Summary of Historical Soil Sampling

J.A. Jones collected six soil samples from the excavation subsequent to tank removal (see Appendix C for sample locations and depths). These soil samples were obtained from the sidewalls and base of excavation (BOE) from depths of 3 feet and 8 feet BLS, respectively. The soil samples were shipped to Prism Laboratories, Inc. (Prism) in Charlotte, North Carolina for various laboratory tests. One soil sample collected from

immediately beneath the UST was tested for TPH by EPA preparation methods 5030 and 3550 with testing method 8015M. Additional samples collected on September 20, 2001 (BOE sample) and October 23, 2001 (sidewall samples) were tested for VPH and EPH by the MADEP methods, VOCs by EPA SW846 method 8260 and semi-VOCs by EPA SW846 method 8270.

The laboratory reported volatile TPH at 780 mg/Kg and semi-volatile TPH at 18,000 mg/Kg within the BOE soil sample collected on July 31, 2001 (Table 5.1). Prism also reported petroleum contaminants in the BOE soil sample collected on September 20, 2001. C9-C22 aromatic petroleum hydrocarbons (VPH and EPH) were also reported in the BOE soil sample at a concentration of 635.7 mg/Kg, greater than the residential MSCC of 469 mg/Kg (Table 5.2). The laboratory did not detect VPH or EPH in the sidewall samples at concentrations above the laboratory reporting limits (PQL).

In July 2002, one soil sample was collected adjacent to the former UST fuel oil supply and return lines. The soil sample, collected from 4 to 5 feet BLS, was tested by the RBCA methods appropriate for releases associated with fuel oil (VOCs, SVOCs, VPH and EPH). These tests were completed as recommended in the DWM Guidelines. The laboratory did not report the presence of VOC, SVOC, VPH or EPH compounds at concentrations greater than the PQLs. These laboratory results were presented in our *Phase I LSA*.

5.2 Soil Assessment Activities

LANTDIV and the MCB authorized Mid-Atlantic to perform a soil assessment in the vicinity of UST TT-3140/3142 where J.A. Jones reported the petroleum-contaminated soils at the base of the former UST excavation. In addition, LANTDIV and the MCB authorized Mid-Atlantic to complete two soil borings at "background" locations in the vicinity of Building TT-3140-3146 (Drawing 3.1). The primary purpose for advancing these additional borings was to collect soil samples for laboratory analysis from a similar depth and soil type to the BOE sample collected by J.A. Jones. This J.A. Jones sample, collected from 8 feet BLS on September 20, 2001, was reported with C9-C22 aromatic petroleum hydrocarbons at 635.7 mg/Kg. The background samples collected by Mid-Atlantic were tested for VPH and EPH to evaluate if naturally occurring compounds within the C9-C22 range may be present at the site.

A total of seven borings were advanced using a PowerProbe™ DPT sampling unit on March 25, 2003. CATLIN of Wilmington, North Carolina provided Mid-Atlantic with soil sample collection services. Five DPT borings were advanced with the PowerProbe™ in the vicinity of the former UST location in an effort to assess the extent of SVOC-impacted soils detected previously (Drawing 5.1). One of the five borings (USTTT3140/3142-SB05) was advanced in the center of the UST pit near the former J.A. Jones BOE soil sample location. The purpose of this soil boring was to evaluate the nature of the soil backfill material, note observations regarding evidence of petroleum contaminants and collect a soil sample from a similar depth interval as J.A. Jones. Four additional borings (USTTT3140/3142-SB06 through SB09) were placed to surround the location where impacted soil had been identified during previous assessments. Two soil borings (BKGD-1 and BKGD-2) were advanced in "background" locations, as previously discussed. Soil samples were obtained using the PowerProbe's sampling tools and were collected from four-foot long, clear acetate sampling tubes.

One soil sample was selected from each boring for laboratory analysis. The sample collected from 8 to 10 feet BLS at boring USTTT3140/3142-SB05 (hereafter SB05), advanced in the center of the UST pit, was selected for laboratory testing. Soil samples from 7 to 8.5 feet BLS within background borings BKGD-1 and BKGD-2 were selected for laboratory analysis. The selected soil samples from SB05, BKGD-1 and BKGD-2 were collected from a similar-appearing, white-brown fine or fine to medium Sand. The other soil samples selected for laboratory testing were collected from depths in the unsaturated zone where we observed apparent petroleum-contaminated soils (odor, staining) or the soil samples indicated elevated OVA readings. A representative portion of each soil sample was placed into pre-labeled, laboratory-supplied glassware and placed on ice. The selected samples were shipped under chain-of-custody to Paradigm Analytical Laboratories, Inc. (Paradigm) in Wilmington, North Carolina for analysis. The soil samples were tested for VOCs using EPA Methods 8260/5035, SVOCs using EPA Method 8270 (including TICs) and VPH and EPH using the MADEP Methods. The "background" soil samples were tested for VPH and EPH only.

Copies of the laboratory analytical reports for soil samples collected during this assessment are included in Appendix D and summarized in Table 5.3. The laboratory results from the March 25, 2003 sampling event are as follows:

EPA Method 8260B (includes DIPE and MTBE)

As indicated in Table 5.3 and illustrated in Drawing 5.2, nine VOC compounds (sec-butylbenzene, ethylbenzene, isopropylbenzene, 4-isopropylbenzene, naphthalene, n-propylbenzene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene and total xylenes) were detected in soil sample USTT3140/3142-SB09, 5.5-7' (SB09, 5.5-7') at concentrations above the laboratory PQLs but below the applicable Residential and Industrial/Commercial MSCCs. No other VOCs were detected in the SAR soil samples at concentrations above the laboratory PQLs.

EPA Method 8270

As indicated in Table 5.3 and illustrated in Drawing 5.3, five SVOC compounds (acenaphthene, fluorene, 2-methylnaphthalene, naphthalene and phenanthrene) were detected in soil sample SB09, 5.5-7' at concentrations above the laboratory PQLs but below the applicable Residential and Industrial/Commercial MSCCs. No other SVOCs were detected in the SAR soil samples at concentrations above the laboratory PQLs.

Paradigm reported the SVOC TIC 1-methylnaphthalene in sample SB09, 5.5 - 7' with a 100% match probability. The laboratory estimated the concentration of 1-methylnaphthalene at 11 mg/Kg in SB-9, 5.5-7'. Nine other unknown TICs were reported in sample SB-9, 5.5-7' with a total estimated concentration of 34.4 mg/Kg. These unknown TICs were reported by the laboratory as "alkane, unknown", "carboxylic acid, unknown" or "unknown".

MADEP VPH/EPH

As indicated in Table 5.3 and illustrated in Drawing 5.4, the laboratory reported concentrations of VPH and EPH in samples SB05, 8-10', USTTT3140/3142-SB06, 6-8' (SB06, 6-8') and SB09, 5.5-7' at concentrations in excess of laboratory PQLs. All of the reported VPH and/or EPH concentrations are below Residential and Industrial/Commercial MSCCs. Contaminants in the C5-C8 aliphatic fraction range were reported at 11 mg/Kg in soil sample SB09, 5-7'. Contaminants in the C9-C18 aliphatic fraction range were reported in sample SB05, 8-10' (56 mg/Kg), SB07, 4-6' (15 mg/Kg) and SB09, 5.5-7' (330 mg/Kg). Two samples were reported with contaminants in the C19-C36 aliphatic fraction range, SB05, 8-10' (19 mg/Kg) and SB09, 5.5-7' (40 mg/Kg). Three samples were reported with contaminants in the

C9-C22 aromatic fraction range, SB05, 8-10' (67 mg/Kg), SB06, 6-8' (17 mg/Kg) and SB09, 5.5-7' (143 mg/Kg). The laboratory did not report VPH or EPH contaminants in the two background soils samples (BKGD-1 and BKGD-2).

6.0 SOIL ASSESSMENT CONCLUSIONS AND RECOMMENDATIONS

Based on the results of this SAR and our review of previous assessment reports, we offer the following conclusions and recommendations:

- The concentrations of petroleum contaminants at the base of the former UST excavation have decreased nearly ten-fold since UST closure. The concentration of C9-C22 aromatics has decreased from 635.7 mg/Kg in September 2001 to 67 mg/Kg in March 2003(the Residential MSCC for C9-C22 aromatics is 469 mg/Kg). Both samples were collected from a similar depth. A reason for this decrease in contaminant concentrations may include natural attenuation of petroleum contaminants following removal of the contaminant source (fuel oil UST) on July 31, 2001.

- Petroleum-contaminated soils were also identified in soil samples collected from the north side (6-8 feet BLS), east side (4-6 feet BLS), and west side (5.5-7 feet BLS) of the former UST excavation. However, the detected concentrations of VOCs, SVOCs, and petroleum hydrocarbons (VPH and EPH) are below Residential and Industrial/ Commercial MSCCs. The lateral and vertical extent of petroleum-contaminated soils in excess of the Residential MSCCs has been delineated.

- VPH and EPH compounds were not reported by the laboratory in "background" soil samples collected from similar depths and soil types as sample SB05, 8-10' and the former BOE sample collected by J.A. Jones (8 feet BLS). The laboratory results suggest that the detected concentrations of C9-C22 aromatics in the soil samples were not naturally occurring.

- Depth to groundwater, based on our previous work in July 2002 and March 2003, ranged from 10.7 feet BLS (during drought conditions) to approximately 6 feet BLS (after several rainfall events) within the former UST basin. We noted wet soils at approximately 8 feet BLS outside of the former UST pit during March 2003. The shallower depth to groundwater within the UST pit may be attributable to groundwater preferentially accumulating within the sand backfill, creating a localized mound.

- Based on assessment data collected to date, petroleum contaminants are present in the soils at concentrations less than the Residential and Industrial MSCCs. Therefore, remediation of the soils should not be required by DENR.

Based on our knowledge of the requirements in *Guidelines for Assessment and Corrective Action (DENR, 2001)*, and our experience, Mid-Atlantic recommends the following:

- The MCB should submit this report to the DENR and request that the UST TT-3140/3142 site be considered for no further action status.

7.0 EVALUATION OF REMEDIAL ALTERNATIVES FOR SOIL

Based on the laboratory results from sampling events completed in September 2001 and March 2003, the concentration of C9-C22 aromatics reported in soils collected from the base of the former UST excavation have decreased from 635.7 mg/Kg to 67 mg/Kg. The 67 mg/Kg concentration is less than the Residential MSCC of 469 mg/Kg, therefore soil remediation should not be required. Other contaminants identified from the March 2003 sampling event were at concentrations below the Residential and Industrial/Commercial MSCCs. Soil samples obtained from the former excavation sidewalls (3 feet BLS) in October 2001 were not reported with contaminants above the laboratory PQLs.

8.0 PROPOSED SOIL REMEDIATION

As stated in Section 7.0, soil remediation should not be required by the DENR. The site was assigned a "low risk" classification and "residential" land usage.

8.1 Regulatory Status of Excavated Soil

Not Applicable

8.2 Excavation Equipment

Not Applicable

8.3 Excavation, Backfilling and Sampling Procedures

Not Applicable

8.4 Cost Estimate for Remedial Alternative

Not Applicable

8.5 Schedule

Not Applicable

8.6 Public Notice

Not Applicable

9.0 LIMITATIONS

The opinions included herein are based on our experience and the information obtained during the study. This report is based on limited observations made on the dates noted using the procedures described herein. If additional information becomes available, we request the opportunity to review the information, re-assess the potential environmental concerns and modify our conclusions and recommendations, if appropriate.

10.0 REFERENCES

J.A. Jones Environmental Services, 2002, Underground Storage Tank Closure Report, TT-3140/3142, Camp Lejeune, Onslow County, NC, J.A. Jones Environmental Services, January 10, 2002.

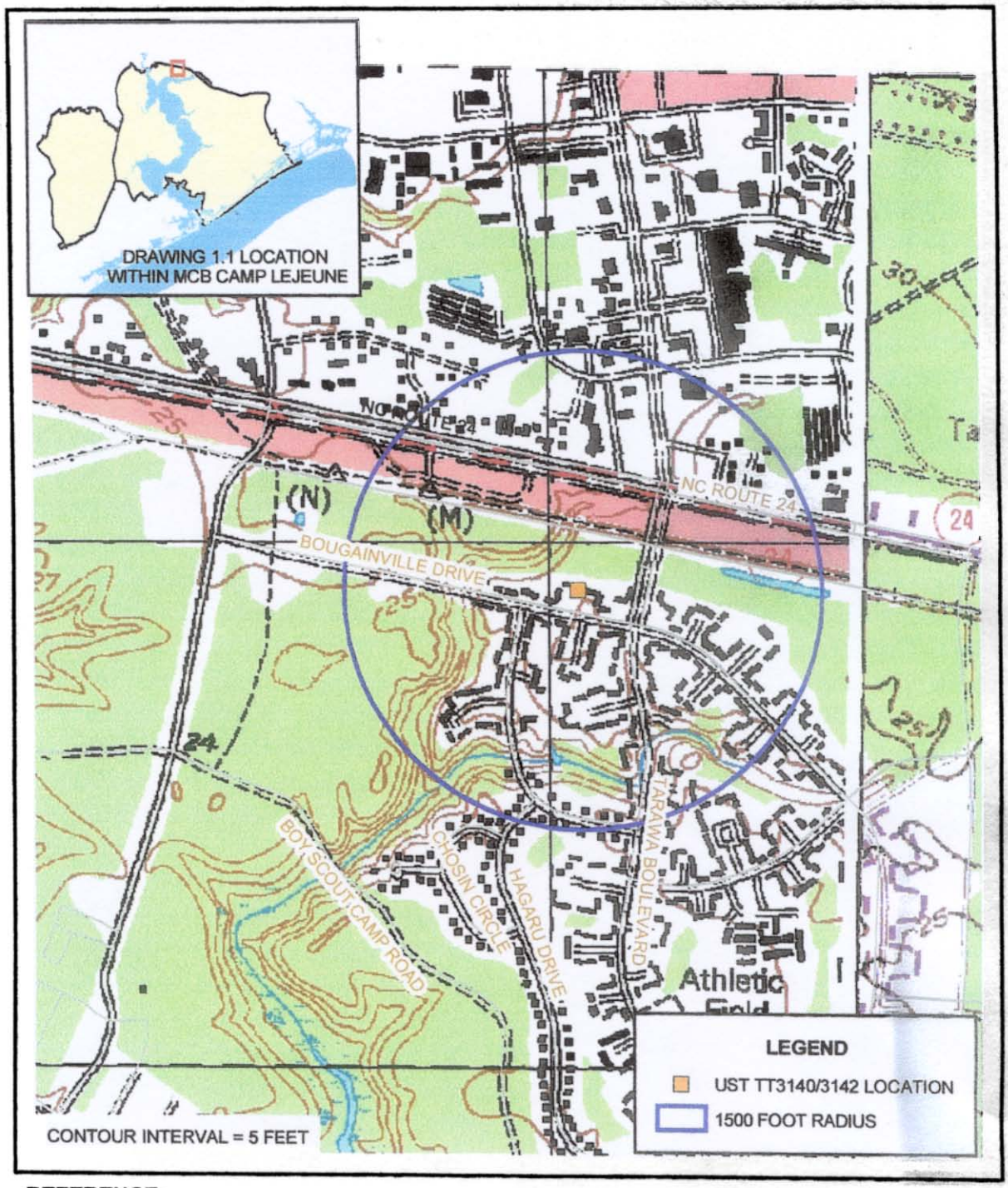
Mid-Atlantic, 2002, "Leaking Underground Storage Tank (LUST) Phase I Limited Site Assessment Report for UST TT-3140/3142" Mid-Atlantic Associates, P.A., Raleigh, North Carolina, November 12, 2002.

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

North Carolina Geological Survey, 1985, *Geologic Map of North Carolina (Scale 1:500,000).*

Winner, M.D.,Jr., and Coble, R.W., 1989, *Hydrogeologic Framework of the North Carolina Coastal Plain Aquifer System: U.S. Geological Survey Open-File Report 87-690*, 155 p.

DRAWINGS



REFERENCE:

JACKSONVILLE SOUTH AND CAMP LEJEUNE, NC DRG FILES, USGS (1997). SCANNED FROM 1:24,000 SCALE TOPOGRAPHIC MAPS WITH SIMILAR NAMES, PUBLISHED 1997 AND 1971, RESPECTIVELY, USGS

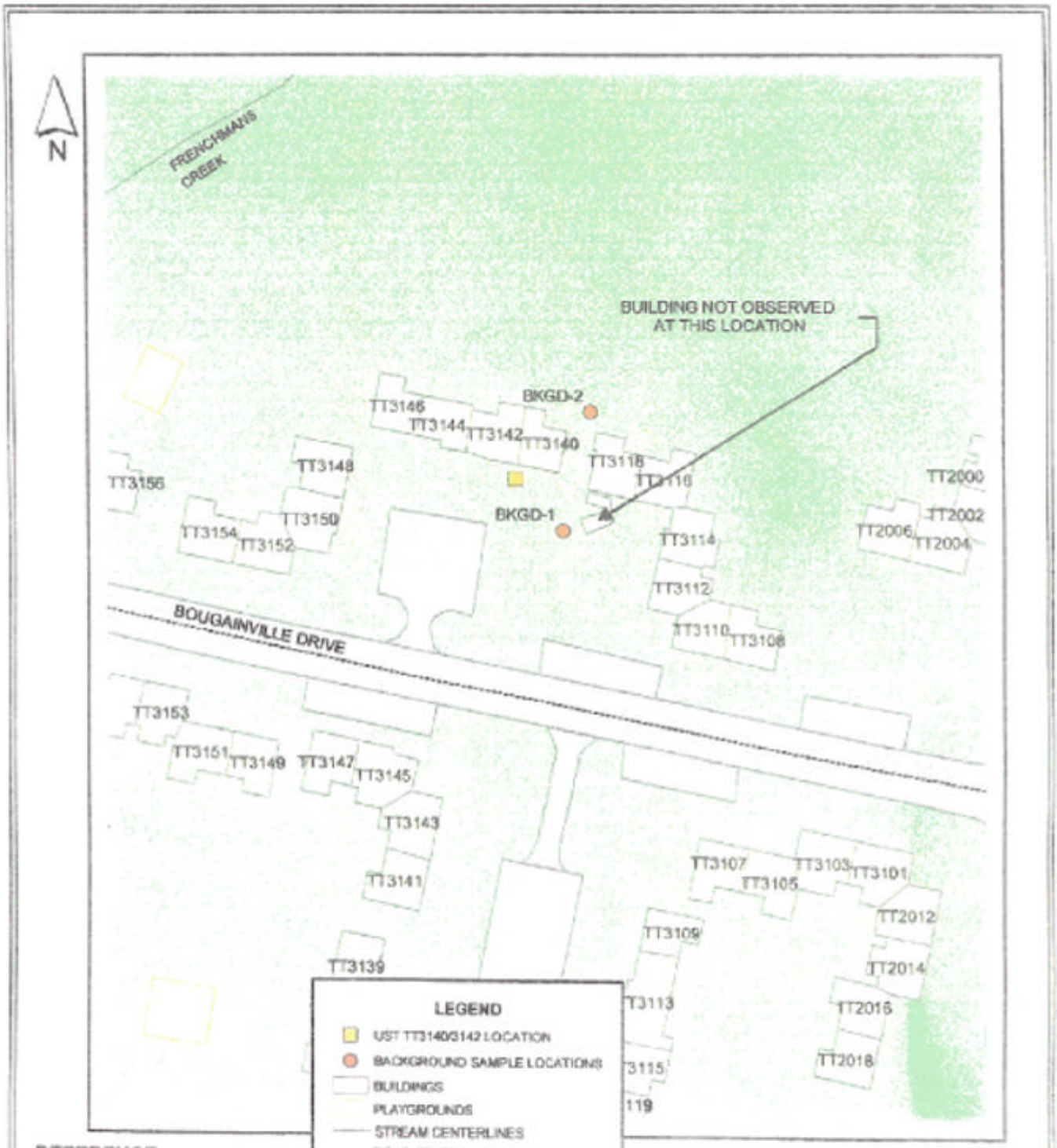
SCALE: 1:12,000

0 500 1,000 2,000 Feet

MID-ATLANTIC ASSOCIATES, INC.
Environmental & Engineering Solutions

TOPOGRAPHIC SITE MAP
WITH 1500 FT. RADIUS
LUST TT3140/3142, TARAWA TERRACE II
MARINE CORPS BASE
CAMP LEJEUNE, NORTH CAROLINA

DRAWN BY: EAA	DATE: MAY 2003
DRAFT CHECK:	JOB NO: 000R1243.57
ENG. CHECK: DW	GIS NO: 01G-1243.57-1
APPROVAL: EAA	DWG NO: 1.1



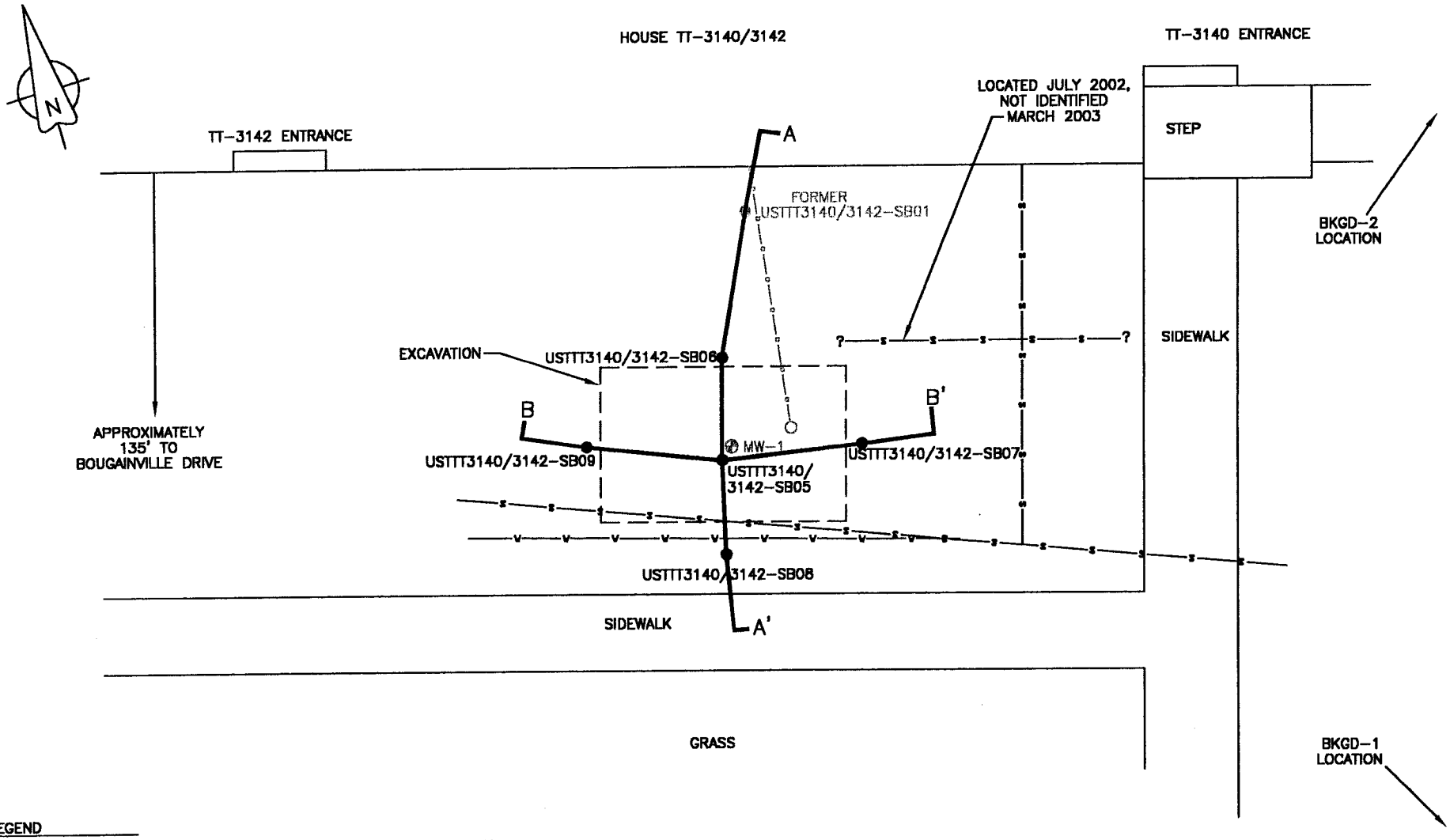
REFERENCE:

GIS DATA LAYERS FROM CAMP LEJEUNE GIS OFFICE.

MID-ATLANTIC ASSOCIATES, INC.

SITE LOCATION WITH NEARBY BUILDINGS AND BACKGROUND SAMPLE LOCATIONS
LUST TT3140/3142 - TARAWA TERRACE II
MARINE CORPS BASE
CAMP LEJEUNE, NORTH CAROLINA

DRAWN BY: EBA	DATE: MAY 2003
DRAFT CHECK: CAT	JOB NO: 000R1243.57
ENG. CHECK: DBJ	GIS NO: 01G-1243.57-2
APPROVAL: CAT	DWG NO: 3.1



LEGEND

MW01	FORMER MONITORING WELL LOCATION
BKGD-2	BACKGROUND SOIL SAMPLE (BORING) LOCATION
USTTT3140/3142-SB01	SOIL SAMPLE (BORING) LOCATION
-s-s-s-	SEWER LINE
-w-w-w-	WATER LINE
-o-o-o-o-o-	FORMER FUEL DELIVERY LINE (APPROXIMATE LOCATION)
A——A'	LITHOLOGIC CROSS-SECTION LOCATION

NOTES:

1. BORINGS SB01 ADVANCED JULY 2002. BORINGS SB05 TO SB09 ADVANCED MARCH 2002. BORINGS NOT NUMBERED SB02 TO SB04 TO AVOID CONFUSION WITH J.A. JONES SAMPLING LOCATIONS IN OCTOBER 2001.

0 5'

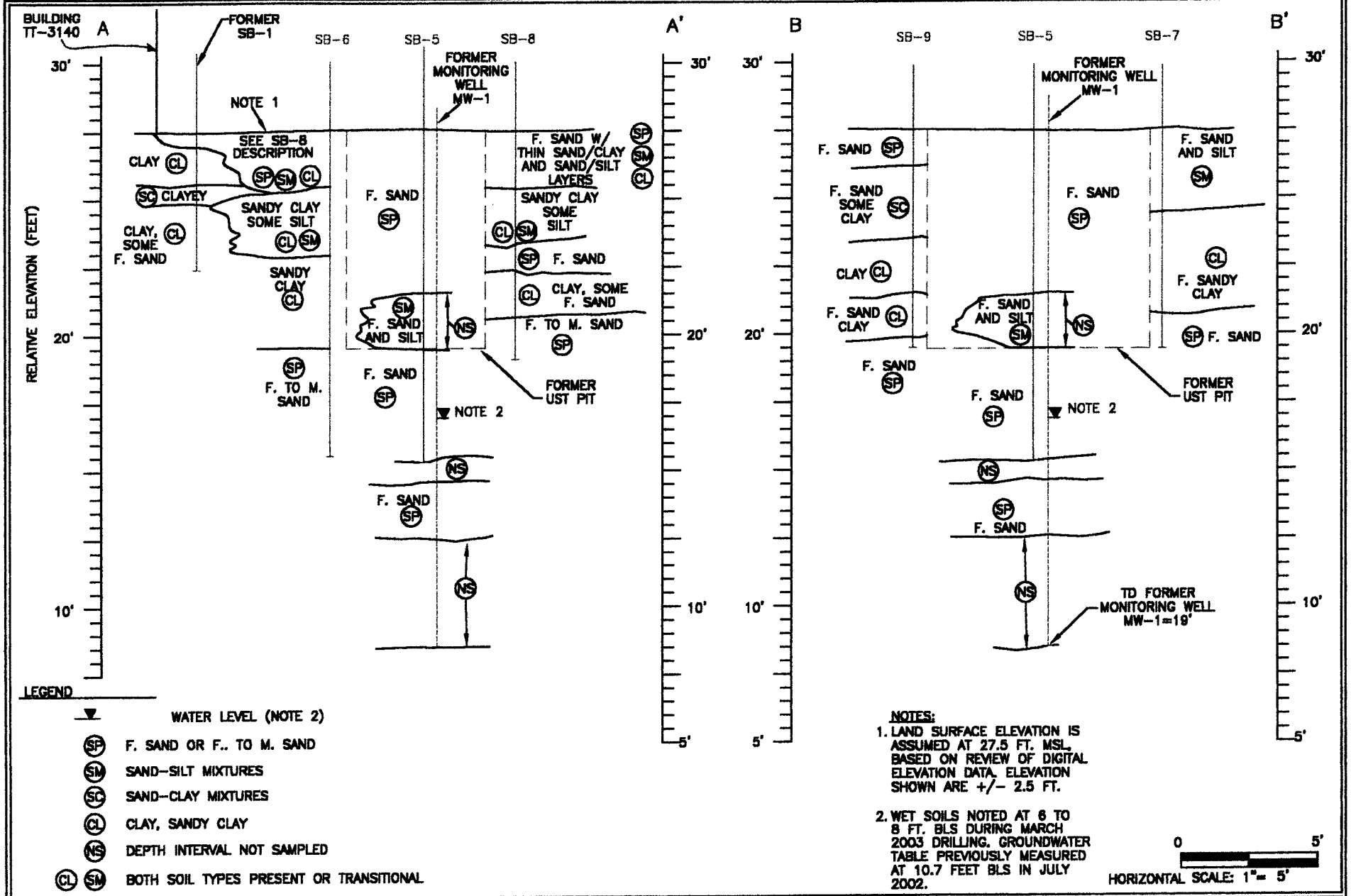
SCALE: 1"= 5'

MID-ATLANTIC ASSOCIATES, INC.
Engineering & Environmental Solutions

CROSS-SECTION LOCATION MAP
SAR LUST TT-3140/3142
MARINE CORPS BASE
CAMP LEJEUNE, NORTH CAROLINA

DRAWN BY:		DATE:	MAY 2003
DRAFT CHECK:	ELA	JOB NO:	000R1243.57
ENG CHECK:	DJW	CAD NO:	01-124303-57
APPROVAL:	ELA	DWG NO:	4.1

REFERENCE: J.A. JONES ENVIRONMENTAL SERVICES REFERENCE SITE MAP 7/31/01; MID-ATLANTIC DRAWING 01-124302-29.



LEGEND

- WATER LEVEL (NOTE 2)
- SP — F. SAND OR F.. TO M. SAND
- SM — SAND–SILT MIXTURES
- SC — SAND–CLAY MIXTURES
- CL — CLAY, SANDY CLAY
- NS — DEPTH INTERVAL NOT SAMPLED
- CL SM — BOTH SOIL TYPES PRESENT OR TRANSITIONAL

NOTES:

1. LAND SURFACE ELEVATION IS ASSUMED AT 27.5 FT. MSL, BASED ON REVIEW OF DIGITAL ELEVATION DATA. ELEVATION SHOWN ARE +/– 2.5 FT.
2. WET SOILS NOTED AT 6 TO 8 FT. BLS DURING MARCH 2003 DRILLING. GROUNDWATER TABLE PREVIOUSLY MEASURED AT 10.7 FEET BLS IN JULY 2002.

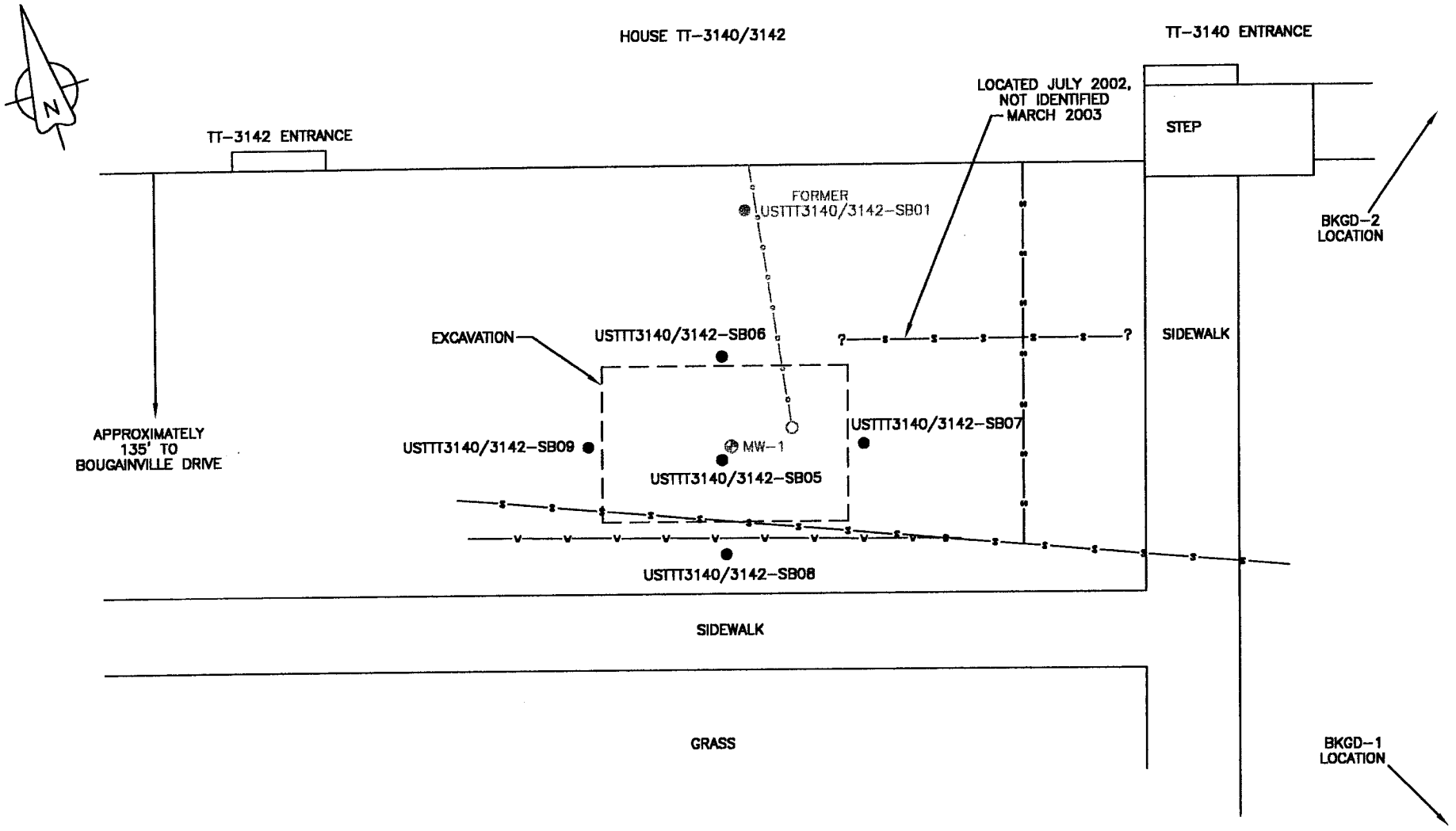
HORIZONTAL SCALE: 1"= 5'

MID-ATLANTIC ASSOCIATES, INC.
Engineering & Environmental Solutions

LITHOLOGIC CROSS–SECTIONS
SAR, LUST TT–3140/3142
MARINE CORPS BASE
CAMP LEJEUNE, NORTH CAROLINA

DRAWN BY:		DATE:	MAY 2003
DRAFT CHECK:	EAA	JOB NO:	000R1243.57
ENG CHECK:	DBN	CAD NO:	01–124307–57
APPROVAL:	EAA	DWG NO:	4.2

REFERENCE: MID–ATLANTIC DRAWING NO. 01–124301–29.



LEGEND

MW01	FORMER MONITORING WELL LOCATION
BKGD-2	BACKGROUND SOIL SAMPLE (BORING) LOCATION
USTTT3140/3142-SB01	SOIL SAMPLE (BORING) LOCATION
—s—s—s—	SEWER LINE
—v—v—v—	WATER LINE
—g—g—g—g—	FORMER FUEL DELIVERY LINE (APPROXIMATE LOCATION)

NOTES:

1. BORING SB01 ADVANCED JULY 2002. BORINGS SB05 TO SB09 ADVANCED MARCH 2002. BORINGS NOT NUMBERED SB02 TO SB04 TO AVOID CONFUSION WITH J.A. JONES SAMPLING LOCATIONS IN OCTOBER 2001.

0 5'

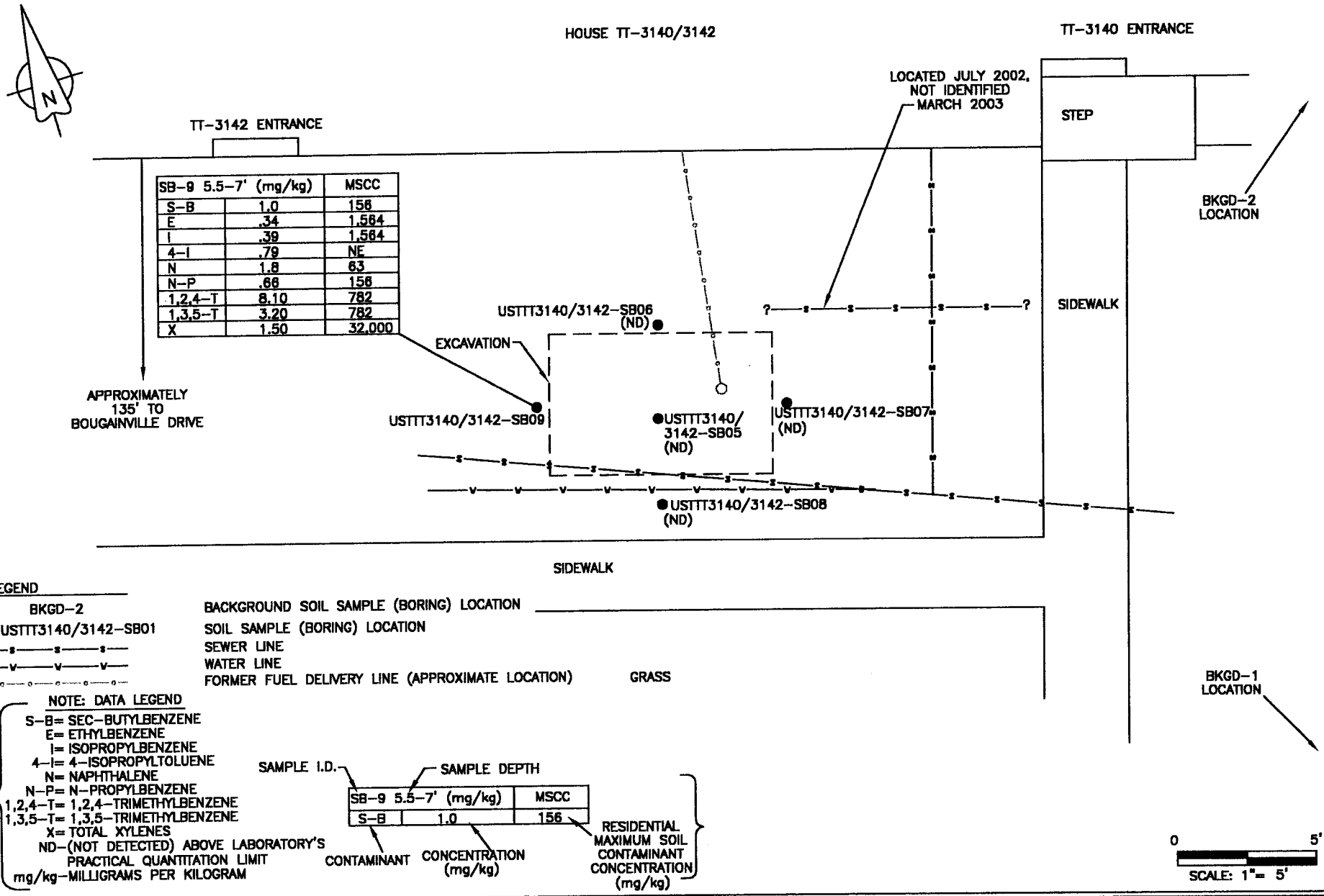
SCALE: 1"= 5'

MID-ATLANTIC ASSOCIATES, INC.
Engineering & Environmental Solutions

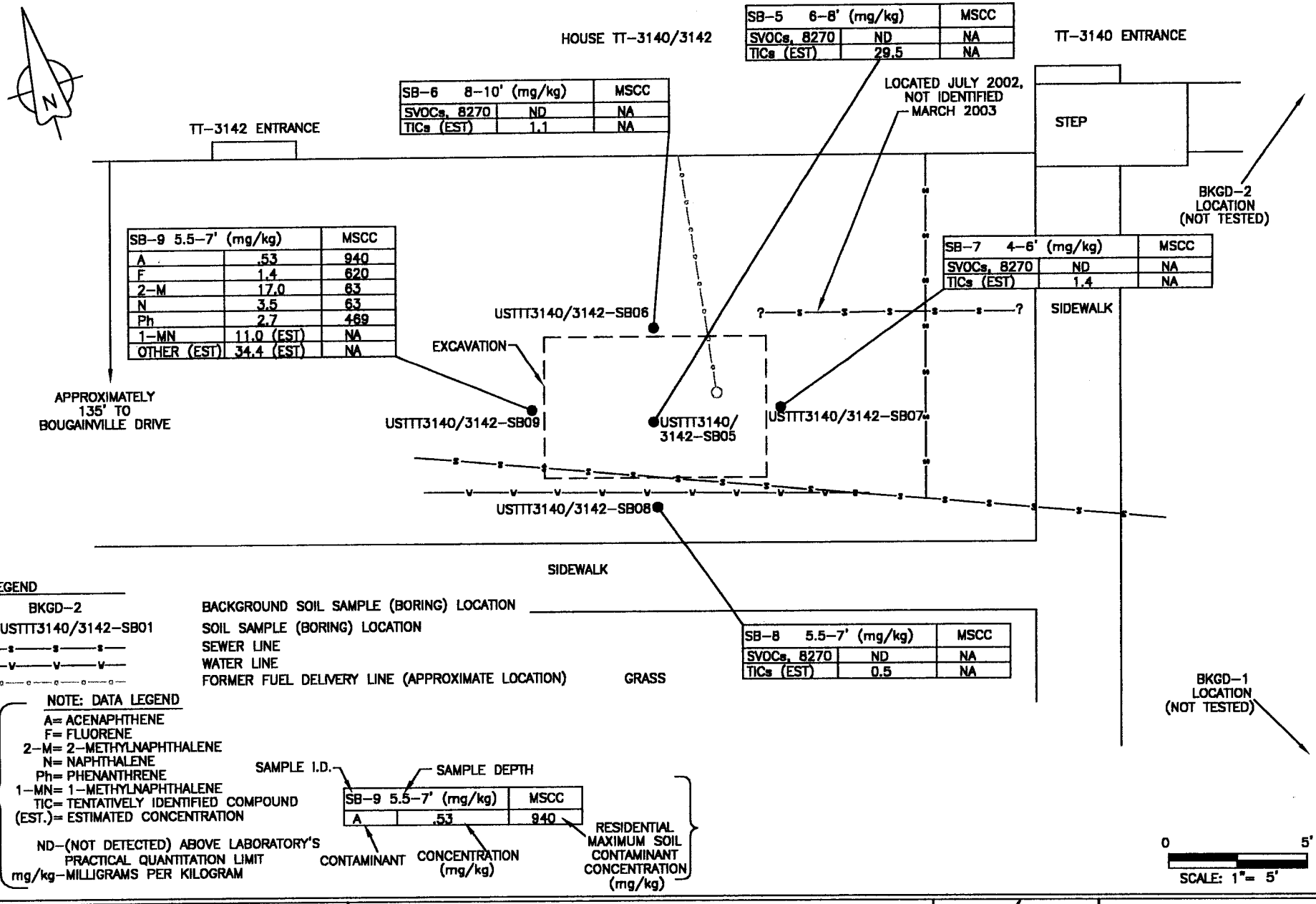
SITE MAP WITH UTILITIES
SAR LUST TT-3140/3142
MARINE CORPS BASE
CAMP LEJEUNE, NORTH CAROLINA

DRAWN BY:		DATE:	MAY 2003
DRAFT CHECK:		JOB NO:	000R1243.57
ENG CHECK:		CAD NO:	01-124302-57
APPROVAL:		DWG NO:	5.1

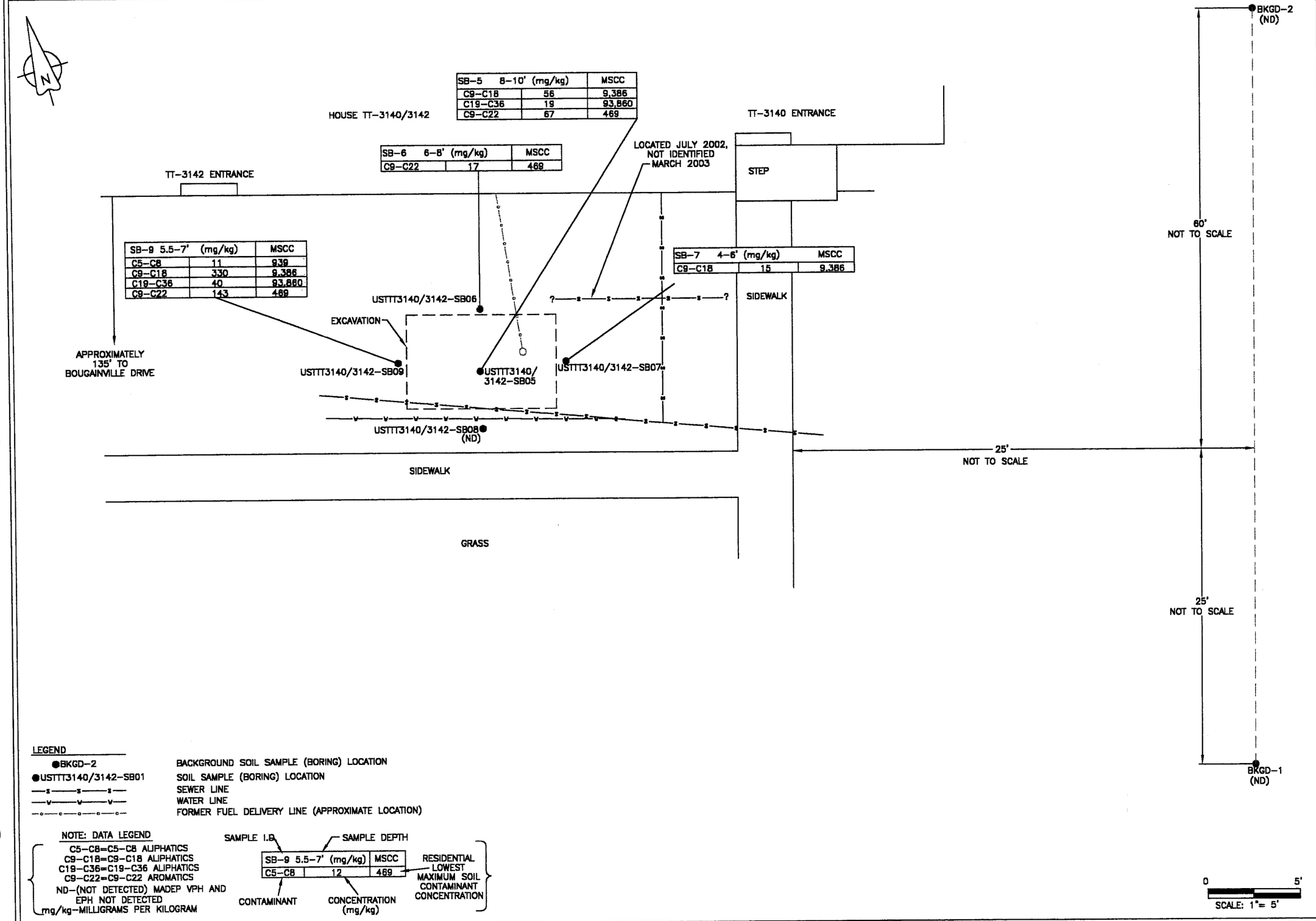
REFERENCE: J.A. JONES ENVIRONMENTAL SERVICES SITE MAP DATED 7/31/01; MID-ATLANTIC DRAWING 01-124302-29.



MID-ATLANTIC ASSOCIATES, INC. *Engineering & Environmental Solutions*	SOIL SAMPLE LABORATORY RESULTS-EPA METHOD 8260B SAR LUST TT-3140/3142 MARINE CORPS BASE CAMP LEJEUNE, NORTH CAROLINA	DRAWN BY:	DATE: MAY 2003
		DRAFT CHECK:	JOB NO: 000R1243.57
		ENG CHECK:	CAD NO: 01-124304-57
REFERENCE: J.A. JONES ENVIRONMENTAL SERVICES SITE MAP DATED 7/31/01; MID-ATLANTIC DRAWING 01-124302-29.		APPROVAL:	DWG NO: 5.2



MID-ATLANTIC ASSOCIATES, INC. *Engineering & Environmental Solutions*	SOIL SAMPLE LABORATORY RESULTS-EPA METHOD 8270 SAR LUST TT-3140/3142 MARINE CORPS BASE CAMP LEJEUNE, NORTH CAROLINA	DRAWN BY:	DATE: MAY 2003
		DRAFT CHECK:	JOB NO: 000R1243.57
		ENG CHECK: DNJ	CAD NO: 01-124305-57
REFERENCE: J.A. JONES ENVIRONMENTAL SERVICES SITE MAP DATED 7/31/01; MID-ATLANTIC DRAWING 01-124302-29.		APPROVAL:	DWG NO: 5.3



LEGEND

●BKGD-2	BACKGROUND SOIL SAMPLE (BORING) LOCATION
●USTTT3140/3142-SB01	SOIL SAMPLE (BORING) LOCATION
—s—s—s—	SEWER LINE
—v—v—v—	WATER LINE
—o—o—o—o—o—	FORMER FUEL DELIVERY LINE (APPROXIMATE LOCATION)

NOTE: DATA LEGEND

C5-C8=C5-C8 ALIPHATICS
C9-C18=C9-C18 ALIPHATICS
C19-C36=C19-C36 ALIPHATICS
C9-C22=C9-C22 AROMATICS
ND-(NOT DETECTED) MADEP VPH AND EPH NOT DETECTED
mg/kg-MILLIGRAMS PER KILOGRAM

DRAWN BY:		DATE: MAY 2003
DRAFTING CHECK BY:		JOB NO: 000R1243.57
ENGINEER CHECK BY:		CAD # 01-124306-57
APPROVED BY:		DWG NO: 5.4

SOIL SAMPLE LABORATORY RESULTS-
MADEP VPH AND EPH
SAR LUST TT-3140/3142
MARINE CORPS BASE
CAMP LEJEUNE, NORTH CAROLINA

MID-ATLANTIC ASSOCIATES, INC.
Engineering & Environmental Solutions

REFERENCE: J.A. JONES ENVIRONMENTAL SERVICES SITE MAP DATED 7/31/01; MID-ATLANTIC DRAWING 01-124302-29.

TABLES

TABLE 2.1
SITE HISTORY
UST SYSTEM INFORMATION

UST ID Number	Product (gasoline, diesel, jet fuel, etc.)	Capacity (gallons)	Date Installed (m/dd/yy)	Date Permanently Closed (P), or Still in Use* (C) (m/dd/yy)	Was Release Associated With UST System? (Yes / No)
TT-3140/3142	Heating Oil	550	1976	7/31/01 (P)	Yes

* Still in use means not permanently closed.

TABLE 2.2
SITE HISTORY
UST OWNER/OPERATOR INFORMATION

Dates of Ownership/Operation (m/dd/yy) to (m/dd/yy)	UST ID Number	Name of Owner or Operator (indicate which)	Usage of UST at Site
1976 to 7/31/01	UST TT-3140/3142	Marine Corps Base – Owner	Heating Oil Supply to Home Heating System

Address	Telephone Number
Commanding General (Attn: I&E, EMD/IRD) Marine Corps Base PSC Box 20004 Camp Lejeune, NC 28542-0004	(910) 451-5068

TABLE 3.1

BUILDING OCCUPANTS NEAR PROJECT SITE

Date: May 2003 Incident No./Name: 23699/Tarawa Terrace 3140 Facility ID #: N/A

PART A: PROPERTY OWNERSHIP INFORMATION

Tax Parcel Number/Map ID	Owner Name (Last, First, MI)	Address
N/A	Commanding General Marine Corps Base Camp Lejeune, NC	I&E/EMD/EQB PSC Box 20004 Marine Corps Base Camp Lejeune, NC 28542

PART B: BUILDING OCCUPANT INFORMATION

Building ID (Reference Drawing 3.1)	Building Occupants	Usage of Building[1]
TT3140 to TT3146 [includes subject site]	Military Families (4 families at maximum occupancy)	Military Family Housing for Enlisted Personnel, Rank E1 to E5
TT3108 to TT3118	Military Families (6 families at maximum occupancy)	Military Family Housing for Enlisted Personnel, Rank E1 to E5

N/A = Not Applicable. The entire surrounding area is used for military housing.

[1] Based on review of MCB family housing internet site (www.lejeune.usmc.mil/family_housing/)

Table 5.1: Summary of Soil Sampling Results (mg/Kg), UST Closure Assessment

Date: May 2003 Incident Number and Name: 23699, Tarawa Terrace 3140/3142 Facility ID#: N/A

Analytical Method (e.g., VOC by EPA 8260) →			TPH 5030/ 8015M	TPH 5030/ 8015M				
Sample ID	**Contaminant of Concern** →		Volatile TPH (gasoline range)	Semi-Volatile TPH (diesel fuel range)				
	Date Collected (m/dd/yy)	**Sample Depth** (ft BLS)						
TT-3140/3142	7/31/01	8	**780**	**18,000**				
TPH Action Level			10	10				

Notes:

Bold = Concentration shown exceeds TPH action level.
ft. BLS = feet below land surface
Results are reported in mg/kg (milligrams per kilogram)

Table 5.2: Summary of Soil Sampling Results (mg/Kg), JA Jones Additional Sampling (RBCA) and Limited Site Assessment

Date: May 2003 Incident Number and Name: 23699, Tarawa Terrace 3140/3142 Facility ID#: N/A

Analytical Method (e.g., VOC by EPA 8260) →			VOC EPA 8260	VOC EPA 8260	VOC EPA 8260	VOC EPA 8260	VOC EPA 8260	VOC EPA 8260	VOC EPA 8260	VOC EPA 8260	VOC EPA 8260	VOC EPA 8270	Semi-VOC EPA 8270	Semi-VOC EPA 8270	Semi-VOC EPA 8270	Semi-VOC EPA 8270	Semi-VOC EPA 8270	Semi-VOC EPA 8270	MADEP VPH	MADEP VPH	MADEP EPH	MADEP EPH	MADEP VPH	MADEP EPH
Sample ID	Contaminant of Concern → / Date Collected (m/dd/yy)	Sample Depth (ft BLS)	sec-Butylbenzene	Ethylbenzene	Isopropylbenzene	4-Isopropyltoluene	Naphthalene (EPA 8260 Test)	n-Propylbenzene	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	Total Xylenes	Acenaphthene	Fluorene	2-Methylnaphthalene	Naphthalene	Phenanthrene	TIC 1-methylnaphthalene (Probability. Listed)	TIC Carboxylic Acid, Unknown (Probability. Listed)	Other TICs (Total)	C5-C8 Aliphatics	C9-C12 Aliphatics	C9-C18 Aliphatics	C19-C36 Aliphatics	C9-C10 Aromatics	C11-C22 Aromatics
-R [JA Jones]	9/20/01	8'	<.005	<.005	<.005	<.005	<.005	<.005	<.005	<.005	<.005	<3.5	<3.5	<3.5	<3.5	<3.5	NT	NT	NT	<7	7.8	830	390	5.7	**630**
-1 [JA Jones]	10/23/01	3'	<.005	<.005	<.005	<.005	<.005	<.005	<.005	<.005	<.005	<.003	<.003	<.003	<.003	<.003	NT	NT	NT	<10	<10	<10	<10	<10	<10
-2 [JA Jones]	10/23/01	3'	<.005	<.005	<.005	<.005	<.005	<.005	<.005	<.005	<.005	<.003	<.003	<.003	<.003	<.003	NT	NT	NT	<10	<10	<10	<10	<10	<10
-3 [JA Jones]	10/23/01	3'	<.005	<.005	<.005	<.005	<.005	<.005	<.005	<.005	<.005	<.003	<.003	<.003	<.003	<.003	NT	NT	NT	<10	<10	<10	<10	<10	<10
-4 [JA Jones]	10/23/01	3'	<.005	<.005	<.005	<.005	<.005	<.005	<.005	<.005	<.005	<.003	<.003	<.003	<.003	<.003	NT	NT	NT	<10	<10	<10	<10	<10	<10
SB01 [MAA-LSA]	7/24/02	4 – 5'	<.006	<.006	<.006	<.006	<.006	<.006	<.006	<.006	<.006	<.360	<.360	<.360	<.360	<.360	Not ID'd	Not ID'd	Not ID'd	<10	<10	<10	<10	<10	<10
Soil to groundwater MSCC (mg/kg)			3	0.24	2	Not Est.	0.58	2	8	7	5	8	44	3	0.58	60	NA	NA	NA	72	3,255		Immobile	34	
Residential MSCC (mg/kg)			156	1,560	1,564	Not Est.	63	156	782	782	32,000	940	620	63	63	469	NA	NA	NA	939	9,386		93,860	469	
Industrial/Commercial MSCC (mg/kg)			4,088	40,000	40,880	Not Est.	1,635	4,088	20,440	20,440	200,000	24,000	16,400	1,635	1,635	12,264	NA	NA	NA	24,528	245,280		HBL >100%	12,264	

Notes:
DENR has assigned this site with "Residential" land usage
Bold = Concentration shown exceeds Residential MSCC but is below Industrial/Commercial MSCC.
MSCC = maximum soil contaminant concentration
HBL = Health Based Level
ft. BLS = feet below land surface
Results are reported in mg/kg (milligrams per kilogram)
<.66 = Not detected at or above method detection limit.
NT = Not tested for this parameter
Not I.D.'d – Not Identified
Not Est. = MSCC not established
MAA-LSA = Mid-Atlantic Associates, Inc., Phase I Limited Site Assessment, July 2002 (sampling event). Soil sample collected from vicinity of former fuel delivery lines.
JA Jones = JA Jones Environmental Services, Additional Soil Sampling for Risk Based Corrective Action (RBCA) parameters, September and October 2001.

Table 5.3: Summary of Soil Sampling Results (mg/Kg), Soil Assessment Report

Date: May 2003 Incident Number and Name: 23699, Tarawa Terrace 3140/3142 Facility ID#: N/A

Analytical Method (e.g., VOC by EPA 8260) →			VOC EPA 8260	VOC EPA 8260	VOC EPA 8260	VOC EPA 8260	VOC EPA 8260	VOC EPA 8260	VOC EPA 8260	VOC EPA 8260	VOC EPA 8260	VOC EPA 8270	Semi-VOC EPA 8270	Semi-VOC EPA 8270	Semi-VOC EPA 8270	Semi-VOC EPA 8270	Semi-VOC EPA 8270	Semi-VOC EPA 8270	MADEP VPH	MADEP VPH	MADEP EPH	MADEP EPH	MADEP VPH	MADEP EPH
Sample ID	Contaminant of Concern →		sec-Butylbenzene	Ethylbenzene	Isopropylbenzene	4-Isopropyltoluene	Naphthalene (EPA 8260 Test)	n-Propylbenzene	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	Total Xylenes	Acenaphthene	Fluorene	2-Methylnaphthalene	Naphthalene	Phenanthrene	TIC 1-methylnaphthalene (Probability, Listed) [estimated concentration]	TIC Carboxylic Acid, Unknown (Probability, Listed) [estimated concentration]	Other TICs (Total) [estimated concentration]	C5-C8 Aliphatics	C9-C12 Aliphatics	C9-C18 Aliphatics	C19-C36 Aliphatics	C9-C10 Aromatics	C11-C22 Aromatics
	Date Collected (m/dd/yy)	Sample Depth (ft BLS)																						
SB05 8-10′	3/25/03	8 – 10′	<.006	<.006	<.006	<.006	<.006	<.006	<.006	<.006	<.006	<.37	<.37	<.37	<.37	<.37	Not ID'd.	Not ID'd.	10 [29.5]	<10	15	41	19	<10	67
SB06 6-8′	3/25/03	6 – 8′	<.006	<.006	<.006	<.006	<.006	<.006	<.006	<.006	<.006	<.36	<.36	<.36	<.36	<.36	Not ID'd.	Not ID'd.	2 [1.1]	<10	<10	<10	<10	<10	17
SB07 4-6′	3/25/03	4 – 6′	<.006	<.006	<.006	<.006	<.006	<.006	<.006	<.006	<.006	<.37	<.37	<.37	<.37	<.37	Not ID'd.	87% [3.8]	1 [1.4]	<10	15	<10	<10	<10	<10
SB08 5.5-7′	3/25/03	5.5 – 7′	<.006	<.006	<.006	<.006	<.006	<.006	<.006	<.006	<.006	<.37	<.37	<.37	<.37	<.37	Not ID'd.	90% [0.9]	1 [0.5]	<10	<10	<10	<10	<10	<10
SB09 5.5-7′	3/25/03	5.5 – 7′	1.0	.34	.39	.79	1.8	.66	8.10	3.20	1.50	.53	1.4	17.0	3.5	2.7	100% [11.0]	Not ID'd.	9 [34.4]	11	170	160	40	23	120
BKGD-1 7-8.5′	3/25/03	7 – 8.5′	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	<10	<10	<10	<10	<10	<10
BKGD-2 7-8.5′	3/25/03	7 – 8.5′	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	<10	<10	<10	<10	<10	<10
Soil to groundwater MSCC (mg/kg)			3	0.24	2	Not Est.	0.58	2	8	7	5	8	44	3	0.58	60	NA	NA	NA	72	3,255		Immobile	34	
Residential MSCC (mg/kg)			156	1,560	1,564	Not Est.	63	156	782	782	32,000	940	620	63	63	469	NA	NA	NA	939	9,386		93,860	469	
Industrial/Commercial MSCC (mg/kg)			4,088	40,000	40,880	Not Est.	1,635	4,088	20,440	20,440	200,000	24,000	16,400	1,635	1,635	12,264	NA	NA	NA	24,528	245,280		HBL >100%	12,264	

Notes:
DENR has assigned this site with "Residential" land usage
Bold = Concentration shown exceeds Residential MSCC but is below Industrial/Commercial MSCC.
MSCC = maximum soil contaminant concentration
HBL = Health Based Level
ft. BLS = feet below land surface
Results are reported in mg/kg (milligrams per kilogram)
<.66 = Not detected at or above method detection limit.
NT = Not tested for this parameter
Not I.D.'d – Not Identified
Not Est. = MSCC not established
MAA-LSA = Mid-Atlantic Associates, Inc., Phase I Limited Site Assessment, July 2002 (sampling event). Soil sample collected from vicinity of former fuel delivery lines.
JA Jones = JA Jones Environmental Services, Additional Soil Sampling for Risk Based Corrective Action (RBCA) parameters, September and October 2001.

APPENDIX A

LIMITED SITE ASSESSMENT RISK CLASSIFICATION AND LAND USE FORM

3.0 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**

   Water supply wells are not located within a 1,500-foot radius of the project site.

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 are no water-supply wells located within 1,000 feet of the source area.

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 are no water-supply wells located within 250 feet of the source area of the release.

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**

   No. There are an adequate number of locations for additional water-supply wells to be installed on other portions of the base.

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. No evidence of accumulations were reported in the UST Closure document or during this investigation.

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

No. Review of available previous environmental reports and 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

Yes. The location of the former tank basin (source area) is approximately 320 feet southeast of a perennial stream designated as "Frenchman's Creek" on the MCB *Hydrography – Creeks and Streams* data layer[1] (Drawing 3.1). This perennial stream is not exhibited on the USGS topographic quadrangle (Drawing 1.1). We contacted Mr. Charles Weaver of the DWQ to identify the DENR stream classification for the perennial stream. He could not find a listing for Frenchman's Creek in the stream classification rules, however he noted that streams within sub-basin 2 of the White Oak River Basin were designated as "SC NSW" or "SC HQW NSW". Mr. Weaver stated that when the name and classification of a receiving stream is found, the upgradient streams (including intermittent streams) are given the same stream classification.

*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?*

No, the contaminants reported in the source well groundwater sample (USTTT3140/3142-MW01) were at concentrations beneath ten times the surface water quality standards for class "SC HQW NSW".

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

[1] Reference Section 9 for GIS data layer source information.

No. Wellhead protection areas defined by 42 USC 300h-7(e) have not, as of this time, been designated by the State for Camp Lejeune. However, MCB Camp Lejeune has identified proposed wellhead protection areas on the base. The site is not located in 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 Geological Survey, 1985), the subject site lies within the Coastal Plain Physiographic Province. Potential impacts to deeper aquifers are unknown.

*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**

Aquifers below the surficial aquifer in the area of UST TT3140/3142 typically include the Castle Hayne Aquifer, the Beaufort Aquifer, and the Peedee Aquifer, in order of increasing depth. Both the Beaufort and Peedee Aquifers contain saltwater in portions of the MCB and are not generally used for water-supply. The Castle Hayne Aquifer contains freshwater and is the principal aquifer used in the area for water-supply.

While there is likely recharge to the unconfined surficial aquifer at the Base, this aquifer is not used for water supply. Deeper aquifers may obtain a portion of recharge from the surficial aquifer at the Base; however, the amount of recharge provided by the surficial aquifer is expected to be substantially limited due to the presence of semi-confining to confining units composed of silt and/or clay.

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

Groundwater sample results for VOCs, VPH, and EPH were below established GCLs and 2L Standards.

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)? Describe.* **YES** NO

   Yes. The former UST was located adjacent to a building containing two single-family residences, which adjoin one another (Drawing 3.1). The UST was located between two of the residences, TT-3140 and TT-3142. Additional multi-unit residential buildings are located in the vicinity around the UST TT3140/3142 site.

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

   No. The property in the direct vicinity of the former UST contains two military family residences as indicated in "1" above.

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? Describe.* YES **NO**

   The property is residential as previously mentioned. The surrounding property has been developed and historically utilized as a residential area for enlisted marines and their families.

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

   Yes. Military families housed in the Tarawa Terrace housing areas typically have young children. The UST was located in front of the entrances to two residences and near walkways that lead to the entrances.

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

The site is located within a restricted area of the base and military police frequently patrol the area. However, access is not restricted to the former tank areas. Military personnel frequently traverse the area on their way to their homes.

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

No. The former UST excavation is overlain by grass.

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

The MCB Camp Lejeune is not subject to local or county zoning requirements.

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

No. The designated use of the site as residential housing for the MCB is not likely to change in the foreseeable future. Building renovation or new housing may occur in the future, as MCB military personnel needs dictate.

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):

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

Military families reside in residential units TT3140 and TT3142 located approximately 6.5 feet to the north of the former UST.

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?*

A playground is located approximately 240 feet to the west-northwest of the site (Drawing 3.1).

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

As previously stated, MCB Camp Lejeune is not subject to local or county zoning requirements. The surrounding property has been developed for military support purposes.

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

The surrounding properties are developed and buildings are used for residential housing of military personnel and their families. Recreational facilities such as playgrounds, tennis courts, and basketball courts are also located nearby.

4.0 RECEPTOR INFORMATION

4.1 Water-Supply Wells

There are no active public drinking water-supply wells located within 1,500 feet of the source area of the release. Former water-supply wells used by the MCB in this area have been abandoned according to MCB Water Department personnel.

4.2 Public Water Supplies

Public water is provided to buildings within 1,500 feet of the subject site by water mains which carry treated potable water. Potable water is supplied to the site and surrounding areas by the MCB water-supply system. Based on marked utility locations, a water line that services the TT-3140 to TT-3146 building is located adjacent to the south side of the former UST excavation (Drawing 4.1). Potable water for Tarawa Terrace is provided by the Holcomb Boulevard water treatment facilities. Groundwater obtained from the Castle Hayne Aquifer beneath the MCB is the raw water source for the treatment facilities.

4.3 Surface Water

The closest surface water body is a perennial stream located approximately 320 feet northwest of the subject site (Drawing 3.1).

APPENDIX B

SOIL BORING LOGS

SOIL BORING/MONITORING WELL LOG

Project: Phase I LSA, UST TT 3140/3142		Project No.: 0001243.29	
Boring/MW No.: UST TT3140/3142-SB01		Date: July 24, 2002	
Installation Method: Hand Auger		Borehole Diameter: 3.5 inches	
Depth Interval (ft.)	**Field Screening Results (ppm)**	**Lithology (soil type, color, etc.)**	**Soil Conditions (dry, moist, petroleum odor)**
1 – 2	0	0 – 0.5 Black topsoil 0.5 – 2' Brown **CLAY** (CL), little fine sand	Soils moist from recent rain, no apparent odor
2 –3	0	2 – 2.5' Gray brown clayey fine **SAND** (SC)	Soils moist from recent rain, no apparent odor
3 – 4	0	2.5 – 5' Brown **CLAY** (CL) some fine sand	No apparent odor, soft
4 - 5	0		

Notes: Sample from 4 to 5 feet submitted to Lab, Time = 1700

WELL CONSTRUCTION DETAILS (if applicable)

Total Depth: 5 feet	Well Diameter: N/A
Screened Interval: N/A	Sand Interval: N/A
Bentonite Interval: N/A	Grout Interval: N/A
Outer Casing Interval: N/A	Outer Casing Diameter: N/A

SOIL BORING/MONITORING WELL LOG

Project: Phase I LSA, UST TT 3140/3142			Project No.: 0001243.29	
Boring/MW No.: UST TT3140/3142 – MW01			Date: July 23, 2002	
Installation Method: HSA			Borehole Diameter: 8 inches	
Split Spoon Interval (ft.)	**Blow Counts**	**Field Screening Results (ppm)**	**Lithology (soil type, color, etc.)**	**Soil Conditions (dry, moist, petroleum odor)**
4 – 6	Pushed	Not screened (not enough sample)	Tan-brown fine **SAND** (SP), fill	Dry, poor recovery
8 – 10	51	8.3	White-brown fine **SAND** (SP), limited brown mottling	Dry to moist, slight odor
13 - 15	30	2.1	White-brown fine **SAND** (SP), wet	Wet

Notes: Temporary Well. Static Water Level = 10.71 feet BLS (7/24/02)

WELL CONSTRUCTION DETAILS (if applicable)

Total Depth: 19 feet	Well Diameter: 2 inches
Screened Interval: 4 to 19 feet	Sand Interval: 3 to 19 feet
Bentonite Interval: 2 to 3 feet	Grout Interval: N/A
Outer Casing Interval: N/A	Outer Casing Diameter: N/A

SOIL BORING LOG

Project Name: SAR, USTTT3140/3142	**Project No.: 0001243.57**
Boring/MW No.: USTTT3140/3142-SB05	**Date: March 25, 2003**
Installation Method: PowerProbe™	**Borehole Diameter: Approx. 2 inches**
Weather Conditions: Sunny; Rain at site March 17 to March 21, 2003.	

Depth Interval (ft.)	Field Screening Results (ppm)	Lithology (soil type, color, etc.)	Soil Conditions (dry, moist, petroleum odor)
0 – 6	0 – 4 = No sample 4 – 5.5 = 16.8	Yellow-brown fine **SAND** (SP)	Dry, apparent backfill
6 – 8	6 – 8 = 31.4	Dark-brown fine **SAND** and silt (SM)	Soils wet at 6 feet
8 – 12	8 – 10 = 28.3 10 – 12 = Not collected	White-brown fine **SAND** (SP)	Wet soils

Notes: Soil boring advanced in center of UST pit beside former J.A. Jones sample location from 8 feet BLS. High water table due to recent precipitation. Boring abandoned with bentonite from land surface to 12 feet BLS.

Total Depth: 12 feet	
Soil Samples Collected (Depth/Time):	8 to 10 Feet - 1100 Hours

SOIL BORING LOG

Project Name: SAR, USTTT3140/3142	**Project No.: 0001243.57**
Boring/MW No.: USTTT3140/3142-SB06	**Date: March 25, 2003**
Installation Method: : PowerProbe™	**Borehole Diameter: Approx. 2 inches**
Weather Conditions: Sunny; Rain at site March 17 to March 21, 2003.	

Depth Interval (ft.)	Field Screening Results (ppm)	Lithology (soil type, color, etc.)	Soil Conditions (dry, moist, petroleum odor)
0 – 2	8.8	0 – 0.6: Dark brown fine **SAND**, little silt (SP) 0.6 – 1.6: Brown fine **SAND**, some clay with orange mottling (SC) 1.6 – 2: Dark brown fine **SAND** and silt (SM)	
2 – 4	22.4	2 – 4: Gray brown fine sandy **CLAY**, some silt (CL-SM)	
4 – 6	16.7	4 – 6: Brown sandy **CLAY** (CL)	
6 – 8	44.7	6 – 8: Gray fine sandy **CLAY** (CL)	
8 – 12		8 – 12: Light white-brown fine to medium **SAND** with brown mottling 8-9; (SP)	Wet soils at approximately 8 feet

Notes: Boring abandoned with bentonite from land surface to 12 feet BLS.

Total Depth: 12 feet	
Soil Samples Collected (Depth/Time):	6 to 8 Feet - 1145 Hours

SOIL BORING LOG

Project Name: SAR, USTTT3140/3142	**Project No.: 0001243.57**
Boring/MW No.: USTTT3140/3142-SB07	**Date: March 25, 2003**
Installation Method: : PowerProbe™	**Borehole Diameter: Approx. 2 inches**
Weather Conditions: Sunny; Rain at site March 17 to March 21, 2003.	

Depth Interval (ft.)	Field Screening Results (ppm)	Lithology (soil type, color, etc.)	Soil Conditions (dry, moist, petroleum odor)
0 – 4	0 - 2 = 24 2 - 4 = 17.5	0.5 – 3: Dark brown fine **SAND** and silt (SM) 3 – 4: Brown fine sandy **CLAY** (CL)	Moist at 3 – 4'
4 – 6	10	Light brown fine sandy **CLAY** with orange-brown mottling (CL)	Moist at 6 – 7.75'
6 – 8	10.3	Gray fine sandy **CLAY** (CL)	Wet at 7.8'
8 – 12		Light white brown fine to medium **SAND**, brown mottling 8-9' (SP)	Wet soils

Notes: Boring abandoned with bentonite from land surface to 12 feet BLS.

Total Depth: 12 feet	
Soil Samples Collected (Depth/Time):	4 to 6 Feet - 1125 Hours

SOIL BORING LOG

Project Name: SAR, USTTT3140/3142	**Project No.: 0001243.57**
Boring/MW No.: USTTT3140/3142-SB08	**Date: March 25, 2003**
Installation Method: : PowerProbe™	**Borehole Diameter: Approx. 2 inches**
Weather Conditions: Sunny; Rain at site March 17 to March 21, 2003.	

Depth Interval (ft.)	Field Screening Results (ppm)	Lithology (soil type, color, etc.)	Soil Conditions (dry, moist, petroleum odor)
0 – 4	Samples not collected for Field Screening	Similar Soils to SB06 through SB09, 0 to 4 Feet.	
4 – 5.2	29.4	Dark brown fine **SAND** (SP)	Moist to wet
5.2 – 6.7	30.1	Gray **CLAY**, some fine sand (CL)	
6.7 – 8	Wet soils, sample not collected	White-brown fine to medium **SAND** (SP)	Wet soils at 7.3'

Notes: Hand augered to 4 feet in order to prevent rupture of nearby water line. Boring abandoned with bentonite from land surface to 8 feet BLS.

Total Depth: 8 feet	
Soil Samples Collected (Depth/Time):	5.5 to 7 Feet - 1210 Hours

SOIL BORING LOG

Project Name: SAR, USTTT3140/3142	**Project No.: 0001243.57**
Boring/MW No.: USTTT3140/3142-SB09	**Date: March 25, 2003**
Installation Method: : PowerProbe™	**Borehole Diameter: Approx. 2 inches**
Weather Conditions: Sunny; Rain at site March 17 to March 21, 2003.	

Depth Interval (ft.)	Field Screening Results (ppm)	Lithology (soil type, color, etc.)	Soil Conditions (dry, moist, petroleum odor)
0 – 1.3	0 – 2 = 24.5	Dark brown fine **SAND**, little silt, organic (SP)	
1.3 – 4	2 – 4 = 19.3	Dark brown fine **SAND**, some clay, mottled orange-brown (SC)	
4 – 6	4 – 5.5 = 24.3	Yellow-brown to gray **CLAY**, little fine sand (CL)	
6 – 8	5.5 – 7 = 873.3	6 – 7.8: Gray fine sandy **CLAY** (CL) 7.8 – 8: White-brown fine to medium **SAND** (SP), wet	5.5 - 7' – sample has strong petroleum odor, dry 7.8 - 8' – Wet soils

Notes: Boring abandoned with bentonite from land surface to 8 feet BLS.

Total Depth: 8 feet	
Soil Samples Collected (Depth/Time):	5.5 to 7 Feet - 1230 Hours

SOIL BORING LOG

Project Name: SAR, USTTT3140/3142	**Project No.: 0001243.57**
Boring/MW No.: BKGD-1	**Date: March 25, 2003**
Installation Method: PowerProbe™	**Borehole Diameter: Approx. 2 inches**
Weather Conditions: Sunny; Rain at site March 17 to March 21, 2003.	

Depth Interval (ft.)	Field Screening Results (ppm)	Lithology (soil type, color, etc.)	Soil Conditions (dry, moist, petroleum odor)
0 – 2	Samples not collected for field screening	Dark brown fine **SAND** (SP)	
2 – 6.5	4 – 6' = 4.5	2 – 2.3: Gray-brown fine **SAND** (SP) 2.3 – 4: Brown **CLAY**, some fine sand with gray-brown mottling (CL) 4 – 6.5: Brown **CLAY**, some fine sand with gray-brown mottling (CL)	
6.5 – 8	Samples not collected for field screening	6.5 – 7.2: Gray sandy **CLAY** (CL) 7.2 – 8: White-brown fine to medium **SAND** (SP)	Moist at 6.5' Wet at 7.2'
8 – 12	Samples not collected for field screening	White-brown fine to medium **SAND** (SP)	Wet

Notes: Soil boring in "background" location, approximately 40 feet southeast of UST pit. Sample collected at similar depth to J.A. Jones sample in similar soil type. Boring abandoned with bentonite from land surface to 12 feet BLS.

Total Depth: 12 feet	
Soil Samples Collected (Depth/Time):	7.2 to 8.5 Feet - 1245 Hours (VPH and EPH only)

SOIL BORING LOG

Project Name: SAR, USTTT3140/3142	**Project No.: 0001243.57**
Boring/MW No.: BKGD-2	**Date: March 25, 2003**
Installation Method: PowerProbe™	**Borehole Diameter: Approx. 2 inches**
Weather Conditions: Sunny; Rain at site March 17 to March 21, 2003.	

Depth Interval (ft.)	Field Screening Results (ppm)	Lithology (soil type, color, etc.)	Soil Conditions (dry, moist, petroleum odor)
0 – 1	Samples not collected for field screening	Dark brown fine **SAND**, little silt with minor, isolated orange-brown clay lenses (SP-SC)	
1 – 4	Samples not collected for field screening	Tan-brown fine **SAND**, some silt (SM)	
4 – 6.75	4 – 6 = 15.9	Gray **CLAY**, little fine sand with red-brown mottling (CL)	
6.7 – 8	6 – 7.5 = 15.1	6.75 – 7: Tan fine to medium **SAND** (SP) 7 – 8: White brown fine to medium **SAND** (SP)	Wet soils at approximately 7.5 feet BLS
8 – 12		White brown fine to medium **SAND** (SP)	

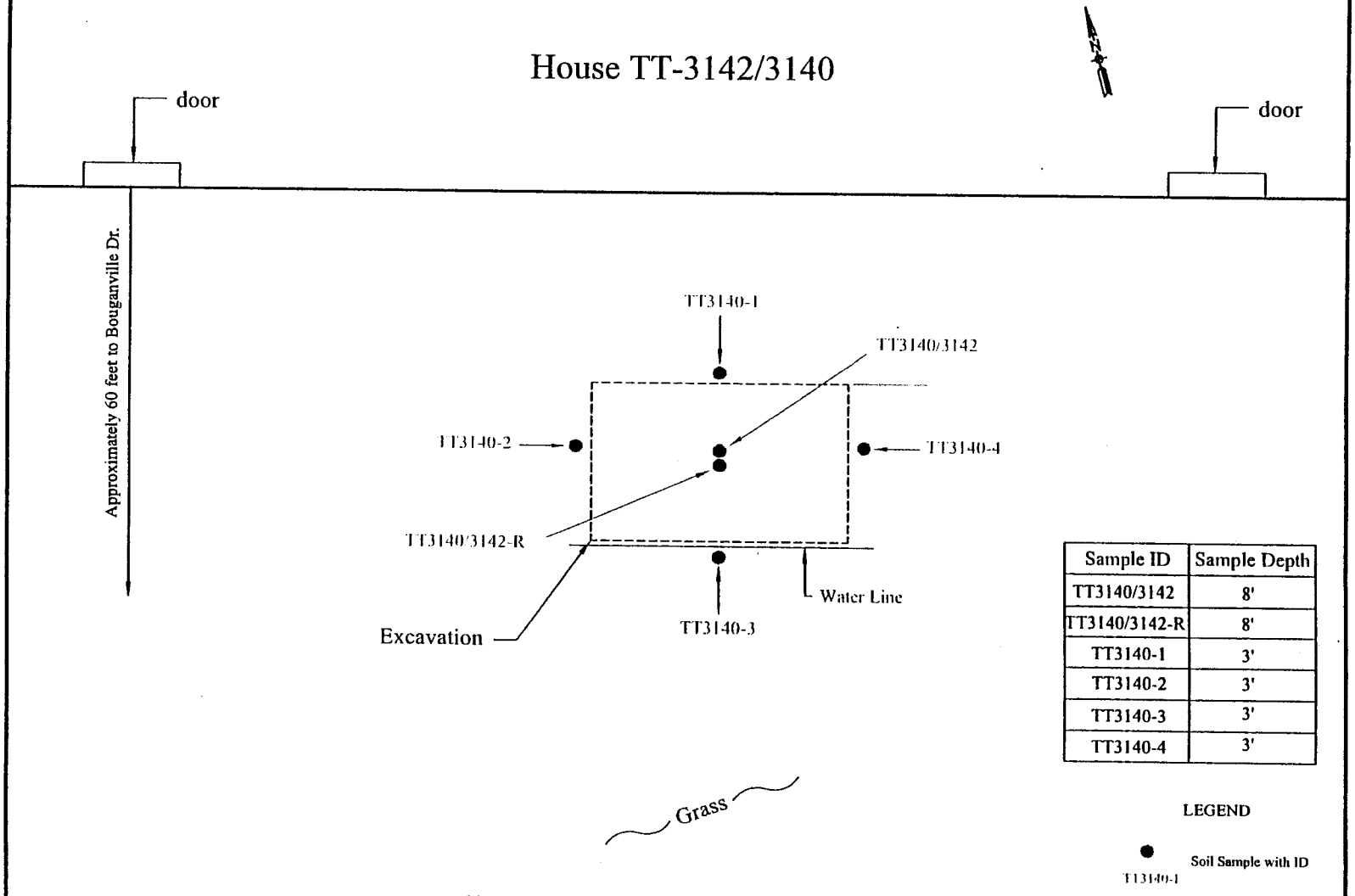
Notes: Soil boring in "background" location, approximately 65 feet northeast of UST pit. Sample collected at similar depth to J.A. Jones sample in similar soil type. Boring abandoned with bentonite from land surface to 12 feet BLS.

Total Depth: 12 feet	
Soil Samples Collected (Depth/Time):	7 to 8.5 Feet - 1300 Hours (VPH and EPH only)

APPENDIX C

SAMPLING LOCATIONS, UST CLOSURE ASSESSMENT, J.A. JONES ENVIRONMENTAL SERVICES COMPANY

House TT-3142/3140



Sample ID	Sample Depth
TT3140/3142	8'
TT3140/3142-R	8'
TT3140-1	3'
TT3140-2	3'
TT3140-3	3'
TT3140-4	3'

LEGEND

● TT3140-1 Soil Sample with ID

0 2.5 5 ft

Graphic Scale

Date	Revision

J.A. JONES ENVIRONMENTAL SERVICES CHARLOTTE, NORTH CAROLINA

CONTRACT NO: N62470-01-D-3011

PROJECT #:	TO 44
DATE:	7/31/01
PROJECT MGR:	D.R.O
DESIGNED BY:	N/A
DRAWN BY:	B.M.
SCALE:	1" = 5'

UST REMOVAL
MARINE CORPS BASE
CAMP LEJEUNE, NC

SITE DRAWING

FIGURE: 2

TABLES

Table 1 Soil Sample Analytical Results (7/31/01 Sampling Event)

Sample ID	Sample Date	Sample Depth (ft bls)	TPH-GRO (Mg/Kg)	TPH-DRO (Mg/Kg)
TT-3140/3142	7/31/01	8	780	18,000

Table 2 SOIL SAMPLES ANALYTICAL RESULTS

(9/20 & 10/23/01 Sampling Event)

SAMPLE ID	DATE	SAMPLE DEPTH	COMPOUND CONCENTRATION (in ppm)		
			C9-C22 Aromatics	C9-C18 Aliphatics	C19-C36 Aliphatics
TT3140/3142-R	9/20/01	8'	**635.7**	837.8	390
TT3140-1	10/23/01	3'			
TT3140-2	10/23/01	3'			
TT3140-3	10/23/01	3'			
TT3140-4	10/23/01	3'			
Residential Soil Cleanup Level	--		469	9386	93860
Soil-to-Water Maximum Soil Contaminant Concentration	--		34	3255	

Note:

1. Only those compounds whose concentration is above Method Detection Limit are listed
2. A no-entry-cell indicates compound concentration Below Method Detection Limit
3. Bold indicates compound concentration above Residential Soil Cleanup Level

APPENDIX D

LABORATORY ANALYTICAL REPORTS AND CHAIN-OF-CUSTODY RECORDS FOR SOIL SAMPLES

PARADIGM ANALYTICAL LABORATORIES, INC.
2627 Northchase Parkway S.E.
Wilmington, North Carolina 28405
(910) 350-1903
Fax (910) 350-1557

RECEIVED
APR 11 2003
BY:

Mr. Eric Aufderhaar
Mid-Atlantic Associates
409 Rogersview Ct.
Raleigh,NC 27610

April 8, 2003

Report Number: G122-2098

Client Project ID: SAR TT-3140/3142

Dear Mr. Aufderhaar,

Enclosed are the results of the analytical services performed under the referenced project. 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 for assistance. We will be happy to answer any questions or concerns which you may have.

Thank you for using 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,

Paradigm Analytical Laboratories, Inc.

Laboratory Director
J. Patrick Weaver

VPH (Aliphatics/Aromatics) Laboratory Reporting Form

Client Name: Mid-Atlantic Associates

Project Name: SAR TT-3140/3142

Sample Information and Analytical Results	
Sample Identification	USTTT3140/3142-SB05 8-10'
Sample Matrix	Soil
Collection Option (for Soil)*	2
Date Collected	03/25/03
Date Received	03/25/03
Date Extracted	03/26/03
Date Analyzed	03/28/03
Dry Weight	85
Dilution Factor	1
C_5-C_8 Aliphatics**	< 10 (mg/Kg)
C_9-C_{12} Aliphatics**	15 (mg/Kg)
C_9-C_{10} Aromatics**	< 10 (mg/Kg)
Surrogate % Recovery - PID	95
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: G122-2098-66423

Reviewed By: MAC

VPH (Aliphatics/Aromatics) Laboratory Reporting Form

Client Name: Mid-Atlantic Associates

Project Name: SAR TT-3140/3142

Sample Information and Analytical Results	
Sample Identification	USTTT3140/3142-SB06 6-8'
Sample Matrix	Soil
Collection Option (for Soil)*	2
Date Collected	03/25/03
Date Received	03/25/03
Date Extracted	03/26/03
Date Analyzed	03/28/03
Dry Weight	86
Dilution Factor	1
C_5-C_8 Aliphatics**	< 10 (mg/Kg)
C_9-C_{12} Aliphatics**	< 10 (mg/Kg)
C_9-C_{10} Aromatics**	< 10 (mg/Kg)
Surrogate % Recovery - PID	95
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: G122-2098-66424

Reviewed By: MLC

VPH (Aliphatics/Aromatics) Laboratory Reporting Form

Client Name: Mid-Atlantic Associates

Project Name: SAR TT-3140/3142

Sample Information and Analytical Results	
Sample Identification	USTTT3140/3142-SB07 4-6'
Sample Matrix	Soil
Collection Option (for Soil)*	2
Date Collected	03/25/03
Date Received	03/25/03
Date Extracted	03/26/03
Date Analyzed	03/28/03
Dry Weight	84
Dilution Factor	1
C_5-C_8 Aliphatics**	< 10 (mg/Kg)
C_9-C_{12} Aliphatics**	15 (mg/Kg)
C_9-C_{10} Aromatics**	< 10 (mg/Kg)
Surrogate % Recovery - PID	86
Surrogate % Recovery - FID	110

* = 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: G122-2098-66425

Reviewed By: MLC

VPH (Aliphatics/Aromatics) Laboratory Reporting Form

Client Name: Mid-Atlantic Associates

Project Name: SAR TT-3140/3142

Sample Information and Analytical Results	
Sample Identification	USTTT3140/3142-SB08 5.5-7'
Sample Matrix	Soil
Collection Option (for Soil)*	2
Date Collected	03/25/03
Date Received	03/25/03
Date Extracted	03/26/03
Date Analyzed	03/28/03
Dry Weight	84
Dilution Factor	1
C_5-C_8 Aliphatics**	< 10 (mg/Kg)
C_9-C_{12} Aliphatics**	< 10 (mg/Kg)
C_9-C_{10} Aromatics**	< 10 (mg/Kg)
Surrogate % Recovery - PID	89
Surrogate % Recovery - FID	110

* = 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: G122-2098-66426

Reviewed By: MLC

VPH (Aliphatics/Aromatics) Laboratory Reporting Form

Client Name: Mid-Atlantic Associates

Project Name: SAR TT-3140/3142

Sample Information and Analytical Results	
Sample Identification	USTTT3140/3142-SB09 5.5-7'
Sample Matrix	Soil
Collection Option (for Soil)*	2
Date Collected	03/25/03
Date Received	03/25/03
Date Extracted	03/26/03
Date Analyzed	03/28/03
Dry Weight	86
Dilution Factor	1
C_5-C_8 Aliphatics**	11 (mg/Kg)
C_9-C_{12} Aliphatics**	170 (mg/Kg)
C_9-C_{10} Aromatics**	23 (mg/Kg)
Surrogate % Recovery - PID	140***
Surrogate % Recovery - FID	530***

* = 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.

***= High surrogate recovery due to matrix interference

Lab Info: G122-2098-66427

Reviewed By: mrc

VPH (Aliphatics/Aromatics) Laboratory Reporting Form

Client Name: Mid-Atlantic Associates

Project Name: SAR TT-3140/3142

Sample Information and Analytical Results	
Sample Identification	BKGD-1, 7-8.5
Sample Matrix	Soil
Collection Option (for Soil)*	2
Date Collected	03/25/03
Date Received	03/25/03
Date Extracted	03/26/03
Date Analyzed	03/28/03
Dry Weight	86
Dilution Factor	1
C_5-C_8 Aliphatics**	< 10 (mg/Kg)
C_9-C_{12} Aliphatics**	< 10 (mg/Kg)
C_9-C_{10} Aromatics**	< 10 (mg/Kg)
Surrogate % Recovery - PID	89
Surrogate % Recovery - FID	110

* = 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: G122-2098-66428

Reviewed By: mrc

VPH (Aliphatics/Aromatics) Laboratory Reporting Form

Client Name: Mid-Atlantic Associates

Project Name: SAR TT-3140/3142

Sample Information and Analytical Results	
Sample Identification	BKGD-2, 7-8.5
Sample Matrix	Soil
Collection Option (for Soil)*	2
Date Collected	03/25/03
Date Received	03/25/03
Date Extracted	03/26/03
Date Analyzed	03/28/03
Dry Weight	85
Dilution Factor	1
C_5-C_8 Aliphatics**	< 10 (mg/Kg)
C_9-C_{12} Aliphatics**	< 10 (mg/Kg)
C_9-C_{10} Aromatics**	< 10 (mg/Kg)
Surrogate % Recovery - PID	89
Surrogate % Recovery - FID	110

* = 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: G122-2098-66429

Reviewed By: mlc

Attachment 2

VPH Laboratory Reporting Form

Calibration and QA/QC Information

FID Initial Calibration Date: 12/26/02 PID Initial Calibration Date: 12/26/02

Calibration Ranges and Limits

Range	MDL (µg/L)	MDL (mg/Kg)	ML (µg/L)	ML (mg/Kg)	RL (µg/L)	RL (mg/Kg)
C_5-C_8 Aliphatics	9.3	0.41	29.4	1.3	100	10
C_9-C_{12} Aliphatics	7.9	0.3	25.2	0.97	100	10
C_9-C_{10} Aromatics	0.5	0.04	1.5	0.14	100	10

Calibration Concentration Levels

Range	Levels (µg/L)	Levels (mg/Kg)	%RSD or CCC	Method of Quantitation
C_5-C_8 Aliphatics	20	2	4.0	Calibration Factor
	80	8		
	200	20		
	800	80		
	2000	200		
C_9-C_{12} Aliphatics	15	1.5	12.3	Calibration Factor
	60	6		
	150	15		
	600	60		
	1500	150		
C_9-C_{10} Aromatics	32.5	3.25	11.3	Calibration Factor
	130	13		
	325	32.5		
	1300	130		
	3250	325		

Calibration Check Date: 03/27/03

Calibration Check

Range	Levels (µg/L)	Levels (mg/Kg)	RPD
C_5-C_8 Aliphatics	200	20	-9.3
C_9-C_{12} Aliphatics	150	15	4.2
C_9-C_{10} Aromatics	325	32.5	-1.4

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

Reviewed By: _____

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Volatiles
by GCMS 8260B/5035

Client Sample ID: USTTT3140/3142-SB05 8-10'
Client Project ID: SAR TT-3140/3142
Lab Sample ID: 66423
Lab Project ID: G122-2098
Matrix: Soil %Solids: 85.3

Date Analyzed: 4/2/03
Analyzed By: EKR
Date Collected: 3/25/03
Date Received: 3/25/03
Dilution: 1

Compound	Quantitation Limit (ug/KG)	Result (ug/KG)
Acetone	59	BQL
Acrolein	120	BQL
Acrylonitrile	120	BQL
Benzene	5.9	BQL
Bromobenzene	5.9	BQL
Bromochloromethane	5.9	BQL
Bromodichloromethane	5.9	BQL
Bromoform	5.9	BQL
Bromomethane	5.9	BQL
2-Butanone	29	BQL
n-Butylbenzene	5.9	BQL
sec-Butylbenzene	5.9	BQL
tert-Butylbenzene	5.9	BQL
Carbon disulfide	5.9	BQL
Carbon tetrachloride	5.9	BQL
Chlorobenzene	5.9	BQL
Chloroethane	5.9	BQL
Chloroform	5.9	BQL
Chloromethane	5.9	BQL
2-Chlorotoluene	5.9	BQL
4-Chlorotoluene	5.9	BQL
Dibromochloromethane	5.9	BQL
1,2-Dibromo-3-chloropropane	5.9	BQL
Dibromomethane	5.9	BQL
1,2-Dibromoethane (EDB)	5.9	BQL
1,2-Dichlorobenzene	5.9	BQL
1,3-Dichlorobenzene	5.9	BQL
1,4-Dichlorobenzene	5.9	BQL
trans-1,4-Dichloro-2-butene	5.9	BQL
1,1-Dichloroethane	5.9	BQL
1,1-Dichloroethene	5.9	BQL
1,2-Dichloroethane	5.9	BQL
cis-1,2-Dichloroethene	5.9	BQL
trans-1,2-dichloroethene	5.9	BQL
1,2-Dichloropropane	5.9	BQL
1,3-Dichloropropane	5.9	BQL
2,2-Dichloropropane	5.9	BQL
1,1-Dichloropropene	5.9	BQL
cis-1,3-Dichloropropene	5.9	BQL
trans-1,3-Dichloropropene	5.9	BQL
Dichlorodifluoromethane	5.9	BQL
Diisopropyl ether (DIPE)	5.9	BQL
Ethylbenzene	5.9	BQL
Hexachlorobutadiene	5.9	BQL
2-Hexanone	5.9	BQL

Reviewed by: mlc

Flags: BQL = Below Quantitation Limit

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Volatiles
by GCMS 8260B/5035

Client Sample ID: USTTT3140/3142-SB05 8-10'
Client Project ID: SAR TT-3140/3142
Lab Sample ID: 66423
Lab Project ID: G122-2098
Matrix: Soil %Solids: 85.3

Date Analyzed: 4/2/03
Analyzed By: EKR
Date Collected: 3/25/03
Date Received: 3/25/03
Dilution: 1

Compound	Quantitation Limit (ug/KG)	Result (ug/KG)
Iodomethane	5.9	BQL
Isopropylbenzene	5.9	BQL
4-Isopropyltoluene	5.9	BQL
Methylene chloride	23	BQL
4-Methyl-2-pentanone	5.9	BQL
Methyl-tert-butyl ether (MTBE)	5.9	BQL
Naphthalene	5.9	BQL
n-Propyl benzene	5.9	BQL
Styrene	5.9	BQL
1,1,1,2-Tetrachloroethane	5.9	BQL
1,1,2,2-Tetrachloroethane	5.9	BQL
Tetrachloroethene	5.9	BQL
Toluene	5.9	BQL
1,2,3-Trichlorobenzene	5.9	BQL
1,2,4-Trichlorobenzene	5.9	BQL
Trichloroethene	5.9	BQL
1,1,1-Trichloroethane	5.9	BQL
1,1,2-Trichloroethane	5.9	BQL
Trichlorofluoromethane	5.9	BQL
1,2,3-Trichloropropane	5.9	BQL
1,2,4-Trimethylbenzene	5.9	BQL
1,3,5-Trimethylbenzene	5.9	BQL
Vinyl chloride	5.9	BQL
m-,p-Xylene	12	BQL
o-Xylene	5.9	BQL

Surrogate Spike Recoveries Compound	Spike Added (ug/KG)	Surrogate Result (ug/KG)	%Rec
Bromofluorobenzene	50	49.1	98
1,2-Dichloroethane-d4	50	52.1	104
Toluene-d8	50	51.0	102

Comments:
All results are corrected for dilution.

Reviewed by: MR

Flags: BQL = Below Quantitation Limit

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Volatiles
by GCMS 8260B/5035

Client Sample ID: USTTT3140/3142-SB06 6-8'
Client Project ID: SAR TT-3140/3142
Lab Sample ID: 66424
Lab Project ID: G122-2098
Matrix: Soil %Solids: 86.0

Date Analyzed: 4/2/03
Analyzed By: EKR
Date Collected: 3/25/03
Date Received: 3/25/03
Dilution: 1

Compound	Quantitation Limit (ug/KG)	Result (ug/KG)
Acetone	58	BQL
Acrolein	120	BQL
Acrylonitrile	120	BQL
Benzene	5.8	BQL
Bromobenzene	5.8	BQL
Bromochloromethane	5.8	BQL
Bromodichloromethane	5.8	BQL
Bromoform	5.8	BQL
Bromomethane	5.8	BQL
2-Butanone	29	BQL
n-Butylbenzene	5.8	BQL
sec-Butylbenzene	5.8	BQL
tert-Butylbenzene	5.8	BQL
Carbon disulfide	5.8	BQL
Carbon tetrachloride	5.8	BQL
Chlorobenzene	5.8	BQL
Chloroethane	5.8	BQL
Chloroform	5.8	BQL
Chloromethane	5.8	BQL
2-Chlorotoluene	5.8	BQL
4-Chlorotoluene	5.8	BQL
Dibromochloromethane	5.8	BQL
1,2-Dibromo-3-chloropropane	5.8	BQL
Dibromomethane	5.8	BQL
1,2-Dibromoethane (EDB)	5.8	BQL
1,2-Dichlorobenzene	5.8	BQL
1,3-Dichlorobenzene	5.8	BQL
1,4-Dichlorobenzene	5.8	BQL
trans-1,4-Dichloro-2-butene	5.8	BQL
1,1-Dichloroethane	5.8	BQL
1,1-Dichloroethene	5.8	BQL
1,2-Dichloroethane	5.8	BQL
cis-1,2-Dichloroethene	5.8	BQL
trans-1,2-dichloroethene	5.8	BQL
1,2-Dichloropropane	5.8	BQL
1,3-Dichloropropane	5.8	BQL
2,2-Dichloropropane	5.8	BQL
1,1-Dichloropropene	5.8	BQL
cis-1,3-Dichloropropene	5.8	BQL
trans-1,3-Dichloropropene	5.8	BQL
Dichlorodifluoromethane	5.8	BQL
Diisopropyl ether (DIPE)	5.8	BQL
Ethylbenzene	5.8	BQL
Hexachlorobutadiene	5.8	BQL
2-Hexanone	5.8	BQL

Reviewed by: MAC

Flags: BQL = Below Quantitation Limit

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Volatiles
by GCMS 8260B/5035

Client Sample ID: USTTT3140/3142-SB06 6-8'
Client Project ID: SAR TT-3140/3142
Lab Sample ID: 66424
Lab Project ID: G122-2098
Matrix: Soil %Solids: 86.0

Date Analyzed: 4/2/03
Analyzed By: EKR
Date Collected: 3/25/03
Date Received: 3/25/03
Dilution: 1

Compound	Quantitation Limit (ug/KG)	Result (ug/KG)
Iodomethane	5.8	BQL
Isopropylbenzene	5.8	BQL
4-Isopropyltoluene	5.8	BQL
Methylene chloride	23	BQL
4-Methyl-2-pentanone	5.8	BQL
Methyl-tert-butyl ether (MTBE)	5.8	BQL
Naphthalene	5.8	BQL
n-Propyl benzene	5.8	BQL
Styrene	5.8	BQL
1,1,1,2-Tetrachloroethane	5.8	BQL
1,1,2,2-Tetrachloroethane	5.8	BQL
Tetrachloroethene	5.8	BQL
Toluene	5.8	BQL
1,2,3-Trichlorobenzene	5.8	BQL
1,2,4-Trichlorobenzene	5.8	BQL
Trichloroethene	5.8	BQL
1,1,1-Trichloroethane	5.8	BQL
1,1,2-Trichloroethane	5.8	BQL
Trichlorofluoromethane	5.8	BQL
1,2,3-Trichloropropane	5.8	BQL
1,2,4-Trimethylbenzene	5.8	BQL
1,3,5-Trimethylbenzene	5.8	BQL
Vinyl chloride	5.8	BQL
m-,p-Xylene	12	BQL
o-Xylene	5.8	BQL

Surrogate Spike Recoveries Compound	Spike Added (ug/KG)	Surrogate Result (ug/KG)	%Rec
Bromofluorobenzene	50	50.9	102
1,2-Dichloroethane-d4	50	49.3	99
Toluene-d8	50	51.5	103

Comments:
All results are corrected for dilution.

Reviewed by: WHC

Flags: BQL = Below Quantitation Limit

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Volatiles
by GCMS 8260B/5035

Client Sample ID: USTTT3140/3142-SB07 4-6'
Client Project ID: SAR TT-3140/3142
Lab Sample ID: 66425
Lab Project ID: G122-2098
Matrix: Soil %Solids: 83.8

Date Analyzed: 4/2/03
Analyzed By: EKR
Date Collected: 3/25/03
Date Received: 3/25/03
Dilution: 1

Compound	Quantitation Limit (ug/KG)	Result (ug/KG)
Acetone	60	BQL
Acrolein	120	BQL
Acrylonitrile	120	BQL
Benzene	6	BQL
Bromobenzene	6	BQL
Bromochloromethane	6	BQL
Bromodichloromethane	6	BQL
Bromoform	6	BQL
Bromomethane	6	BQL
2-Butanone	30	BQL
n-Butylbenzene	6	BQL
sec-Butylbenzene	6	BQL
tert-Butylbenzene	6	BQL
Carbon disulfide	6	BQL
Carbon tetrachloride	6	BQL
Chlorobenzene	6	BQL
Chloroethane	6	BQL
Chloroform	6	BQL
Chloromethane	6	BQL
2-Chlorotoluene	6	BQL
4-Chlorotoluene	6	BQL
Dibromochloromethane	6	BQL
1,2-Dibromo-3-chloropropane	6	BQL
Dibromomethane	6	BQL
1,2-Dibromoethane (EDB)	6	BQL
1,2-Dichlorobenzene	6	BQL
1,3-Dichlorobenzene	6	BQL
1,4-Dichlorobenzene	6	BQL
trans-1,4-Dichloro-2-butene	6	BQL
1,1-Dichloroethane	6	BQL
1,1-Dichloroethene	6	BQL
1,2-Dichloroethane	6	BQL
cis-1,2-Dichloroethene	6	BQL
trans-1,2-dichloroethene	6	BQL
1,2-Dichloropropane	6	BQL
1,3-Dichloropropane	6	BQL
2,2-Dichloropropane	6	BQL
1,1-Dichloropropene	6	BQL
cis-1,3-Dichloropropene	6	BQL
trans-1,3-Dichloropropene	6	BQL
Dichlorodifluoromethane	6	BQL
Diisopropyl ether (DIPE)	6	BQL
Ethylbenzene	6	BQL
Hexachlorobutadiene	6	BQL
2-Hexanone	6	BQL

Reviewed by: MHC

Flags: BQL = Below Quantitation Limit

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Volatiles
by GCMS 8260B/5035

Client Sample ID: USTTT3140/3142-SB07 4-6'
Client Project ID: SAR TT-3140/3142
Lab Sample ID: 66425
Lab Project ID: G122-2098
Matrix: Soil %Solids: 83.8

Date Analyzed: 4/2/03
Analyzed By: EKR
Date Collected: 3/25/03
Date Received: 3/25/03
Dilution: 1

Compound	Quantitation Limit (ug/KG)	Result (ug/KG)
Iodomethane	6	BQL
Isopropylbenzene	6	BQL
4-Isopropyltoluene	6	BQL
Methylene chloride	24	BQL
4-Methyl-2-pentanone	6	BQL
Methyl-tert-butyl ether (MTBE)	6	BQL
Naphthalene	6	BQL
n-Propyl benzene	6	BQL
Styrene	6	BQL
1,1,1,2-Tetrachloroethane	6	BQL
1,1,2,2-Tetrachloroethane	6	BQL
Tetrachloroethene	6	BQL
Toluene	6	BQL
1,2,3-Trichlorobenzene	6	BQL
1,2,4-Trichlorobenzene	6	BQL
Trichloroethene	6	BQL
1,1,1-Trichloroethane	6	BQL
1,1,2-Trichloroethane	6	BQL
Trichlorofluoromethane	6	BQL
1,2,3-Trichloropropane	6	BQL
1,2,4-Trimethylbenzene	6	BQL
1,3,5-Trimethylbenzene	6	BQL
Vinyl chloride	6	BQL
m-,p-Xylene	12	BQL
o-Xylene	6	BQL

Surrogate Spike Recoveries Compound	Spike Added (ug/KG)	Surrogate Result (ug/KG)	%Rec
Bromofluorobenzene	50	52.1	104
1,2-Dichloroethane-d4	50	54.8	110
Toluene-d8	50	51.5	103

Comments:
All results are corrected for dilution.

Reviewed by: mc

Flags: BQL = Below Quantitation Limit

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Volatiles
by GCMS 8260B/5035

Client Sample ID: USTTT3140/3142-SB08 5.5-7'
Client Project ID: SAR TT-3140/3142
Lab Sample ID: 66426
Lab Project ID: G122-2098
Matrix: Soil %Solids: 84.3

Date Analyzed: 4/2/03
Analyzed By: EKR
Date Collected: 3/25/03
Date Received: 3/25/03
Dilution: 1

Compound	Quantitation Limit (ug/KG)	Result (ug/KG)
Acetone	59	BQL
Acrolein	120	BQL
Acrylonitrile	120	BQL
Benzene	5.9	BQL
Bromobenzene	5.9	BQL
Bromochloromethane	5.9	BQL
Bromodichloromethane	5.9	BQL
Bromoform	5.9	BQL
Bromomethane	5.9	BQL
2-Butanone	30	BQL
n-Butylbenzene	5.9	BQL
sec-Butylbenzene	5.9	BQL
tert-Butylbenzene	5.9	BQL
Carbon disulfide	5.9	BQL
Carbon tetrachloride	5.9	BQL
Chlorobenzene	5.9	BQL
Chloroethane	5.9	BQL
Chloroform	5.9	BQL
Chloromethane	5.9	BQL
2-Chlorotoluene	5.9	BQL
4-Chlorotoluene	5.9	BQL
Dibromochloromethane	5.9	BQL
1,2-Dibromo-3-chloropropane	5.9	BQL
Dibromomethane	5.9	BQL
1,2-Dibromoethane (EDB)	5.9	BQL
1,2-Dichlorobenzene	5.9	BQL
1,3-Dichlorobenzene	5.9	BQL
1,4-Dichlorobenzene	5.9	BQL
trans-1,4-Dichloro-2-butene	5.9	BQL
1,1-Dichloroethane	5.9	BQL
1,1-Dichloroethene	5.9	BQL
1,2-Dichloroethane	5.9	BQL
cis-1,2-Dichloroethene	5.9	BQL
trans-1,2-dichloroethene	5.9	BQL
1,2-Dichloropropane	5.9	BQL
1,3-Dichloropropane	5.9	BQL
2,2-Dichloropropane	5.9	BQL
1,1-Dichloropropene	5.9	BQL
cis-1,3-Dichloropropene	5.9	BQL
trans-1,3-Dichloropropene	5.9	BQL
Dichlorodifluoromethane	5.9	BQL
Diisopropyl ether (DIPE)	5.9	BQL
Ethylbenzene	5.9	BQL
Hexachlorobutadiene	5.9	BQL
2-Hexanone	5.9	BQL

Reviewed by: MLC

Flags: BQL = Below Quantitation Limit

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Volatiles
by GCMS 8260B/5035

Client Sample ID: USTTT3140/3142-SB08 5.5-7'
Client Project ID: SAR TT-3140/3142
Lab Sample ID: 66426
Lab Project ID: G122-2098
Matrix: Soil %Solids: 84.3

Date Analyzed: 4/2/03
Analyzed By: EKR
Date Collected: 3/25/03
Date Received: 3/25/03
Dilution: 1

Compound	Quantitation Limit (ug/KG)	Result (ug/KG)
Iodomethane	5.9	BQL
Isopropylbenzene	5.9	BQL
4-Isopropyltoluene	5.9	BQL
Methylene chloride	24	BQL
4-Methyl-2-pentanone	5.9	BQL
Methyl-tert-butyl ether (MTBE)	5.9	BQL
Naphthalene	5.9	BQL
n-Propyl benzene	5.9	BQL
Styrene	5.9	BQL
1,1,1,2-Tetrachloroethane	5.9	BQL
1,1,2,2-Tetrachloroethane	5.9	BQL
Tetrachloroethene	5.9	BQL
Toluene	5.9	BQL
1,2,3-Trichlorobenzene	5.9	BQL
1,2,4-Trichlorobenzene	5.9	BQL
Trichloroethene	5.9	BQL
1,1,1-Trichloroethane	5.9	BQL
1,1,2-Trichloroethane	5.9	BQL
Trichlorofluoromethane	5.9	BQL
1,2,3-Trichloropropane	5.9	BQL
1,2,4-Trimethylbenzene	5.9	BQL
1,3,5-Trimethylbenzene	5.9	BQL
Vinyl chloride	5.9	BQL
m-,p-Xylene	12	BQL
o-Xylene	5.9	BQL

Surrogate Spike Recoveries Compound	Spike Added (ug/KG)	Surrogate Result (ug/KG)	%Rec
Bromofluorobenzene	50	50.6	101
1,2-Dichloroethane-d4	50	48.5	97
Toluene-d8	50	51.9	104

Comments:
All results are corrected for dilution.

Reviewed by: MAC

Flags: BQL = Below Quantitation Limit

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Volatiles
by GCMS 8260B/5035

Client Sample ID: USTTT3140/3142-SB09 5.5-7'
Client Project ID: SAR TT-3140/3142
Lab Sample ID: 66427
Lab Project ID: G122-2098
Matrix: Soil %Solids: 86.4

Date Analyzed: 4/3/03
Analyzed By: JTF
Date Collected: 3/25/03
Date Received: 3/25/03
Dilution: 200

Compound	Quantitation Limit (ug/KG)	Result (ug/KG)
Acetone	5800	BQL
Acrolein	23000	BQL
Acrylonitrile	23000	BQL
Benzene	230	BQL
Bromobenzene	230	BQL
Bromochloromethane	230	BQL
Bromodichloromethane	230	BQL
Bromoform	230	BQL
Bromomethane	230	BQL
2-Butanone	5800	BQL
n-Butylbenzene	230	BQL
sec-Butylbenzene	230	**1000**
tert-Butylbenzene	230	BQL
Carbon disulfide	230	BQL
Carbon tetrachloride	230	BQL
Chlorobenzene	230	BQL
Chloroethane	230	BQL
Chloroform	230	BQL
Chloromethane	230	BQL
2-Chlorotoluene	230	BQL
4-Chlorotoluene	230	BQL
Dibromochloromethane	230	BQL
1,2-Dibromo-3-chloropropane	1200	BQL
Dibromomethane	230	BQL
1,2-Dibromoethane (EDB)	230	BQL
1,2-Dichlorobenzene	230	BQL
1,3-Dichlorobenzene	230	BQL
1,4-Dichlorobenzene	230	BQL
trans-1,4-Dichloro-2-butene	1200	BQL
1,1-Dichloroethane	230	BQL
1,1-Dichloroethene	230	BQL
1,2-Dichloroethane	230	BQL
cis-1,2-Dichloroethene	230	BQL
trans-1,2-dichloroethene	230	BQL
1,2-Dichloropropane	230	BQL
1,3-Dichloropropane	230	BQL
2,2-Dichloropropane	230	BQL
1,1-Dichloropropene	230	BQL
cis-1,3-Dichloropropene	230	BQL
trans-1,3-Dichloropropene	230	BQL
Dichlorodifluoromethane	1200	BQL
Diisopropyl ether (DIPE)	230	BQL
Ethylbenzene	230	**340**
Hexachlorobutadiene	230	BQL
2-Hexanone	1200	BQL

Reviewed by: MC

Flags: BQL = Below Quantitation Limit

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Volatiles
by GCMS 8260B/5035

Client Sample ID: USTTT3140/3142-SB09 5.5-7'
Client Project ID: SAR TT-3140/3142
Lab Sample ID: 66427
Lab Project ID: G122-2098
Matrix: Soil %Solids: 86.4

Date Analyzed: 4/3/03
Analyzed By: JTF
Date Collected: 3/25/03
Date Received: 3/25/03
Dilution: 200

Compound	Quantitation Limit (ug/KG)	Result (ug/KG)
Iodomethane	230	BQL
Isopropylbenzene	230	**390**
4-Isopropyltoluene	230	**790**
Methylene chloride	1200	BQL
4-Methyl-2-pentanone	1200	BQL
Methyl-tert-butyl ether (MTBE)	230	BQL
Naphthalene	230	**1800**
n-Propyl benzene	230	**660**
Styrene	230	BQL
1,1,1,2-Tetrachloroethane	230	BQL
1,1,2,2-Tetrachloroethane	230	BQL
Tetrachloroethene	230	BQL
Toluene	230	BQL
1,2,3-Trichlorobenzene	230	BQL
1,2,4-Trichlorobenzene	230	BQL
Trichloroethene	230	BQL
1,1,1-Trichloroethane	230	BQL
1,1,2-Trichloroethane	230	BQL
Trichlorofluoromethane	230	BQL
1,2,3-Trichloropropane	230	BQL
1,2,4-Trimethylbenzene	230	**8100**
1,3,5-Trimethylbenzene	230	**3200**
Vinyl chloride	230	BQL
m-,p-Xylene	460	**1500**
o-Xylene	230	BQL

Surrogate Spike Recoveries Compound	Spike Added (ug/KG)	Surrogate Result (ug/KG)	%Rec
Bromofluorobenzene	10	9.7	97
1,2-Dichloroethane-d4	10	9.5	95
Toluene-d8	10	10.0	100

Comments:
All results are corrected for dilution.

Reviewed by: MLC

Flags: BQL = Below Quantitation Limit

EPH (Aliphatics/Aromatics) Results

by MDEP-EPH

Client Name: Mid-Atlantic Associates

Project Name: SAR TT-3140/3142

Sample Information and Analytical Results	
Sample Identification	USTTT3140/3142-SB05 8-10'
Sample Matrix	Soil
Date Collected	03/25/03
Date Received	03/25/03
Date Extracted	03/27/03
Date Analyzed	04/02/03
Dry Weight	85.3
Dilution Factor	1
C_9-C_{18} Aliphatics*	41 (mg/Kg)
C_{19}-C_{36} Aliphatics*	19 (mg/Kg)
C_{11}-C_{22} Aromatics*	67 (mg/Kg)
Aliphatic Surrogate % Recovery	73
Aromatic Surrogate % Recovery	80
Fractionation Surrogate 1 % Recovery	90

Comments:

* = Excludes any surrogates or internal standards.

Lab info: G122-2098-66423

Reviewed By: MLC

EPH (Aliphatics/Aromatics) Results

by MDEP-EPH

Client Name: Mid-Atlantic Associates

Project Name: SAR TT-3140/3142

Sample Information and Analytical Results	
Sample Identification	USTTT3140/3142-SB06 6-8'
Sample Matrix	Soil
Date Collected	03/25/03
Date Received	03/25/03
Date Extracted	03/27/03
Date Analyzed	03/31/03
Dry Weight	86
Dilution Factor	1
C_9-C_{18} Aliphatics*	< 10 (mg/Kg)
C_{19}-C_{36} Aliphatics*	< 10 (mg/Kg)
C_{11}-C_{22} Aromatics*	17 (mg/Kg)
Aliphatic Surrogate % Recovery	71
Aromatic Surrogate % Recovery	68
Fractionation Surrogate 1 % Recovery	92

Comments:

* = Excludes any surrogates or internal standards.

Lab info: G122-2098-66424

Reviewed By: MLC

EPH (Aliphatics/Aromatics) Results

by MDEP-EPH

Client Name: Mid-Atlantic Associates

Project Name: SAR TT-3140/3142

Sample Information and Analytical Results	
Sample Identification	USTTT3140/3142-SB07 4-6'
Sample Matrix	Soil
Date Collected	03/25/03
Date Received	03/25/03
Date Extracted	03/27/03
Date Analyzed	04/01/03
Dry Weight	83.8
Dilution Factor	1
C_9-C_{18} Aliphatics*	< 10 (mg/Kg)
C_{19}-C_{36} Aliphatics*	< 10 (mg/Kg)
C_{11}-C_{22} Aromatics*	< 10 (mg/Kg)
Aliphatic Surrogate % Recovery	85
Aromatic Surrogate % Recovery	79

Comments:

* = Excludes any surrogates or internal standards.
Sample did not require fractionation.

Lab info: G122-2098-66425

Reviewed By: MH

EPH (Aliphatics/Aromatics) Results

by MDEP-EPH

Client Name: Mid-Atlantic Associates

Project Name: SAR TT-3140/3142

Sample Information and Analytical Results	
Sample Identification	USTTT3140/3142-SB08 5.5-7'
Sample Matrix	Soil
Date Collected	03/25/03
Date Received	03/25/03
Date Extracted	03/27/03
Date Analyzed	03/31/03
Dry Weight	84.3
Dilution Factor	1
C_9-C_{18} Aliphatics*	< 10 (mg/Kg)
C_{19}-C_{36} Aliphatics*	< 10 (mg/Kg)
C_{11}-C_{22} Aromatics*	< 10 (mg/Kg)
Aliphatic Surrogate % Recovery	97
Aromatic Surrogate % Recovery	94

Comments:

* = Excludes any surrogates or internal standards.
Sample did not require fractionation.

Lab info: G122-2098-66426

Reviewed By: MMC

EPH (Aliphatics/Aromatics) Results

by MDEP-EPH

Client Name: Mid-Atlantic Associates

Project Name: SAR TT-3140/3142

Sample Information and Analytical Results	
Sample Identification	USTTT3140/3142-SB09 5.5-7'
Sample Matrix	Soil
Date Collected	03/25/03
Date Received	03/25/03
Date Extracted	03/27/03
Date Analyzed	03/31/03
Dry Weight	86.4
Dilution Factor	1
C_9-C_{18} Aliphatics*	160 (mg/Kg)
C_{19}-C_{36} Aliphatics*	40 (mg/Kg)
C_{11}-C_{22} Aromatics*	120 (mg/Kg)
Aliphatic Surrogate % Recovery	73
Aromatic Surrogate % Recovery	71
Fractionation Surrogate 1 % Recovery	92

Comments:

* = Excludes any surrogates or internal standards.

Lab info: G122-2098-66427

Reviewed By: MLC

EPH (Aliphatics/Aromatics) Results

by MDEP-EPH

Client Name: Mid-Atlantic Associates

Project Name: SAR TT-3140/3142

Sample Information and Analytical Results	
Sample Identification	BKGD-1, 7-8.5
Sample Matrix	Soil
Date Collected	03/25/03
Date Received	03/25/03
Date Extracted	03/27/03
Date Analyzed	04/03/03
Dry Weight	86
Dilution Factor	1
C_9-C_{18} Aliphatics*	< 10 (mg/Kg)
C_{19}-C_{36} Aliphatics*	< 10 (mg/Kg)
C_{11}-C_{22} Aromatics*	< 10 (mg/Kg)
Aliphatic Surrogate % Recovery	59
Aromatic Surrogate % Recovery	80
Fractionation Surrogate 1 % Recovery	100

Comments:

* = Excludes any surrogates or internal standards.

Lab info: G122-2098-66428

Reviewed By: MRC

EPH (Aliphatics/Aromatics) Results

by MDEP-EPH

Client Name: Mid-Atlantic Associates

Project Name: SAR TT-3140/3142

Sample Information and Analytical Results	
Sample Identification	BKGD-2, 7-8.5
Sample Matrix	Soil
Date Collected	03/25/03
Date Received	03/25/03
Date Extracted	03/27/03
Date Analyzed	03/31/03
Dry Weight	85
Dilution Factor	1
C_9-C_{18} Aliphatics*	< 10 (mg/Kg)
C_{19}-C_{36} Aliphatics*	< 10 (mg/Kg)
C_{11}-C_{22} Aromatics*	< 10 (mg/Kg)
Aliphatic Surrogate % Recovery	95
Aromatic Surrogate % Recovery	94

Comments:

* = Excludes any surrogates or internal standards.
Sample did not require fractionation.

Lab info: G122-2098-66429

Reviewed By: MLC

PARADIGM ANALYTICAL LABORATORIES, INC.

Attachment 3

EPH Laboratory Reporting Form

Calibration and QA/QC Information

Initial Calibration Date: 03/19/03

Calibration Ranges and Limits

Range	MDL (µg/L)	MDL (mg/Kg)	ML (µg/L)	ML (mg/Kg)	RL (µg/L)	RL (mg/Kg)
C_9-C_{18} Aliphatics	0.1	0.8	0.3	2.6	100	10
C_{19}-C_{36} Aliphatics	0.1	1.6	0.3	5	100	10
C_{11}-C_{22} Aromatics	0.2	2.1	0.6	6.7	100	10

Calibration Concentration Levels

Range	Levels (µg/L)	Levels (mg/Kg)	%RSD or CCC	Method of Quantitation
C_9-C_{18} Aliphatics	0.06	1	5.00	Calibration Factor
	0.15	2.5		
	0.3	5		
	0.6	10		
	1.2	20		
C_{19}-C_{36} Aliphatics	0.08	1.33	2.4	Calibration Factor
	0.2	3.33		
	0.4	6.67		
	0.8	13.3		
	1.6	26.7		
C_{11}-C_{22} Aromatics	0.17	2.83	1.3	Calibration Factor
	0.425	7.08		
	0.85	14.2		
	1.7	28.3		
	3.4	56.7		

Calibration Check Date: 03/31/03

Calibration Check

Range	Levels (µg/mL)	Levels (mg/Kg)	RPD
C_9-C_{18} Aliphatics	0.6	10	3.1
C_{19}-C_{36} Aliphatics	0.8	13.3	3.3
C_{11}-C_{22} Aromatics	1.7	28.3	-1.6

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

Attachment 3

EPH Laboratory Reporting Form

Calibration and QA/QC Information

Initial Calibration Date: 03/19/03

Calibration Ranges and Limits

Range	MDL (µg/L)	MDL (mg/Kg)	ML (µg/L)	ML (mg/Kg)	RL (µg/L)	RL (mg/Kg)
C_9-C_{18} Aliphatics	0.1	0.8	0.3	2.6	100	10
C_{19}-C_{36} Aliphatics	0.1	1.6	0.3	5	100	10
C_{11}-C_{22} Aromatics	0.2	2.1	0.6	6.7	100	10

Calibration Concentration Levels

Range	Levels (µg/L)	Levels (mg/Kg)	%RSD or CCC	Method of Quantitation
C_9-C_{18} Aliphatics	0.06	1	5.00	Calibration Factor
	0.15	2.5		
	0.3	5		
	0.6	10		
	1.2	20		
C_{19}-C_{36} Aliphatics	0.08	1.33	2.4	Calibration Factor
	0.2	3.33		
	0.4	6.67		
	0.8	13.3		
	1.6	26.7		
C_{11}-C_{22} Aromatics	0.17	2.83	1.3	Calibration Factor
	0.425	7.08		
	0.85	14.2		
	1.7	28.3		
	3.4	56.7		

Calibration Check Date: 04/02/03

Calibration Check

Range	Levels (µg/mL)	Levels (mg/Kg)	RPD
C_9-C_{18} Aliphatics	0.6	10	-6.8
C_{19}-C_{36} Aliphatics	0.8	13.3	-7.7
C_{11}-C_{22} Aromatics	1.7	28.3	-4.9

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

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Semivolatiles
by GCMS 8270

Client Sample ID: USTTT3140/3142-SB05 8-10'
Client Project ID: SAR TT-3140/3142
Lab Sample ID: 66423
Lab Project ID: G122-2098
Matrix: Soil %Solids: 85.3

Date Collected: 3/25/2003
Date Received: 3/25/2003
Date Analyzed: 4/2/2003
Analyzed By: MRC
Dilution: 1

Compound	Quantitation Limit (ug/KG)	Result (ug/KG)
Acenaphthene	370	BQL
Acenaphthylene	370	BQL
Anthracene	370	BQL
Benzo[a]anthracene	370	BQL
Benzo[a]pyrene	370	BQL
Benzo[b]fluoranthene	370	BQL
Benzo[g,h,i]perylene	370	BQL
Benzo[k]fluoranthene	370	BQL
Benzoic Acid	730	BQL
Bis(2-chloroethoxy)methane	370	BQL
Bis(2-chloroethyl)ether	370	BQL
Bis(2-chloroisopropyl)ether	370	BQL
Bis(2-ethylhexyl)phthalate	370	BQL
4-bromophenyl phenyl ether	370	BQL
Butylbenzylphthalate	370	BQL
4-Chloroaniline	1800	BQL
4-Chloro-3-methylphenol	370	BQL
2-Chloronaphthalene	370	BQL
2-Chlorophenol	370	BQL
4-Chlorophenyl phenyl ether	370	BQL
Chrysene	370	BQL
Di-n-Butylphthalate	370	BQL
Di-n-octylphthalate	370	BQL
Dibenzo[a,h]anthracene	370	BQL
Dibenzofuran	370	BQL
1,2-Dichlorobenzene	370	BQL
1,3-Dichlorobenzene	370	BQL
1,4-Dichlorobenzene	370	BQL
3,3'-Dichlorobenzidine	730	BQL
2,4-Dichlorophenol	370	BQL
Diethylphthalate	370	BQL
2,4-Dimethylphenol	370	BQL
Dimethylphthalate	370	BQL
4,6-Dinitro-2-methylphenol	1800	BQL
2,4-Dinitrophenol	1800	BQL
2,4-Dinitrotoluene	370	BQL
2,6-Dinitrotoluene	370	BQL
Fluoranthene	370	BQL
Fluorene	370	BQL
Hexachlorobenzene	370	BQL

Results for Semivolatiles

by GCMS 8270

Client Sample ID: USTTT3140/3142-SB05 8-10'
Client Project ID: SAR TT-3140/3142
Lab Sample ID: 66423
Lab Project ID: G122-2098
Matrix: Soil %Solids: 85.3

Date Collected: 3/25/2003
Date Received: 3/25/2003
Date Analyzed: 4/2/2003
Analyzed By: MRC
Dilution: 1

Compound	Quantitation Limit (ug/KG)	Result (ug/KG)
Hexachlorobutadiene	370	BQL
Hexachlorocyclopentadiene	730	BQL
Hexachloroethane	370	BQL
Indeno(1,2,3-c,d)pyrene	370	BQL
Isophorone	370	BQL
2-Methylnaphthalene	370	BQL
2-Methylphenol	370	BQL
3- & 4-Methylphenol	370	BQL
N-Nitrosodi-n-propylamine	370	BQL
N-Nitrosodiphenylamine	370	BQL
Naphthalene	370	BQL
2-Nitroaniline	370	BQL
3-Nitroaniline	1800	BQL
4-Nitroaniline	1800	BQL
Nitrobenzene	370	BQL
2-Nitrophenol	370	BQL
4-Nitrophenol	1800	BQL
Pentachlorophenol	1800	BQL
Phenanthrene	370	BQL
Phenol	370	BQL
Pyrene	370	BQL
1,2,4-Trichlorobenzene	370	BQL
2,4,5-Trichlorophenol	370	BQL
2,4,6-Trichlorophenol	370	BQL

Surrogate Spike Recoveries	Spike Added	Spike Result	Percent Recovered
2-Fluorobiphenyl	10	9.5	95
2-Fluorophenol	10	9.4	94
Nitrobenzene-d5	10	9.1	91
Phenol-d6	10	9.1	91
2,4,6-Tribromophenol	10	9.4	94
4-Terphenyl-d14	10	9.9	99

Comments:

Results are corrected for %solids and dilution where applicable.

Flags:

BQL = Below Quantitation Limit.

Reviewed By: MRC

Results of Library Search for Semivolatile Compounds

by GCMS

Client Sample ID: USTTT3140/3142-SB05 8-10'
Client Project ID: SAR TT-3140/3142
Lab Sample ID: 66423
Lab Project ID: G122-2098
Matrix: Soil
% SOLIDS: 85.3

Date Collected: 3/25/2003
Date Received: 3/25/2003
Date Analyzed: 4/2/2003
Analyzed By: MRC
Dilution: 1

No.	Compound	Retention Time	CAS#	Match Probability	Result (ug/KG)
1	Alkane, Unknown	17.12			5900
2	Alkane, Unknown	13.38			4100
3	Alkane, Unknown	17.69			3500
4	Alkane, Unknown	11.85			3200
5	Unknown	11.75			3000
6	Unknown	10.12			2200
7	Carboxylic Acid, Unknown	18.19			2000
8	Unknown	12.08			2000
9	Alkane, Unknown	18.26			1900
10	Alkane, Unknown	13.81			1700

Comment:

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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: mrc

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Semivolatiles
by GCMS 8270

Client Sample ID: USTTT3140/3142-SB06 6-8'
Client Project ID: SAR TT-3140/3142
Lab Sample ID: 66424
Lab Project ID: G122-2098
Matrix: Soil %Solids: 86.0

Date Collected: 3/25/2003
Date Received: 3/25/2003
Date Analyzed: 4/2/2003
Analyzed By: MRC
Dilution: 1

Compound	Quantitation Limit (ug/KG)	Result (ug/KG)
Acenaphthene	360	BQL
Acenaphthylene	360	BQL
Anthracene	360	BQL
Benzo[a]anthracene	360	BQL
Benzo[a]pyrene	360	BQL
Benzo[b]fluoranthene	360	BQL
Benzo[g,h,i]perylene	360	BQL
Benzo[k]fluoranthene	360	BQL
Benzoic Acid	730	BQL
Bis(2-chloroethoxy)methane	360	BQL
Bis(2-chloroethyl)ether	360	BQL
Bis(2-chloroisopropyl)ether	360	BQL
Bis(2-ethylhexyl)phthalate	360	BQL
4-bromophenyl phenyl ether	360	BQL
Butylbenzylphthalate	360	BQL
4-Chloroaniline	1800	BQL
4-Chloro-3-methylphenol	360	BQL
2-Chloronaphthalene	360	BQL
2-Chlorophenol	360	BQL
4-Chlorophenyl phenyl ether	360	BQL
Chrysene	360	BQL
Di-n-Butylphthalate	360	BQL
Di-n-octylphthalate	360	BQL
Dibenzo[a,h]anthracene	360	BQL
Dibenzofuran	360	BQL
1,2-Dichlorobenzene	360	BQL
1,3-Dichlorobenzene	360	BQL
1,4-Dichlorobenzene	360	BQL
3,3'-Dichlorobenzidine	730	BQL
2,4-Dichlorophenol	360	BQL
Diethylphthalate	360	BQL
2,4-Dimethylphenol	360	BQL
Dimethylphthalate	360	BQL
4,6-Dinitro-2-methylphenol	1800	BQL
2,4-Dinitrophenol	1800	BQL
2,4-Dinitrotoluene	360	BQL
2,6-Dinitrotoluene	360	BQL
Fluoranthene	360	BQL
Fluorene	360	BQL
Hexachlorobenzene	360	BQL

Results for Semivolatiles
by GCMS 8270

Client Sample ID: USTTT3140/3142-SB06 6-8'
Client Project ID: SAR TT-3140/3142
Lab Sample ID: 66424
Lab Project ID: G122-2098
Matrix: Soil %Solids: 86.0

Date Collected: 3/25/2003
Date Received: 3/25/2003
Date Analyzed: 4/2/2003
Analyzed By: MRC
Dilution: 1

Compound	Quantitation Limit (ug/KG)	Result (ug/KG)
Hexachlorobutadiene	360	BQL
Hexachlorocyclopentadiene	730	BQL
Hexachloroethane	360	BQL
Indeno(1,2,3-c,d)pyrene	360	BQL
Isophorone	360	BQL
2-Methylnaphthalene	360	BQL
2-Methylphenol	360	BQL
3- & 4-Methylphenol	360	BQL
N-Nitrosodi-n-propylamine	360	BQL
N-Nitrosodiphenylamine	360	BQL
Naphthalene	360	BQL
2-Nitroaniline	360	BQL
3-Nitroaniline	1800	BQL
4-Nitroaniline	1800	BQL
Nitrobenzene	360	BQL
2-Nitrophenol	360	BQL
4-Nitrophenol	1800	BQL
Pentachlorophenol	1800	BQL
Phenanthrene	360	BQL
Phenol	360	BQL
Pyrene	360	BQL
1,2,4-Trichlorobenzene	360	BQL
2,4,5-Trichlorophenol	360	BQL
2,4,6-Trichlorophenol	360	BQL

Surrogate Spike Recoveries	Spike Added	Spike Result	Percent Recovered
2-Fluorobiphenyl	10	8.0	80
2-Fluorophenol	10	7.9	79
Nitrobenzene-d5	10	7.6	76
Phenol-d6	10	8.1	81
2,4,6-Tribromophenol	10	7.6	76
4-Terphenyl-d14	10	9.7	97

Comments:

Results are corrected for %solids and dilution where applicable.

Flags:

BQL = Below Quantitation Limit.

Reviewed By: MM

PARADIGM ANALYTICAL LABORATORIES, INC.

Results of Library Search for Semivolatile Compounds

by GCMS

Client Sample ID: USTTT3140/3142-SB06 6-8'
Client Project ID: SAR TT-3140/3142
Lab Sample ID: 66424
Lab Project ID: G122-2098
Matrix: Soil
% SOLIDS: 86.0

Date Collected: 3/25/2003
Date Received: 3/25/2003
Date Analyzed: 4/2/2003
Analyzed By: MRC
Dilution: 1

No.	Compound	Retention Time	CAS#	Match Probability	Result (ug/KG)
1	Carboxylic Acid, Unknown	18.19			950
2	Unknown	18.08			180
3					
4					
5					
6					
7					
8					
9					
10					

Comment:

Tentatively Identified Compound (TIC) refers to substances which are not present in the list of target compounds. Therefore, not all TICs are identified and quantitated using individual standards. TIC listings are prepared utilizing a computerized library search of electron impact mass spectral data and evaluation of the relevant data by a mass spectral data specialist.

Quantitation is accomplished by relative peak area of the compound compared to that of the nearest internal standard from the total ion chromatogram. TICs are identified and quantitated only if the peak area is equal to or greater than 10% of that of the nearest internal standard. Quantitation provided is an estimate.

Reviewed by: MRC

Results for Semivolatiles

by GCMS 8270

Client Sample ID: USTTT3140/3142-SB07 4-6'
Client Project ID: SAR TT-3140/3142
Lab Sample ID: 66425
Lab Project ID: G122-2098
Matrix: Soil %Solids: 83.8

Date Collected: 3/25/2003
Date Received: 3/25/2003
Date Analyzed: 4/2/2003
Analyzed By: MRC
Dilution: 1

Compound	Quantitation Limit (ug/KG)	Result (ug/KG)
Acenaphthene	370	BQL
Acenaphthylene	370	BQL
Anthracene	370	BQL
Benzo[a]anthracene	370	BQL
Benzo[a]pyrene	370	BQL
Benzo[b]fluoranthene	370	BQL
Benzo[g,h,i]perylene	370	BQL
Benzo[k]fluoranthene	370	BQL
Benzoic Acid	740	BQL
Bis(2-chloroethoxy)methane	370	BQL
Bis(2-chloroethyl)ether	370	BQL
Bis(2-chloroisopropyl)ether	370	BQL
Bis(2-ethylhexyl)phthalate	370	BQL
4-bromophenyl phenyl ether	370	BQL
Butylbenzylphthalate	370	BQL
4-Chloroaniline	1900	BQL
4-Chloro-3-methylphenol	370	BQL
2-Chloronaphthalene	370	BQL
2-Chlorophenol	370	BQL
4-Chlorophenyl phenyl ether	370	BQL
Chrysene	370	BQL
Di-n-Butylphthalate	370	BQL
Di-n-octylphthalate	370	BQL
Dibenzo[a,h]anthracene	370	BQL
Dibenzofuran	370	BQL
1,2-Dichlorobenzene	370	BQL
1,3-Dichlorobenzene	370	BQL
1,4-Dichlorobenzene	370	BQL
3,3'-Dichlorobenzidine	740	BQL
2,4-Dichlorophenol	370	BQL
Diethylphthalate	370	BQL
2,4-Dimethylphenol	370	BQL
Dimethylphthalate	370	BQL
4,6-Dinitro-2-methylphenol	1900	BQL
2,4-Dinitrophenol	1900	BQL
2,4-Dinitrotoluene	370	BQL
2,6-Dinitrotoluene	370	BQL
Fluoranthene	370	BQL
Fluorene	370	BQL
Hexachlorobenzene	370	BQL

Results for Semivolatiles
by GCMS 8270

Client Sample ID: USTTT3140/3142-SB07 4-6'
Client Project ID: SAR TT-3140/3142
Lab Sample ID: 66425
Lab Project ID: G122-2098
Matrix: Soil %Solids: 83.8

Date Collected: 3/25/2003
Date Received: 3/25/2003
Date Analyzed: 4/2/2003
Analyzed By: MRC
Dilution: 1

Compound	Quantitation Limit (ug/KG)	Result (ug/KG)
Hexachlorobutadiene	370	BQL
Hexachlorocyclopentadiene	740	BQL
Hexachloroethane	370	BQL
Indeno(1,2,3-c,d)pyrene	370	BQL
Isophorone	370	BQL
2-Methylnaphthalene	370	BQL
2-Methylphenol	370	BQL
3- & 4-Methylphenol	370	BQL
N-Nitrosodi-n-propylamine	370	BQL
N-Nitrosodiphenylamine	370	BQL
Naphthalene	370	BQL
2-Nitroaniline	370	BQL
3-Nitroaniline	1900	BQL
4-Nitroaniline	1900	BQL
Nitrobenzene	370	BQL
2-Nitrophenol	370	BQL
4-Nitrophenol	1900	BQL
Pentachlorophenol	1900	BQL
Phenanthrene	370	BQL
Phenol	370	BQL
Pyrene	370	BQL
1,2,4-Trichlorobenzene	370	BQL
2,4,5-Trichlorophenol	370	BQL
2,4,6-Trichlorophenol	370	BQL

Surrogate Spike Recoveries	Spike Added	Spike Result	Percent Recovered
2-Fluorobiphenyl	10	9.5	95
2-Fluorophenol	10	8.5	85
Nitrobenzene-d5	10	8.7	87
Phenol-d6	10	8.5	85
2,4,6-Tribromophenol	10	7.0	70
4-Terphenyl-d14	10	10.5	105

Comments:

Results are corrected for %solids and dilution where applicable.

Flags:

BQL = Below Quantitation Limit.

Reviewed By: MRE

PARADIGM ANALYTICAL LABORATORIES, INC.

Results of Library Search for Semivolatile Compounds

by GCMS

Client Sample ID: USTTT3140/3142-SB07 4-6'
Client Project ID: SAR TT-3140/3142
Lab Sample ID: 66425
Lab Project ID: G122-2098
Matrix: Soil
% SOLIDS: 83.8

Date Collected: 3/25/2003
Date Received: 3/25/2003
Date Analyzed: 4/2/2003
Analyzed By: MRC
Dilution: 1

No.	Compound	Retention Time	CAS#	Match Probability	Result (ug/KG)
1	Carboxylic Acid, Unknown	18.19	000103-23-1	87	3800
2	Unknown	18.08	000301-02-0	80	1400
3					
4					
5					
6					
7					
8					
9					
10					

Comment:

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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: mre

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Semivolatiles
by GCMS 8270

Client Sample ID: USTTT3140/3142-SB08 5.5-7'
Client Project ID: SAR TT-3140/3142
Lab Sample ID: 66426
Lab Project ID: G122-2098
Matrix: Soil %Solids: 84.3

Date Collected: 3/25/2003
Date Received: 3/25/2003
Date Analyzed: 4/3/2003
Analyzed By: MRC
Dilution: 1

Compound	Quantitation Limit (ug/KG)	Result (ug/KG)
Acenaphthene	370	BQL
Acenaphthylene	370	BQL
Anthracene	370	BQL
Benzo[a]anthracene	370	BQL
Benzo[a]pyrene	370	BQL
Benzo[b]fluoranthene	370	BQL
Benzo[g,h,i]perylene	370	BQL
Benzo[k]fluoranthene	370	BQL
Benzoic Acid	740	BQL
Bis(2-chloroethoxy)methane	370	BQL
Bis(2-chloroethyl)ether	370	BQL
Bis(2-chloroisopropyl)ether	370	BQL
Bis(2-ethylhexyl)phthalate	370	BQL
4-bromophenyl phenyl ether	370	BQL
Butylbenzylphthalate	370	BQL
4-Chloroaniline	1800	BQL
4-Chloro-3-methylphenol	370	BQL
2-Chloronaphthalene	370	BQL
2-Chlorophenol	370	BQL
4-Chlorophenyl phenyl ether	370	BQL
Chrysene	370	BQL
Di-n-Butylphthalate	370	BQL
Di-n-octylphthalate	370	BQL
Dibenzo[a,h]anthracene	370	BQL
Dibenzofuran	370	BQL
1,2-Dichlorobenzene	370	BQL
1,3-Dichlorobenzene	370	BQL
1,4-Dichlorobenzene	370	BQL
3,3'-Dichlorobenzidine	740	BQL
2,4-Dichlorophenol	370	BQL
Diethylphthalate	370	BQL
2,4-Dimethylphenol	370	BQL
Dimethylphthalate	370	BQL
4,6-Dinitro-2-methylphenol	1800	BQL
2,4-Dinitrophenol	1800	BQL
2,4-Dinitrotoluene	370	BQL
2,6-Dinitrotoluene	370	BQL
Fluoranthene	370	BQL
Fluorene	370	BQL
Hexachlorobenzene	370	BQL

Results for Semivolatiles
by GCMS 8270

Client Sample ID: USTTT3140/3142-SB08 5.5-7'
Client Project ID: SAR TT-3140/3142
Lab Sample ID: 66426
Lab Project ID: G122-2098
Matrix: Soil %Solids: 84.3

Date Collected: 3/25/2003
Date Received: 3/25/2003
Date Analyzed: 4/3/2003
Analyzed By: MRC
Dilution: 1

Compound	Quantitation Limit (ug/KG)	Result (ug/KG)
Hexachlorobutadiene	370	BQL
Hexachlorocyclopentadiene	740	BQL
Hexachloroethane	370	BQL
Indeno(1,2,3-c,d)pyrene	370	BQL
Isophorone	370	BQL
2-Methylnaphthalene	370	BQL
2-Methylphenol	370	BQL
3- & 4-Methylphenol	370	BQL
N-Nitrosodi-n-propylamine	370	BQL
N-Nitrosodiphenylamine	370	BQL
Naphthalene	370	BQL
2-Nitroaniline	370	BQL
3-Nitroaniline	1800	BQL
4-Nitroaniline	1800	BQL
Nitrobenzene	370	BQL
2-Nitrophenol	370	BQL
4-Nitrophenol	1800	BQL
Pentachlorophenol	1800	BQL
Phenanthrene	370	BQL
Phenol	370	BQL
Pyrene	370	BQL
1,2,4-Trichlorobenzene	370	BQL
2,4,5-Trichlorophenol	370	BQL
2,4,6-Trichlorophenol	370	BQL

Surrogate Spike Recoveries	Spike Added	Spike Result	Percent Recovered
2-Fluorobiphenyl	10	8.9	89
2-Fluorophenol	10	7.7	77
Nitrobenzene-d5	10	8.5	85
Phenol-d6	10	8.6	86
2,4,6-Tribromophenol	10	7.2	72
4-Terphenyl-d14	10	9.9	99

Comments:

Results are corrected for %solids and dilution where applicable.

Flags:

BQL = Below Quantitation Limit.

Reviewed By: MRC

PARADIGM ANALYTICAL LABORATORIES, INC.

Results of Library Search for Semivolatile Compounds

by GCMS

Client Sample ID: USTTT3140/3142-SB08 5.5-7'
Client Project ID: SAR TT-3140/3142
Lab Sample ID: 66426
Lab Project ID: G122-2098
Matrix: Soil
% SOLIDS: 84.3

Date Collected: 3/25/2003
Date Received: 3/25/2003
Date Analyzed: 4/3/2003
Analyzed By: MRC
Dilution: 1

No.	Compound	Retention Time	CAS#	Match Probability	Result (ug/KG)
1	Carboxylic Acid, Unknown	18.19	000103-23-1	90	880
2	Unknown	18.08	000301-02-0	72	500
3					
4					
5					
6					
7					
8					
9					
10					

Comment:

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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: MRC

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Semivolatiles
by GCMS 8270

Client Sample ID: USTTT3140/3142-SB09 5.5-7'
Client Project ID: SAR TT-3140/3142
Lab Sample ID: 66427
Lab Project ID: G122-2098
Matrix: Soil %Solids: 86.4

Date Collected: 3/25/2003
Date Received: 3/25/2003
Date Analyzed: 4/3/2003
Analyzed By: MRC
Dilution: 1

Compound	Quantitation Limit (ug/KG)	Result (ug/KG)
Acenaphthene	360	**530**
Acenaphthylene	360	BQL
Anthracene	360	BQL
Benzo[a]anthracene	360	BQL
Benzo[a]pyrene	360	BQL
Benzo[b]fluoranthene	360	BQL
Benzo[g,h,i]perylene	360	BQL
Benzo[k]fluoranthene	360	BQL
Benzoic Acid	710	BQL
Bis(2-chloroethoxy)methane	360	BQL
Bis(2-chloroethyl)ether	360	BQL
Bis(2-chloroisopropyl)ether	360	BQL
Bis(2-ethylhexyl)phthalate	360	BQL
4-bromophenyl phenyl ether	360	BQL
Butylbenzylphthalate	360	BQL
4-Chloroaniline	1800	BQL
4-Chloro-3-methylphenol	360	BQL
2-Chloronaphthalene	360	BQL
2-Chlorophenol	360	BQL
4-Chlorophenyl phenyl ether	360	BQL
Chrysene	360	BQL
Di-n-Butylphthalate	360	BQL
Di-n-octylphthalate	360	BQL
Dibenzo[a,h]anthracene	360	BQL
Dibenzofuran	360	BQL
1,2-Dichlorobenzene	360	BQL
1,3-Dichlorobenzene	360	BQL
1,4-Dichlorobenzene	360	BQL
3,3'-Dichlorobenzidine	710	BQL
2,4-Dichlorophenol	360	BQL
Diethylphthalate	360	BQL
2,4-Dimethylphenol	360	BQL
Dimethylphthalate	360	BQL
4,6-Dinitro-2-methylphenol	1800	BQL
2,4-Dinitrophenol	1800	BQL
2,4-Dinitrotoluene	360	BQL
2,6-Dinitrotoluene	360	BQL
Fluoranthene	360	BQL
Fluorene	360	**1400**
Hexachlorobenzene	360	BQL

Results for Semivolatiles
by GCMS 8270

Client Sample ID: USTTT3140/3142-SB09 5.5-7'
Client Project ID: SAR TT-3140/3142
Lab Sample ID: 66427
Lab Project ID: G122-2098
Matrix: Soil %Solids: 86.4

Date Collected: 3/25/2003
Date Received: 3/25/2003
Date Analyzed: 4/3/2003
Analyzed By: MRC
Dilution: 1

Compound	Quantitation Limit (ug/KG)	Result (ug/KG)
Hexachlorobutadiene	360	BQL
Hexachlorocyclopentadiene	710	BQL
Hexachloroethane	360	BQL
Indeno(1,2,3-c,d)pyrene	360	BQL
Isophorone	360	BQL
2-Methylnaphthalene	360	**17000**
2-Methylphenol	360	BQL
3- & 4-Methylphenol	360	BQL
N-Nitrosodi-n-propylamine	360	BQL
N-Nitrosodiphenylamine	360	BQL
Naphthalene	360	**3500**
2-Nitroaniline	360	BQL
3-Nitroaniline	1800	BQL
4-Nitroaniline	1800	BQL
Nitrobenzene	360	BQL
2-Nitrophenol	360	BQL
4-Nitrophenol	1800	BQL
Pentachlorophenol	1800	BQL
Phenanthrene	360	**2700**
Phenol	360	BQL
Pyrene	360	BQL
1,2,4-Trichlorobenzene	360	BQL
2,4,5-Trichlorophenol	360	BQL
2,4,6-Trichlorophenol	360	BQL

Surrogate Spike Recoveries	Spike Added	Spike Result	Percent Recovered
2-Fluorobiphenyl	10	10.3	103
2-Fluorophenol	10	9.6	96
Nitrobenzene-d5	10	9.6	96
Phenol-d6	10	9.4	94
2,4,6-Tribromophenol	10	10.9	109
4-Terphenyl-d14	10	8.7	87

Comments:

Results are corrected for %solids and dilution where applicable.

Flags:

BQL = Below Quantitation Limit.

Reviewed By: MRC

Results of Library Search for Semivolatile Compounds

by GCMS

Client Sample ID: USTTT3140/3142-SB09 5.5-7'
Client Project ID: SAR TT-3140/3142
Lab Sample ID: 66427
Lab Project ID: G122-2098
Matrix: Soil
% SOLIDS: 86.4

Date Collected: 3/25/2003
Date Received: 3/25/2003
Date Analyzed: 4/3/2003
Analyzed By: MRC
Dilution: 1

No.	Compound	Retention Time	CAS#	Match Probability	Result (ug/KG)
1	1-Methylnaphthalene	10.73	000090-12-0	100	11000
2	Alkane, Unknown	17.13			5900
3	Carboxylic Acid, Unknown	18.20			5100
4	Trimethylbenzene, Isomer of	7.22			4900
5	Alkane, Unknown	17.70			4000
6	Alkane, Unknown	8.38			3700
7	Methylpropylbenzene, Isomer of	8.05			3000
8	Unknown	7.87			2800
9	Alkane, Unknown	18.26			2600
10	Alkane, Unknown	13.84			2400

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: MRC

ARADIGM ANALYTICAL LABORATORIES, INC.
527 Northchase Parkway SE, Wilmington, NC 28405
Phone: (910)-350-1903 FAX: (910)-350-1557

Chain-of Custody Record & Analytical Request

COC# 36879

Page 1 of 1

Client: Mid-Atlantic Assoc. PA
Address: 409 Rogers View Ct
Address: Raleigh, NC 27609
Quote #: 000 101

Project ID: SARTT-3140/3142
Contact: E. Aufderheide
Phone: (919) 250-9918
Fax: (919) 250-9950

Date: 3-25-2003
Turnaround: Standard
Job Number: 000R1243.57
P.O. Number:

Report To: E. Aufderheide
Invoice To:

Sample ID	Date	Time	Matrix	Preservatives	Analyses: MADEP VPH	EPA 8260 VOCs-Encore	MADEP EPH ONLY	EPH Semi-VOCs	Dry weight ERA	Comments: Please specify any special reporting requirements
STTT3140/3142 -SB05 8-10'	3/25/03	1106	Soil		2	3		1	1	Samples placed on ice after collection @ 270 Offices per E. Aufderheide 3/26/03
STTT3140/3142 -SB06 6-8'	-	1145	Soil		2	3		1	1	
STTT3140/3142 -SB07 4-6'		1125			2	3		1	1	
STTT3140/3142 -SB08 5.5-7'		1210			2	3		1	1	
STTT3140/3142 -SB09 5.5-7'		1230			2	3		1	1	
ICGD-1, 7-8.5		1245			2		1			6122-2098
ICGD-2, 7-8.5		1300			2		1			

Relinquished By	Date	Time	Received By	Date	Time	Temperature
	3/25/03	1700		3/25/03	1700	cooler 5.8, 5.8

State Certification Requested
NC X SC ____ Other ____

SEE REVERSE FOR TERMS AND CONDITIONS