

**QUARTERLY GROUNDWATER MONITORING REPORT
SITE H-28
MARINE CORPS BASE CAMP LEJEUNE, NORTH CAROLINA
Revision 0**

Prepared for:

DEPARTMENT OF THE NAVY
Contract No. N62470-03-D-4000
Task Order No 0009



Atlantic Division
Naval Facilities Engineering Command
6506 Hampton Boulevard
Building C, Room 311
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4 February 2005

EEI PROJECT NO. LDO3-0009

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We hereby certify that the Report shown and marked in this submittal is proposed to be incorporated into Contract Number N62470-03-D-4000, is in compliance with the contract drawings and specifications, can be installed in the allocated spaces, and is submitted for Government approval.

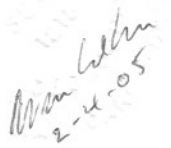


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4 February 2005


2-4-05

LIST OF ACRONYMS/ABBREVIATIONS

AVOC	Aromatic Volatile Organic Compound
Baker	Baker Environmental, Inc.
bgs	below ground surface
CAP	Corrective Action Plan
DI	Deionized Water
DWM	Division of Waste Management
EEI	Engineering and Environment, Inc.
GCL	Gross Contamination Level
Jones	J.A. Jones Environmental Services Company
L	Liter
Law	Law Engineering and Environmental Services, Inc.
MADEP EPH	Massachusetts Department of Environmental Protection Extractable Petroleum Hydrocarbons
MADEP VPH	Massachusetts Department of Environmental Protection Volatile Petroleum Hydrocarbons
MCB	Marine Corps Base
mg/kg	milligrams per kilogram
msl	mean sea level
MW	Monitoring Well
NAVFACENGCOM	Navy Atlantic Division, Naval Facilities Engineering Command
NCAC	North Carolina Administrative Code
NCDENR	North Carolina Department of Environment and Natural Resources
NCGS	North Carolina Geological Survey
NCGWQS	North Carolina Groundwater Quality Standard
ND	Not Detected
QC	Quality Control
SVOC	Semi-Volatile Organic Compound
TIC	Tentatively Identified Compound
TPH	Total Petroleum Hydrocarbons
ug/L	micrograms per liter
USEPA	United States Environmental Protection Agency
UST	Underground Storage Tank

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EXECUTIVE SUMMARY

On behalf of the Department of the Navy, Atlantic Division, Naval Facilities Engineering Command, Engineering and Environment, Inc. has prepared this quarterly groundwater monitoring report for Site H-28, Marine Corps Base Camp Lejeune, North Carolina. The report presents the findings of groundwater monitoring activities conducted in December 2004.

Building H-28 is a single family house located in a residential area of Marine Corps Base Camp Lejeune, North Carolina. In May 1990, a 550-gallon Number 2 fuel oil Underground Storage Tank (UST) was excavated and removed from site. A soil sample collected at the time the UST was removed indicated petroleum constituents were present in soil above State action levels in effect at that time. Monitoring wells subsequently installed in 1991 indicated free product was not present, although petroleum constituents were detected in groundwater at concentrations slightly above North Carolina Groundwater Quality Standards (NCGWQS).

Additional site characterization and site monitoring activities were conducted, including preparation of a Corrective Action Plan (CAP), a risk characterization assessment, and various well gauging and groundwater sampling programs. The CAP identified one area of soil where petroleum constituents were present above soil rehabilitation goals developed in the CAP and recommended excavation of the soils as the remedial response. However, soil excavation later conducted in the area did not reveal evidence of impacted soil, and the excavated soil was used to backfill the excavation. Soil borings later advanced in the immediate vicinity of the former UST indicated soil concentrations were below Maximum Soil Contaminant Concentrations.

The CAP identified NCGWQSs as groundwater rehabilitation goals and recommended monitored natural attenuation to address petroleum impacted groundwater. Several monitoring programs and a risk characterization assessment were conducted from 1998 to 2003. The monitoring programs conducted from 1998 to 2001 identified some petroleum constituents present at concentrations above NCGWQSs but below Gross Contaminant Levels (GCLs) at wells located near the former UST. Concentrations of these constituents generally were observed to decrease over time.

Free product was detected at one well (MW-11) installed in 1999; the well is located close to the former UST. Product recovery efforts including hand bailing and use of sorbent socks were conducted at the well. Gauging data from 1999 to 2001 indicated the product thickness at well MW-11 was decreasing over time. A risk characterization assessment conducted in 1999 concluded that although the expose risk was considered low, the presence of free product indicated the site should be classified as in Intermediate Risk based on North Carolina Department of Environment and Natural Resources guidance.

Gauging data conducted in 2002 and 2003 at well MW-11 indicated free product was no longer present. However, for some of the events, sorbent socks that had been removed in advance of the gauging event had been reinstalled by an unknown party, and the gauging data for those events were compromised. However, the remaining 2003 gauging events indicating measurable free product was not present were considered valid without qualification.

In June 2004, the current groundwater monitoring program was initiated. The program includes quarterly well gauging at all 10 existing site monitoring wells and semi-annual groundwater sampling at wells MW-6, MW-8, and MW-9. Semi-annual groundwater sampling was conducted in June and December 2004. To date, gauging events have been conducted in June, September, and December 2004.

For the three gauging events completed through December 2004, free product was observed at well MW-8, at a thickness of 0.05 foot, 0.01 foot, and 0.01 foot, respectively. Well MW-19 exhibited measurable free product in the September 2004 event, at a thickness of 0.10 foot. No measurable free product was observed at this well during the June or December 2004 events; however, the June 2004 data are considered compromised as a sorbent sock was found in the well prior to gauging. The gauging data from the current and previous monitoring programs suggest that only a minor thickness of free product is present at the site, that what free product is present is limited to the immediate vicinity of the former UST, and that the volume of free product has decreased over time.

In June and December 2004, groundwater samples were collected from monitoring wells MW-6 and MW-9. Well MW-8 was designated for sampling for both events but, due to the presence of measurable free product at the well, a sample was not collected. In December 2004, a sample also was collected from well MW-11, as per recommendations in the June 2004 monitoring report. No target analytes were detected in wells sampled during the June 2004 sampling event. In December 2004, three target analytes (ethylbenzene, naphthalene, and the C₉-C₂₂ Aromatics) were detected above NCGWQSs in well MW-11 only, and the concentrations were substantially below GCLs. Groundwater quality data from the current and previous monitoring programs indicate dissolved-phase petroleum constituent concentrations have decreased over time, and any constituents potentially remaining at concentrations above NCGWQSs would be restricted to wells MW-8 and MW-11, both located close to the former UST.

It is recommended to continue with the quarterly groundwater monitoring program. The site should be accessed in advance of field events to remove sorbent socks; the socks should be reinstalled as needed following the events.

SECTION 1 INTRODUCTION

On behalf of the Department of the Navy, Atlantic Division, Naval Facilities Engineering Command (NAVFACENGCOM), Engineering and Environment, Inc. (EEI) has prepared this quarterly groundwater monitoring report for Site H-28, Marine Corps Base (MCB) Camp Lejeune. The report presents the findings of groundwater monitoring activities conducted in December 2004. This report and the methods used to acquire the data in support of this report have been prepared in accordance with the North Carolina Department of Environmental Resources (NCDENR), Division of Waste Management (DWM), Underground Storage Tank (UST) Section guidelines (NCDENR, 2001 and 2003) and the site specific work prepared for this site by EEI (EEI, April 2004a).

The site has been assigned incident number 23333 by NCDENR. Previous site investigations have indicated the site meets criteria associated with NCDENR's Intermediate Risk classification (Law, 2000a).

1.1 Site Description

The site is located on MCB Camp Lejeune in Onslow County, North Carolina (N34 degrees, 40.636 minutes, W77 degrees, 22.151 minutes) (Law, 2000a) (Figure 1-1). Within Camp Lejeune, the site is located on Julian C. Smith Drive in a residential area of the base and includes Building H-28 (Figure 1-2). Building H-28 is a detached, single family officer's residence.

The nearest mapped body of water is Wallace Creek. The creek is located approximately 200 feet north of the site. No potable water supply wells are located within 1500 feet of the site (Law, 2000a).

1.2 Site History

In May 1990, a 550-gallon UST was excavated and removed from site (Baker, 1994). The installation date of the former UST is not known. The former UST had been located immediately south of Building H-28 and had been used to store Number 2 fuel oil for heating (Figure 1-3). A soil sample collected from below the UST at the time of removal indicated Total Petroleum Hydrocarbons (TPH) – high boiling point range were present at a concentration of 18,000 milligrams per kilogram (mg/kg), above the 10 mg/kg State action level in effect at that time (Baker, 1994). Three monitoring wells (now identified as MW-8, MW-9, and MW-10) were installed in September 1991. Soil samples collected during well installation indicated TPH was not present at detectable levels. Following installation, gauging of the wells indicated no measurable free product was present in any of the wells. However, analysis of groundwater samples collected from the wells indicated two wells, MW-9 and MW-10, exhibited benzene concentrations of 10 micrograms per liter (ug/L) and 19 ug/L, above the North Carolina Groundwater Quality Standard (NCGWQS) for benzene of 1 ug/L (Baker, 1994).

Additional site characterization activities were conducted and, in 1994, a corrective action plan (CAP) was prepared (Baker, 1994). The CAP included the results of the site characterization

program and presented a remediation strategy to address petroleum constituents in soil and groundwater. The characterization data indicated one area south of the former UST where soil TPH concentrations (medium-to-high boiling point range) exceeded the site rehabilitation goal of 240 mg/kg (developed in the CAP using State guidance in effect at that time). Groundwater impacts appeared to be limited to low concentrations of aromatic volatile organic compounds (AVOCs) and semi-volatile organic compounds (SVOCs) detected primarily near the former UST. The CAP identified NCGWQSs as site rehabilitation goals for groundwater, with respect to which benzene was the only compound present above NCGWQS. The SVOCs detected in groundwater did not have NCGWQSs established at that time. The recommended remediation approach for soil was excavation of the affected soils south of the former UST. For groundwater, the CAP recommended remediation by monitored natural attenuation (Baker, 1994).

Soil excavation in the area south of the former UST was conducted in November 1995 (Jones, 1996) (Figure 1-3). Soil vapor analyses conducted during the excavation indicated the soil was not impacted with petroleum hydrocarbons, and the excavated soils were used to backfill the excavation while on site. Laboratory analyses of the soil confirmed that only low concentrations (less than 1 mg/kg) of TPH were present (Jones, 1996).

Groundwater monitoring activities were conducted in 1998. Activities included one site-wide well gauging event in January 1998, gauging wells MW-6 and MW-7 in April and July 1998, and collecting groundwater samples for AVOC and SVOC analyses from wells MW-6 and MW-7 in January, April, and July 1998 (Law, 1998a, b, c). No free product was detected during any of the gauging events, and no AVOCs or SVOCs were detected for the January and April events. For the July 1998 event, some AVOCs and SVOCs were detected in well MW-6 only, with naphthalene reported at a concentration above NCGWQSs but lower than observed during the CAP (Law 1998c).

A risk characterization assessment was conducted in 1999 (Law, 2000a). As part of the assessment, three soil borings were advanced in the immediate vicinity of the former UST (approximately five feet or less from the former UST), and one monitoring well (MW-11) was installed approximately five feet from the former UST. Unsaturated (vadose zone) soil samples collected during the advancement of the borings indicated petroleum constituent concentrations were below the most restrictive Maximum Soil Contaminant Concentrations (MSCCs) established by NCDENR. Groundwater samples were collected from wells MW-6, MW-7, MW-9, and MW-11. Analysis of these samples indicated no detectable petroleum constituents were present in wells MW-7 and MW-9. However, NCGWQSs were exceeded for the C₉-C₂₂ Aromatic Hydrocarbon fraction, the C₉ – C₁₈ Aliphatic Hydrocarbon fraction, and/or naphthalene at wells MW-6 and MW-11, although concentrations were below NCDENR Gross Contaminant Levels (GCLs) for those constituents with established GCLs. Additionally, measurable free product was identified at well MW-11 in two of three gauging events (maximum product thickness of 0.85 foot). The assessment concluded that, although vadose zone soils were below MSCCs and surficial aquifer groundwater posed little exposure risk to surface water or drinking water aquifers, due to the presence of free product at well MW-11, the site should be considered as Intermediate Risk under NCDENR guidance (Law, 2000a).

Groundwater monitoring activities were resumed in 2000 and continued into 2001 (Law, 2000b, Law, 2001). The monitoring program included quarterly well gauging at all site wells (excluding well MW-4, which had not been located since at least January 1998), product recovery by hand bailing at wells exhibiting measurable free product, and semi-annual groundwater sampling at wells MW-6, MW-8, and MW-9. The gauging data identified the presence of free product only in well MW-11, and indicated the product thickness was decreasing over time at the well, with only 0.02 foot of product present at well MW-11 during the program's final gauging event in April 2001. Groundwater sample data indicated few compounds were present at concentrations above NCGWQSs (none above established GCLs), and concentrations of detected constituents generally were decreasing over time. However, the site was considered to remain an Intermediate Risk due to the minor thickness of free product at well MW-11.

A program of quarterly gauging of well MW-11 was initiated in October 2002 and was completed in August 2003 (EEI, 2003a, b, c, d). The program included accessing the well in advance of the gauging event to remove a previously installed sorbent (product recovery) sock. No measurable free product was observed during four quarters of gauging. However, on two occasions, when the well was re-accessed for gauging, the sorbent sock had been reinstalled into the well by an unknown party. The product thickness data for these two events was considered compromised. However, data for the remaining events indicating measurable free product was not present were considered valid without qualification.

In June 2004, the current groundwater monitoring program was initiated. The program includes quarterly gauging at all site wells and semi-annual groundwater sampling at wells MW-6, MW-8, and MW-9. Additionally, free product recovery via hand bailing or installation of sorbent socks is conducted as needed (EEI, 2004a).

For the June and September 2004 quarterly gauging events, free product was observed at well MW-8, at a thickness of 0.05 foot and 0.01 foot, respectively. Well MW-19 exhibited measurable free product in the September 2004 event, at a thickness of 0.10 foot. No measurable free product was observed at this well during the June 2004 event; however, the datum was considered compromised as a sorbent sock was found in the well prior to gauging. For the June 2004 semi-annual sampling event, no target analytes were detected at wells MW-6 and MW-9. Well MW-8, designated for sampling during the event, was not sampled as free product was detected at the well.

The current monitoring event was conducted in December 2004. The event included well gauging at the 10 monitoring wells present at the site. Groundwater samples were collected from monitoring wells MW-6 and MW-9. A sample also was collected from well MW-11, as per recommendations in the June 2004 monitoring report (EEI, 2004b). Well MW-8 was designated for sampling but, due to the presence of 0.01 foot of free product at the well, a sample was not collected. Data for the current event are discussed in the following sections. Section 2 describes field methods used at the site. Section 3 discusses hydrogeologic characteristics of the site. Section 4 presents laboratory analytical results and their significance. Section 5 provides conclusions and recommendations based on review of the data. References cited in the report are listed in Section 6. Figures and tables are organized after the text. Supporting documentation (field records and laboratory analytical reports) are contained in Appendices A and B.

SECTION 2 FIELD PROGRAM

Field methods employed during the groundwater monitoring program are discussed briefly below. Activities were conducted in accordance with NCDENR guidance (NCDENR, 2001 and 2003) and as per the work plan (EEI, 2004a) which details the field methods.

2.1 Well Gauging

On 17 December 2004, 10 site monitoring wells (MW-1 through MW-3, and MW-5 through MW-11) were gauged. Well gauging was conducted using an electronic interface probe to measure the depth to water and depth to product (if present). Data were recorded to the nearest 0.01 foot and referenced to the surveyed top of casing. Approximately two weeks prior to the gauging event (on 30 November 2004), the sorbent socks installed previously (after completing the September 2004 event) in wells MW-8 and MW-11 were removed. During the gauging event, measurable free product was observed only at well MW-8, at a thickness of 0.01 foot. After completion of gauging and sampling, sorbent socks were installed in well MW-8 (due to the presence of free product) and well MW-11 (as the well historically has exhibited free product).

2.2 Groundwater Sampling

Groundwater samples were collected on 17 December 2004 from monitoring wells MW-6 and MW-9. A sample also was collected from well MW-11, as per recommendations in the June 2004 monitoring report (EEI, 2004b). Well MW-8 was designated for sampling but, due to the presence of measurable free product at the well, a sample was not collected. Additionally, one duplicate sample was collected at well MW-6. Field data sampling sheets are presented in Appendix A.

Monitoring well groundwater samples were collected using low-flow purging techniques. A Grundfos Redi-Flo II stainless steel submersible pump discharging through polyethylene tubing was used to purge and sample the wells. The water level in the well was periodically measured and recorded and, if necessary, the pumping rate was decreased to limit drawdown. Additionally, the pump intake height was adjusted as necessary. Water quality indicator parameters (pH, temperature, conductivity, oxidation-reduction potential, dissolved oxygen, and turbidity) were measured and recorded repeatedly during the purge. Purging was continued until water quality indicator parameters had stabilized or until a maximum of five well casing volumes had been purged. If a well purged to dryness, the well was allowed to recharge, and a sample then was collected; however, no wells were purged dry during the sampling event. Samples were collected immediately upon completion of the purge by filling the laboratory-prepared sample bottles directly from the discharge tubing. Samples were kept in an iced cooler from the time of collection until received by the laboratory.

Groundwater samples collected during this event were analyzed for the following parameters:

- AVOCs, EPA Method 602 with xylenes (3x40 milliliter [ml] vials),
- Massachusetts Department of Environmental Protection (MADEP) - Volatile Petroleum Hydrocarbons (VPH) (3 x 40 ml vials)
- SVOCs, EPA Method 625 + 10 largest non-target peaks (i.e., Tentatively Identified Compounds [TICs]) (2 x 1 liter [L])
- MADEP - Extractable Petroleum Hydrocarbons (EPH) (2 x 1 L)

Samples were submitted under chain-of-custody to Paradigm Analytical Laboratories in Wilmington, North Carolina. Samples were delivered to the laboratory either via overnight commercial courier or were picked up by a laboratory courier.

2.3 Equipment Decontamination and Waste Handling Procedures

The pump was decontaminated before first use and after each use by pumping a mixture of Alconox or Liquinox soap and potable water through the pump. The pump then was rinsed by pumping potable water through it, and final rinsed with deionized (DI) water. New polyethylene tubing was used at each well.

Water quality meter flow-through cells and down-hole gauging equipment were decontaminated after each use by washing with an Alconox/DI water mixture, followed by a DI water rinse. The water quality probe was decontaminated with a DI rinse.

Well purge water and equipment decontamination water generated during the sampling event were contained in a portable holding tank. The water was processed through a groundwater treatment system located at Lot 203 on MCB Camp Lejeune. Used tubing and other miscellaneous material were collected and bagged as they were generated. This material was treated as normal solid waste and placed in EEI's refuse container at Lot 203.

2.4 Well Maintenance

During the sampling event, any brush, debris, and/or litter in the vicinity of the well heads were cleared. The well heads, casing risers, well pads, bollards, well caps, locks, etc. were inspected for damage or deterioration. All wells appeared to be undamaged and in serviceable condition.

SECTION 3 HYDROGEOLOGY

The hydrogeologic characteristics of the subsurface substantially control the movement of groundwater, which strongly influences contaminant movement. The regional geologic setting provides a framework for understanding and interpreting the site-specific hydrogeology. Knowledge of the latter allows for evaluating groundwater flow at a scale relevant to the monitoring program.

3.1 Regional Hydrogeology

The site is located in the eastern portion of the Coastal Plain Physiographic Province of North Carolina. The Coastal Plain consists of nearly flat to gently dipping sedimentary strata of varying composition that overlie a crystalline basement complex. Approximately 80 miles northwest of the site, the Coastal Plain pinches out where it contacts the Piedmont Physiographic Province along the Fall Line. East of the Fall Line, the sediments gradually thicken, reaching a maximum thickness of approximately 10,000 feet at Cape Hatteras, North Carolina. In the vicinity of the site, the sedimentary sequence is estimated to be approximately 2000 feet thick (NCGS, 1988).

Surficial deposits of Quaternary age are present in and around the area of the site, typically at thicknesses ranging from about 25 to 80 feet. The uppermost mapped unit in the area of the site is identified as the River Bend Formation of Tertiary age, described as a calcareous limestone interlaced with indurated sandy, molluscan limestone (NCGS, 1985). The River Bend Formation overlies the Castle Hayne Formation, also of Tertiary age. The Castle Hayne Formation is described as gray to cream colored, fine grained to fossiliferous calcareous limestone with minor amounts of fine quartz, glauconite, and phosphate (NCGS, 1988). The thickness of the Castle Hayne Formation in the vicinity of the site is estimated at approximately 300 feet. The Castle Hayne aquifer is a primary source of potable water for the area.

3.2 Site Hydrogeology

The topography of the site is predominantly flat. A drainage ditch is located on the north side of the site along Julian C. Smith Drive. No permanent surface water bodies are present. Wallace Creek is the nearest mapped surface water body, located approximately 200 feet north of the site.

Shallow soil at the site is described as a sandy silt to silty sand. This material grades to a fine sand encountered at approximately six to eight feet below ground surface (bgs). The fine sand extends to a depth of at least 17 feet bgs. Infrequent clay lenses of about 0.5 foot in thickness were reported in the fine sand. First saturated soils of the surficial aquifer were encountered in the fine sand at depths of approximately 10 feet bgs (Baker, 1994).

All of the monitoring wells installed at the site are shallow wells (total depths of approximately 17 feet bgs for most wells) screened in the saturated shallow fine sands of the surficial aquifer. Using the top-of-casing elevations and gauging data recorded 17 December 2004, groundwater elevations for the site monitoring wells were calculated (Table 3-1). For wells exhibiting

measurable free product, the groundwater elevation was corrected by adding 80 percent of the product thickness to the calculated groundwater elevation. (The product thickness was multiplied by 80 percent as the specific gravity of the product is assumed to be 0.8.)

The elevation data for the shallow wells were used to construct a surficial aquifer groundwater elevation map from which groundwater flow direction can be estimated (Figure 3-1). From the map, surficial aquifer groundwater generally flows to the east and to the northwest, towards the center of the site. From the center of the site, groundwater appears to flow northward under a very minor gradient. This flow pattern is somewhat similar to that observed in September 2004, but differs from the June 2004 flow when flow was generally to the northwest (EEI, 2004b and 2004c). Previous investigations suggest some variability in flow direction (Baker, 1994; Law, 1998; Law, 2000b, Law, 2001).

The horizontal gradient i is calculated using the standard equation $i = \Delta h / \Delta L$, where Δh is the change in head measured along the direction of groundwater flow, and ΔL is the straight-line distance between the measurement locations. As wells MW-6 and MW-8 are closely aligned with the groundwater flow direction, data from these wells were used to calculate the horizontal gradient. For these wells, $\Delta L = 20$ feet and $\Delta h = (2.55 \text{ feet} - 2.38 \text{ feet}) = 0.17$ foot, so that $i = 0.17 \text{ foot} / 20 \text{ feet} = 0.0085$ (dimensionless). This is somewhat greater than the 0.0016 gradient previously calculated for the June 2004 data. However, from Figure 3-1, the gradient observed in the vicinity of wells MW-6 and MW-8 is greater than is observed in other portions of the site.

The groundwater linear flow velocity V is calculated using the standard equation $V = (Ki) / n_e$, where i is the horizontal gradient (discussed above), K is the hydraulic conductivity, and n_e is the effective porosity. Previous investigations have provided estimates of K and n_e based on aquifer testing and examination of subsurface soil samples, respectively. The investigations identified a K of 2.24 feet/day and a n_e of 0.30 (dimensionless) for the site (Baker, 1994). Using these values and the horizontal gradient calculated above, the flow velocity is calculated as $V = (2.24 \text{ feet /day} * 0.0085) / 0.30 = 0.063 \text{ foot/day}$, or 23 feet/year. This is greater than the 4.4 feet/year calculated for the June 2004 data due to the larger gradient, as discussed above.

SECTION 4

LABORATORY ANALYTICAL RESULTS

Groundwater samples were collected in December 2004 from site monitoring wells MW-6 and MW-9. A sample also was collected from well MW-11, as per recommendations in the June 2004 monitoring report (EEI, 2004b). As discussed previously, well MW-8 was designated for sampling. However, a sample was not collected from this well due to the presence of measurable free product during the sampling event. One duplicate groundwater sample was collected from well MW-6. Groundwater samples were analyzed by Paradigm Analytical Laboratories for AVOCs (EPA Method 602), SVOCs (EPA Method 625), MADEP VPH, and MADEP EPH. Appendix B presents the laboratory analytical reports.

4.1 Groundwater Analytical Results

Table 4-1 summarizes the analytical results for the current event. Only compounds detected at one or more locations during the current or previous sampling events and were quantitated during the current event are listed.

No analytes were detected in the primary or duplicate samples collected from well MW-6. At well MW-9, the only analyte detected was toluene, reported at an estimated concentration of 0.349 ug/L, substantially below the NCGWQS and GCL of 1,000 ug/L and 257,500 ug/L, respectively.

At well MW-11 (located very near to the former UST), detected AVOCs included ethylbenzene, toluene, and xylene isomers. Concentrations of toluene and the total xylene isomers were considerably below both the NCGWQSs and GCLs. Ethylbenzene was reported at a concentration of 35.6 ug/L, slightly above the NCGWQS of 29 ug/L but substantially below the GCL of 29,000 ug/L.

Four target analyte SVOCs were detected at well MW-11, including acenaphthene, fluorene, phenanthrene, and naphthalene. Except for naphthalene, all of the analytes were reported at low (estimated) concentrations, and all were substantially below the NCGWQSs and GCLs. Naphthalene was reported at a concentration of 114 ug/L, somewhat above the NCGWQS of 21 ug/L but much lower than the GCL of 15,500 ug/L. Several SVOC TICs were reported, most of which could not be identified as discrete compounds. (TICs are substances not on the target compound list, and not all TICs are identified and quantitated using individual standards. All TIC quantitations are estimated.) Two TICs were identified as specific compounds, including 1-methylnaphthalene (estimated concentration of 114 ug/L) and 2-methylnaphthalene (estimated concentration of 165 ug/L). Neither a NCGWQS nor a GCL have been established for 1-methylnaphthalene. Therefore, the standard is set at the reporting limit, and any detection of 1-methylnaphthalene is above the standard. The NCGWQS and GCL for 2-methylnaphthalene are 14 ug/L and 25,000 ug/L, respectively. Consequently, the estimated concentration reported for 2-methylnaphthalene is somewhat above the NCGWQS but is substantially below the GCL. Given the uncertainties associated with TIC quantitation, a reduced level of confidence in the reported concentration is warranted, and the significance of the data is limited.

Well MW-11 exhibited a concentration of 460.2 ug/L for the C₉-C₁₈ Aliphatics (presented in Table 4-1 as the sum of the individually quantitated VPH C₉-C₁₂ Aliphatic Fraction and the EPH C₉-C₁₈ Aliphatic Fraction). This concentration is below the NCGWQS of 4,200 ug/L for the C₉-C₂₂ Aromatics. A GCL has not been established for the C₉-C₂₂ Aromatics. A concentration of 2032 ug/L was reported for the C₉-C₂₂ Aromatics (presented in Table 4-1 as the sum of the individually quantitated VPH C₉-C₁₀ Aromatic Fraction and the EPH C₁₁-C₂₂ Aromatic Fraction). This concentration is above the NCGWQS of 210 ug/L for the C₉-C₂₂ Aromatics. A GCL has not been established for the C₉-C₂₂ Aromatics.

Figures 4-1, 4-2, and 4-3 present ethylbenzene, naphthalene and the C₉-C₂₂ Aromatics concentrations in groundwater at the site. The maps illustrate the limited extent of these constituents, with concentrations at or above the NCGWQSs limited to the immediate vicinity of well MW-11.

Groundwater quality data from the current and previous sampling events are summarized in Table 4-2. From Table 4-2, few compounds have been detected at concentrations above NCGWQSs at any site wells, and no compounds have been detected at concentrations above GCLs. In May 1992, well MW-4 exhibited some SVOCs above NCGWQSs. The well could not be located in subsequent events and may have been abandoned.

Well MW-6 exhibited three SVOCs above NCGWQSs in May 1992, of which only naphthalene was detected in later sampling events. Naphthalene has not been detected in either of the two sampling events of the current monitoring program. In April 2001, the most recent prior event, naphthalene was reported at 16 ug/L (below the NCGWQS of 21 ug/L) by the VOC analysis but was not detected in the SVOC analysis. Concentrations of the C₉-C₂₂ Aromatics, first included in the analytic suite in August 1999, have decreased substantially over time, from 2500 ug/L in April 1999 to below reporting limits in April 2001. The C₉-C₂₂ Aromatics were not detected above the reporting limit of 200 ug/L at well MW-6 in the previous or current sampling events. The NCGWQS for the C₉-C₂₂ Aromatics is 210 ug/L; a GCL has not been established for this hydrocarbon fraction.

At well MW-8, located close to and generally downgradient of the former UST, the AVOC 4-isopropyltoluene was reported at a concentration of 1 ug/L in October 2003. A NCGWQS has not been established for 4-isopropyltoluene. Therefore, the standard is set at the reporting limit, and consequently the detection of 4-isopropyltoluene is by definition above the standard. No other AVOCs were reported at concentrations above NCGWQSs during that event or the subsequent sampling event conducted in April 2001, and no SVOCs have been detected in the well above NCGWQSs. The C₉-C₂₂ Aromatics were reported at concentrations of 220 ug/L and 350 ug/L in October 2000 and April 2001, respectively, both above the NCGWQS. Well MW-8 has not been sampled during the current monitoring program as free product has been present at the well.

At Well MW-9, located close to and generally cross-gradient of the former UST, chloroform was the only compound that has been detected at concentrations above its NCGWQS (of 0.19 ug/L), with concentrations of 0.6 ug/L in October 2000 and April 2001. These concentrations are substantially below the GCL for chloroform of 190 ug/L. Chloroform was not included in the

analytic suite for the current sampling event. However, given the low concentrations previously reported and that chloroform is not a fuel-related compound, the past reporting of chloroform is not considered significant.

Well MW-11, located close to the former UST, exhibited C₉-C₂₂ Aliphatics and C₉-C₂₂ Aromatics concentrations of 4680 ug/L and 3020 ug/L, respectively, in August 1999, above their respective NCGWQSs of 4200 ug/L and 210 ug/L. Data from the current event indicated concentration reductions for both the C₉-C₂₂ Aliphatics (460.2 ug/L) and the C₉-C₂₂ Aromatics (2032 ug/L), with only the latter above the NCGWQS. A GCL has not been established for either hydrocarbon fraction. AVOC and SVOC analyses are available only for the current sampling event. As discussed above, ethylbenzene was the only AVOC reported above its NCGWQS, and naphthalene was the only target analyte SVOC above its NCGWQS; concentrations of both compounds were substantially below GCLs.

Measurable free product was detected at well MW-8 at a thickness of 0.01 foot for the current sampling event. Measurable free product was not observed at any other site well, including well MW-11, which exhibited free product during the previous (September 2004) gauging event. Figure 4-1 illustrates the estimated extent of free product for June 2004. The map illustrates the limited lateral extent of free product, with free product restricted to the area in the immediate vicinity well MW-8, located near the former UST.

Gauging data from investigations conducted prior to the current program have identified measurable free product at only well MW-11 (Table 4-3). Six gauging events conducted from August 1999 to April 2001 identified measurable free product at this well. Over this period, the product thickness declined from a maximum of 0.85 foot in October 2000 to 0.02 foot in January and April 2001. Of the seven gauging events conducted since April 2001, from October 2002 to the current (December 2004) event, measurable free product was observed at well MW-11 only in September 2004 (at 0.10 foot), although three of these events reported the presence of a sorbent sock in the well immediately prior to gauging, reducing the reliability of the gauging data at well MW-11 for those events. Well MW-8 has exhibited minor thicknesses of measurable free product during the last three gauging events (conducted in June, September, and December 2004 with thicknesses of 0.05 foot, 0.01 foot, and 0.01 foot, respectively). The trend of decreasing product thickness at well MW-11 through April 2001, the absence of free product at this well for all but one of the seven gauging events conducted since April 2001, and the occurrence of only a minor and decreasing thickness of product at well MW-8 observed over the past three gauging events suggests the volume of free product at the site has decreased over time.

In summary, a review of the historical and current groundwater quality data indicate dissolved-phase petroleum constituents have decreased over time, and any constituents potentially present at concentrations above NCGWQSs would be restricted to wells MW-8 and MW-11, both located close to the former UST. Gauging data suggest that free product is limited to the immediate vicinity of the former UST, and the volume of free product has decreased over time.

4.2 Quality Assurance/Quality Control and Data Verification

One quality control (QC) sample consisting of a field duplicate sample was collected from well MW-6. The primary and QC samples were submitted to Paradigm Analytical Laboratories for the same analyses. Results for the two samples were consistent, with no analytes detected in either sample.

Data verification was performed by EEI on the complete set of the primary investigative samples, and included a review of the following:

- Holding times
- Blanks
- Laboratory control spikes
- Surrogate recoveries
- Internal standards
- Calibrations

An assessment of the results indicated the data are usable for project purposes.

SECTION 5

CONCLUSIONS AND RECOMMENDATIONS

Conclusions and recommendations have been developed based on a review of site data. Each is discussed below.

5.1 Conclusions

The following conclusions have been drawn based on site data:

- Surficial aquifer groundwater flow for the current monitoring event is to the east and northwest towards the center of the site and northward from the center of the site; flow directions are variable over time.
- A previous investigation indicated constituent concentrations in soil are below NCDENR Soil-to-Groundwater Maximum Contaminant Concentrations.
- Gauging data suggest that only a minor thickness of free product is present at the site, that what free product is present is limited to the immediate vicinity of the former UST, and that the volume of free product has decreased over time.
- Few target analytes were present at detectable concentrations during the current sampling event; only three analytes were detected above NCGWQSs; all were substantially below GCLs and were detected only in well MW-11.
- Historical groundwater quality data indicate few constituents have been present above NCGWQSs, and all constituents have been substantially below GCLs.
- Historical and current groundwater quality data indicate dissolved-phase petroleum constituent concentrations have decreased over time, and any constituents potentially remaining at concentrations above NCGWQSs would be restricted to wells MW-8 and MW-11, both located close to the former UST.

5.2 Recommendations

The following recommendations are made based on site data:

- Continue with the planned quarterly groundwater gauging and semi-annual groundwater sampling program.
- Remove sorbent socks from site monitoring wells approximately two weeks prior to the next scheduled monitoring event, and reinstall socks as needed following the event.

SECTION 6 REFERENCES

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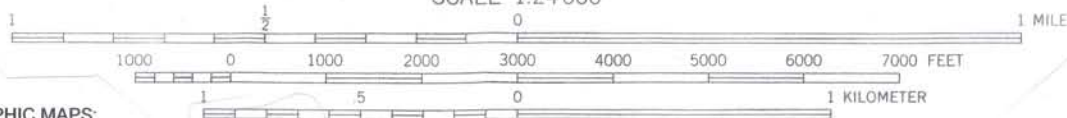
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FIGURES



SCALE 1:24 000



U.S.G.S TOPOGRAPHIC MAPS:
JACKSONVILLE SOUTH, N.C.
1952
PHOTOINSPECTED 1988
and
CAMP LEJEUNE SOUTH, N.C.
1952
PHOTOREVISED 1971

(Map adapted from Law, 2000a)

	FIGURE	1-1	SITE LOCATION SITEH-28 QUARTERLY MONITORING REPORT MCB CAMP LEJEUNE, NC
	DATE	7/30/04	
	REVISION	0	
	DRAWN BY	WCM	
	FILE	H28_TOPO	

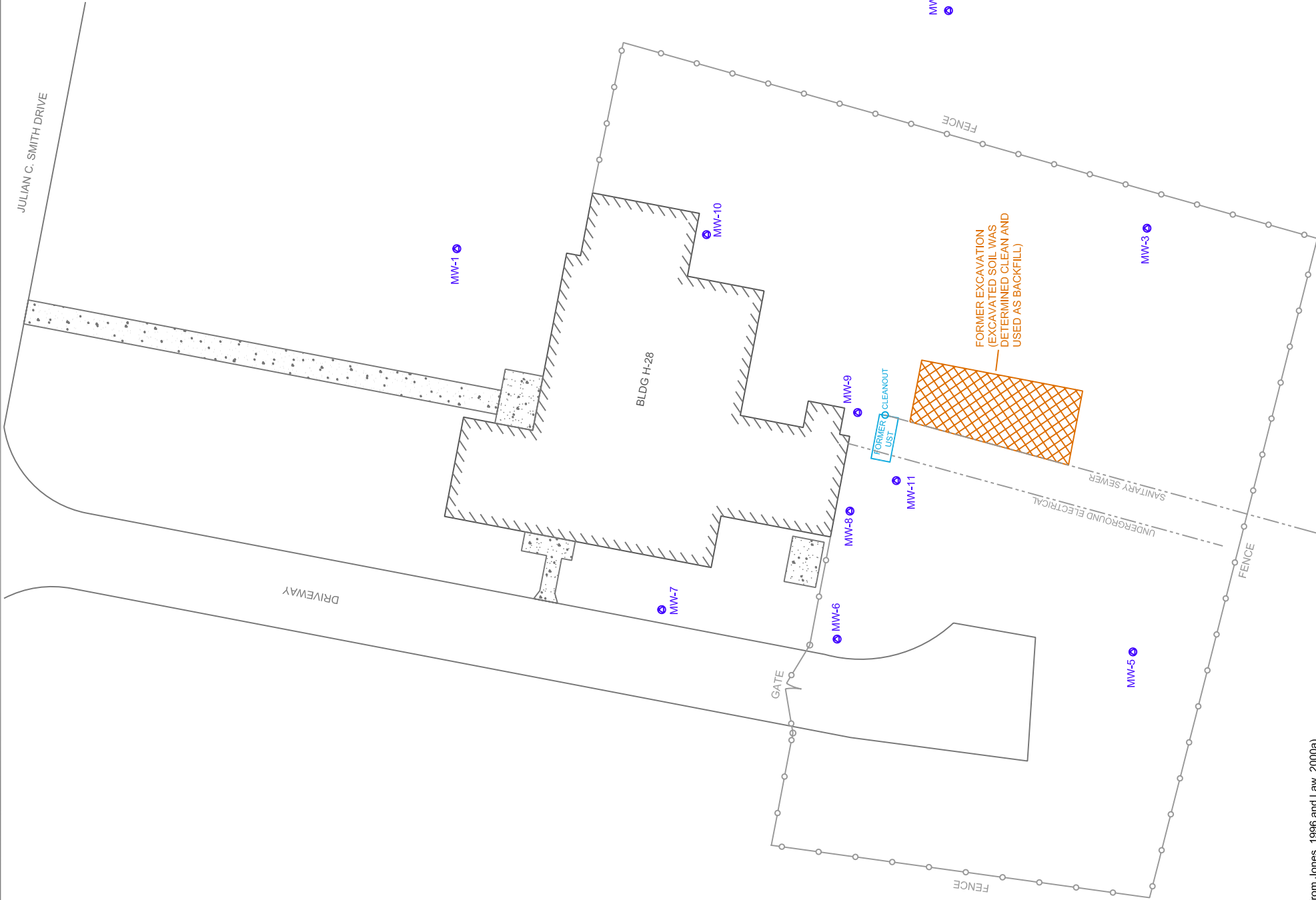


LEGEND

● SHALLOW MONITORING WELL



Engineering & Environment, Inc.	FIGURE	1-2	SITE LAYOUT AND WELL LOCATIONS	
	DATE	01/19/05	SITE H-28	
	REVISION	0	QUARTERLY MONITORING REPORT	
	DRAWN BY	WCM	MCB CAMP LEJEUNE, NC	
	FILE	H28_MAP		

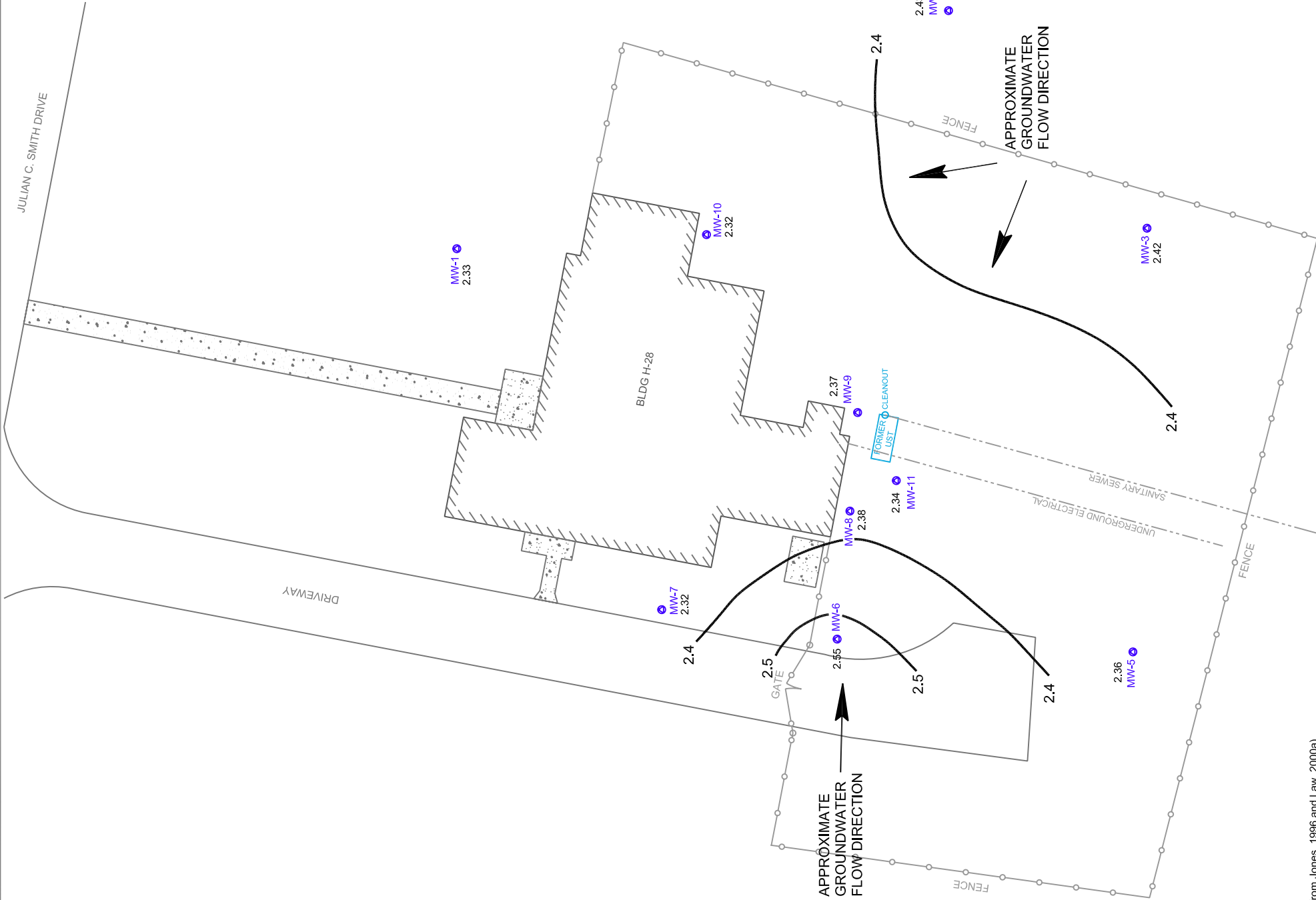


LEGEND

- SHALLOW MONITORING WELL



	FIGURE	1-3	LOCATION OF FORMER UST AND PREVIOUS EXCAVATION
	DATE	01/19/05	SITE H-28
	REVISION	0	QUARTERLY MONITORING REPORT
	DRAWN BY	WCM	MCB CAMP LEJEUNE, NC
	FILE	H28_MAP	

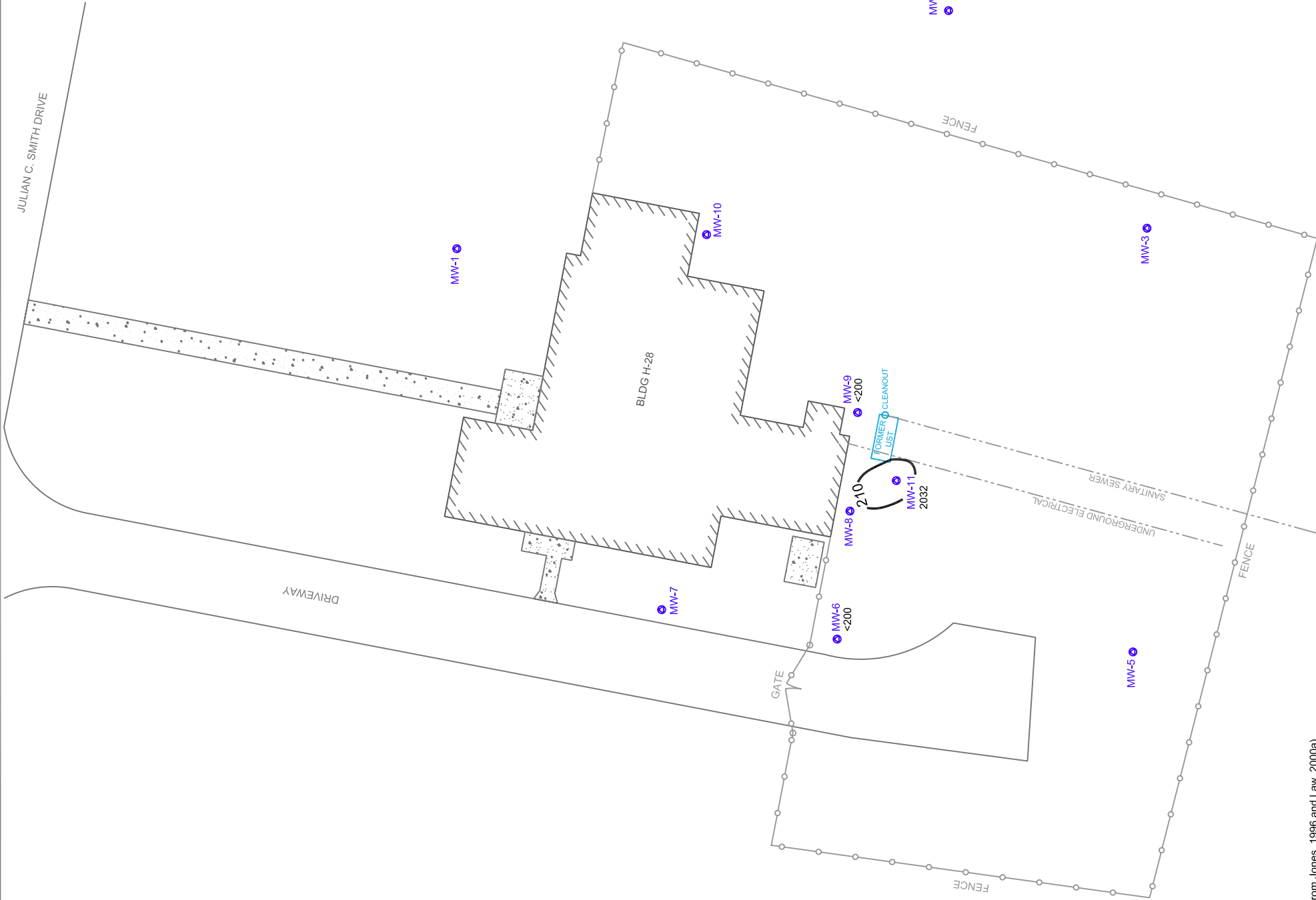


LEGEND

- SHALLOW MONITORING WELL
 - 1.51 SURFICIAL AQUIFER GROUNDWATER ELEVATION
 - 3.0 SURFICIAL AQUIFER GROUNDWATER ELEVATION CONTOUR
- (GROUNDWATER ELEVATIONS EXPRESSED IN FEET ABOVE/BELOW MEAN SEA LEVEL)



	FIGURE	3-1	SURFICIAL AQUIFER
	DATE	01/19/05	GROUNDWATER ELEVATIONS
	REVISION	0	FOR 17 DECEMBER 2004
	DRAWN BY	WCM	SITE H-28
	FILE	H28_MAP	QUARTERLY MONITORING REPORT
			MCB CAMP LEJEUNE, NC

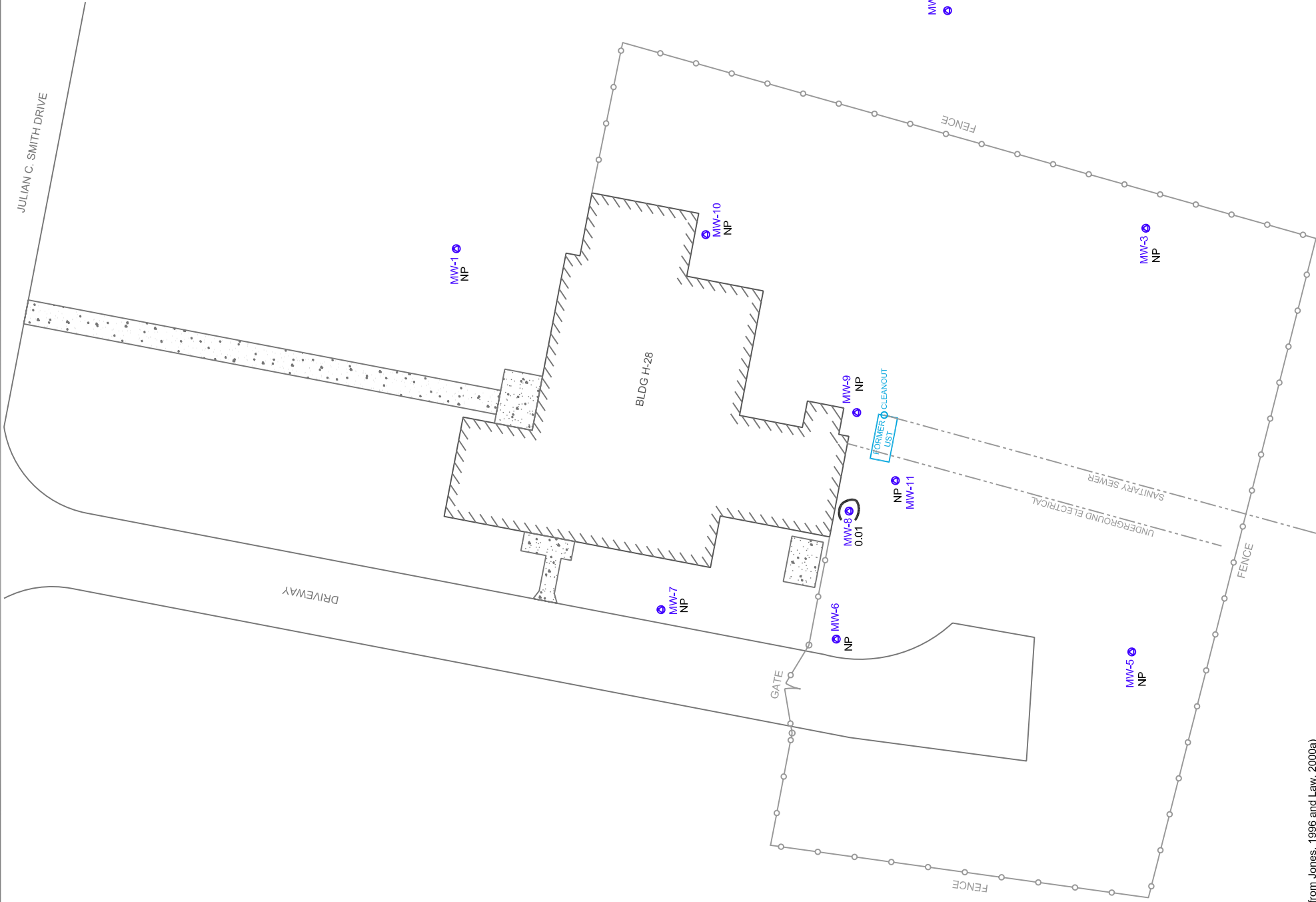


LEGEND

- SHALLOW MONITORING WELL
 - SURFICIAL AQUIFER C9-C22 AROMATICS CONCENTRATION 1140
 - SURFICIAL AQUIFER C9-C22 AROMATICS ISOCONCENTRATION CONTOUR <210
- (CONCENTRATIONS EXPRESSED IN MICROGRAMS PER LITER)
(<# DENOTES NOT DETECTED AT THE INDICATED REPORTING LIMIT)
(THE NORTH CAROLINA GROUNDWATER QUALITY STANDARD FOR C9-C22 AROMATICS IS 210 MICROGRAMS PER LITER)



	FIGURE	4-3	SURFICIAL AQUIFER
	DATE	01/19/05	C9-C22 AROMATICS CONCENTRATIONS
	REVISION	0	FOR DECEMBER 2004
	DRAWN BY	WCM	SITE H-28
	FILE	H28_MAP	QUARTERLY MONITORING REPORT
			MCB CAMP LEJEUNE, NC



LEGEND

- SHALLOW MONITORING WELL
- 0.05 FREE PRODUCT THICKNESS
- ESTIMATED EXTENT OF FREE PRODUCT
- (THICKNESS EXPRESSED IN FEET)
- (NP: MEASURABLE FREE PRODUCT NOT PRESENT)



	FIGURE	4-4	ESTIMATED EXTENT OF FREE PRODUCT
	DATE	01/19/05	FOR DECEMBER 2004
	REVISION	0	SITE H-28
	DRAWN BY	WCM	QUARTERLY MONITORING REPORT
	FILE	H28_MAP	MCB CAMP LEJEUNE, NC

TABLES

Table 3-1
Gauging Data for 17 December 2004
Site H-28

Well Identification	Top of Casing Elevation (feet msl)	Depth to Water (feet btoc)	Depth to Product (feet btoc)	Product Thickness (feet)	Uncorrected Groundwater Elevation (feet msl)	Corrected Groundwater Elevation ⁽¹⁾ (feet msl)
MW-1	11.72	9.39	NP	NP	2.33	2.33
MW-2	12.00	9.57	NP	NP	2.43	2.43
MW-3	12.18	9.76	NP	NP	2.42	2.42
MW-4	12.29	Not Located - Assumed Abandoned				
MW-5	12.31	9.95	NP	NP	2.36	2.36
MW-6	11.96	9.41	NP	NP	2.55	2.55
MW-7	11.62	9.30	NP	NP	2.32	2.32
MW-8	12.07	9.70	9.69	0.01	2.37	2.38
MW-9	12.20	9.83	NP	NP	2.37	2.37
MW-10	11.57	9.25	NP	NP	2.32	2.32
MW-11	12.21	9.87	NP	NP	2.34	2.34

⁽¹⁾ Corrected Groundwater Elevation = Top of Casing Elevation - Depth to Water + 0.8 x Product Thickness

feet msl - feet above/below mean sea level

feet btoc - feet below top of casing

NP - Not Present - no measurable product detected

Table 4-1
Summary of Groundwater Quality Analytical Data for December 2004
Site H-28

EPA Method 602 (ug/L)	NCGWQS	GCL	MW-6	DUP ⁽¹⁾	MW-8	MW-9	MW-11
			17 December 2004	17 December 2004	17 December 2004	17 December 2004	17 December 2004
Benzene	1	5000	<1.00	<1.00	NS	<1.00	<1.00
Ethylbenzene	29	29,000	<1.00	<1.00	NS	<1.00	35.6
Toluene	1000	257,500	<1.00	<1.00	NS	0.349 J	1.54
m,p-Xylene ⁽²⁾			<2.00	<2.00	NS	<2.00	54.2
o-Xylene ⁽²⁾			<2.00	<2.00	NS	<2.00	66.0
Total Xylenes ⁽²⁾	530	87,500	<4.00	<4.00	NS	<4.00	120.2
EPA Method 625 (ug/L)							
Acenaphthene	80	2120	<10.0	<10.0	NS	<10.0	4.00 J
Benzo[a]anthracene	0.0479	22	<10.0	<10.0	NS	<10.0	<10.0
Benzyl butyl phthalate	100	NE	<10.0	<10.0	NS	<10.0	<10.0
Bis(2-ethylhexyl)phthalate	3	3000	<10.0	<10.0	NS	<10.0	<10.0
Di-n-octylphthalate	140	NE	<10.0	<10.0	NS	<10.0	<10.0
Fluorene	280	950	<10.0	<10.0	NS	<10.0	5.90 J
N-Nitrosodi-n-propylamine	0.0007	NE	<10.0	<10.0	NS	<10.0	<10.0
Naphthalene	21	15,500	<10.0	<10.0	NS	<10.0	114
Phenanthrene	210	410	<10.0	<10.0	NS	<10.0	6.20 J
TICs (total)			NR	NR	NS	NR	727.1 J ⁽³⁾
MADEP VPH (ug/L)							
C ₅ -C ₈ Aliphatics	420	NE	<100	<100	NS	<100	<100
C ₉ -C ₁₂ Aliphatics ⁽⁴⁾			<100	<100	NS	<100	300
C ₉ -C ₁₀ Aromatics ⁽⁴⁾			<100	<100	NS	<100	670
MADEP EPH (ug/L)							
C ₉ -C ₁₈ Aliphatics ⁽⁴⁾			<100	<100	NS	<100	160.2
C ₁₉ -C ₃₆ Aliphatics	42,000	NE	<100	<100	NS	<100	<100
C ₁₁ -C ₂₂ Aromatics ⁽⁴⁾			<100	<100	NS	<100	1362
MADEP VPH + EPH (ug/L)							
C ₉ -C ₁₂ + C ₉ -C ₁₈ Aliphatics ⁽⁴⁾	4200	NE	<200	<200	NS	<200	460.2
C ₉ -C ₁₀ + C ₁₁ -C ₂₂ Aromatics ⁽⁴⁾	210	NE	<200	<200	NS	<200	2032

⁽¹⁾ DUP is a duplicate sample collected from well MW-6

⁽²⁾ Laboratory quantitation is performed on the m,p-xylene isomers and on the o-xylene isomer; the NCGWQS is based on the sum of the m-, p-, and o-xylene isomers; the sum of the m,p-xylene isomers and the o-xylene isomer is presented as Total Xylenes

⁽³⁾ Two TICs were identified as specific compounds: 1-Methylnaphthalene was reported at 114 J ug/L (NCGWQS not established, therefore NCGWQS is the reporting limit; GCL not established); 2-Methylnaphthalene was reported at 165 J ug/L (NCGWQS of 14 ug/L; GCL of 12,500 ug/L)

⁽⁴⁾ Laboratory quantitation is performed on each of the indicated hydrocarbon fractions; NCGWQSs are based on the sum of the indicated fractions; the sums for the indicated fractions are presented as MADEP VPH + EPH

J: Estimated concentration below reporting limits or estimated concentration for TIC quantitations

NR: None Reported; no TICs were identified in the sample

NS: Not Sampled; measurable free product detected

GCL: Gross Contamination Level

NE: Not Established; a GCL has not been established for the analyte

NCGWQS: North Carolina Groundwater Quality Standard

TICs (total): Tentatively Identified Compound; sum of all TICs; all TIC concentrations are estimated

ug/L: micrograms per liter

Bold type indicates analyte detection

Shaded area in bold indicates analyte detection at a concentration above the NCGWQS

Shaded area in bold italics indicates analyte detection at a concentration above the GCL

Table 4-2 (Page 1 of 2)
Groundwater Quality Analytical Data Over Time
Site H-28

EPA Method 602 or 6210D (ug/L)	NCGWQS	GCL	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6									
			May 1992	May 1992	May 1992	May 1992	May 1992	May 1992	January 1998	April 1998	July 1998	August 1999	October 2000	April 2001	June 2004	December 2004 Primary	Dup
Benzene	1	5000	ND	ND	ND	ND	ND	8.0	ND	ND	ND	ND	ND	ND	<1.00	<1.00	<1.00
n-Butylbenzene	70	6900	nr	nr	nr	nr	nr	nr	nr	nr	nr	na	ND	ND	na	na	na
sec-Butylbenzene	70	8500	nr	nr	nr	nr	nr	nr	nr	nr	nr	na	ND	ND	na	na	na
Chloroform	0.19	190	nr	nr	nr	nr	nr	nr	nr	nr	nr	na	ND	ND	na	na	na
Ethylbenzene	29	29,000	8.0	ND	ND	5.0	8.0	18.0	ND	ND	4.99	3	9	3	<1.00	<1.00	<1.00
Isopropylbenzene	70	25,000	nr	nr	nr	nr	nr	nr	nr	nr	nr	na	ND	0.8	na	na	na
4-Isopropyltoluene	RL	NE	nr	nr	nr	nr	nr	nr	nr	nr	nr	na	ND	ND	na	na	na
Naphthalene	21	15,500	nr	nr	nr	nr	nr	nr	nr	nr	nr	na	42	16	na	na	na
n-Propyl benzene	70	30,000	nr	nr	nr	nr	nr	nr	nr	nr	nr	na	3	1	na	na	na
Toluene	1000	257,500	7.0	ND	ND	ND	ND	5.0	ND	ND	ND	ND	ND	ND	<1.00	<1.00	<1.00
1,2,4-Trimethylbenzene	350	28,500	nr	nr	nr	nr	nr	nr	nr	nr	nr	na	ND	2	na	na	na
1,3,5-Trimethylbenzene	350	25,000	nr	nr	nr	nr	nr	nr	nr	nr	nr	na	ND	0.8	na	na	na
Total Xylenes	530	87,500	nr	nr	nr	nr	nr	nr	ND	ND	3.26	4	ND	ND	<4.00	<4.00	<4.00
TCLP Full Scan (ug/L)																	
1,2-Dichloroethane	0.38	380	na	na	na	na	na	11.0	na	na	na	na	na	na	na	na	na
EPA Method 625 (ug/L)																	
Acenaphthene	80	2120	na	na	na	nr	na	nr	nr	ND	1.38	ND	ND	ND	<10.0	<10.0	<10.0
Benzo[a]anthracene	0.0479	22	na	na	na	10.9	na	ND	nr	nr	nr	nr	ND	ND	<10.0	<10.0	<10.0
Benzyl butyl phthalate	100	NE	na	na	na	7.2	na	4.3	ND	ND	ND	nr	ND	ND	<10.0	<10.0	<10.0
BIs(2-ethylhexyl)phthalate	3	3000	na	na	na	34.2	na	24.2	ND	ND	ND	ND	ND	ND	<10.0	<10.0	<10.0
Di-n-octylphthalate	140	NE	na	na	na	374	na	12.4	ND	ND	ND	nr	ND	ND	<10.0	<10.0	<10.0
Fluorene	280	950	na	na	na	ND	na	2.9	ND	ND	2.17	ND	ND	ND	<10.0	<10.0	<10.0
N-Nltrosodi-n-propylamine	0.0007	NE	na	na	na	ND	na	3.2	ND	ND	ND	nr	ND	ND	<10.0	<10.0	<10.0
Naphthalene	21	15,500	na	na	na	ND	na	48	ND	ND	31.7	72	40	ND	<10.0	<10.0	<10.0
Phenanthrene	210	410	na	na	na	nr	nr	nr	nr	ND	1.23	ND	ND	ND	<10.0	<10.0	<10.0
TICs (total)			na	na	na	nr	na	nr	nr	nr	nr	305 J	176 J	41.9 J	17 J	None	None
MADEP VPH + EPH (ug/L)																	
C ₉ -C ₁₈ Aliphatics	4200	NE	na	na	na	na	na	na	nr	nr	nr	2770	190	140	<200	<200	<200
C ₉ -C ₂₂ Aromatics	210	NE	na	na	na	na	na	na	nr	nr	nr	2500	230	ND	<200	<200	<200

J: Estimated concentration below reporting limits or estimated concentration for TIC quantitations
na: Not Analyzed, compound not quantitated in the analytic suite specified for the sample
nr: Not Reported; compound not reported in source document summary table (either not analyzed or not detected)
ns: Not Sampled
ND: Not Detected; compound quantitated and not detected; detection limit not specified in source document summay table
<#: Not detected at the indicated detection limit
None: TIC analysis conducted, no TICs detected

GCL:Gross Contamination Level
NE: Not Established; a GCL has not been established for the analyte
NCGWQS: North Carolina Groundwater Quality Standard
TICs (total): Tentatively Identified Compound; sum of all TICs; all TIC concentrations are estimated
ug/L: micrograms per liter

Bold type indicates analyte detection
Shaded area in bold indicates analyte detection at a concentration above the NCGWQS
Shaded area in bold italics indicates analyte detection at a concentration above the GCL

May 1992 data from Baker, 1994
January 1998 from Law, 1998b
April and July 1998 data from Law, 1998c
August 1999 data for MW-7 and MW-11, and October 1999 data for MW-9 from Law, 2000a
October 2000 and April 2001 data for wells MW-6, MW-8, and MW-9 from Law, 2001
June 2004 data from EEI, 2004b
December 2004 data in Appendix B

Table 4-2 (Page 2 of 2)
Groundwater Quality Analytical Data Over Time
Site H-28

EPA Method 602 or 6210D (ug/L)	NCGWQS	GCL	MW-7					MW-8			MW-9							MW-10	MW-11	
			May 1992	January 1998	April 1998	July 1998	August 1999	May 1992	October 2000	April 2001	May 1992	October 1999	October 2000	April 2001	June 2004		December 2004	May 1992	August 1999 ⁽¹⁾	December 2004
Benzene	1	5000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	<1.00	<1.00	<1.00	ND	ns	<1.00
n-Butylbenzene	70	6900	nr	nr	nr	nr	nr	nr	1	2	nr	na	ND	ND	na	na	na	nr	ns	na
sec-Butylbenzene	70	8500	nr	nr	nr	nr	nr	nr	1	ND	nr	na	ND	ND	na	na	na	nr	ns	na
Chloroform	0.19	190	nr	nr	nr	nr	nr	nr	ND	ND	nr	na	0.6	0.6	na	na	na	nr	ns	na
Ethylbenzene	29	29,000	8.0	ND	ND	ND	ND	22.0	2	1	ND	ND	ND	ND	<1.00	<1.00	<1.00	ND	ns	35.6
Isopropylbenzene	70	25,000	nr	nr	nr	nr	nr	nr	1	3	nr	na	ND	ND	na	na	na	nr	ns	na
4-Isopropyltoluene	RL	NE	nr	nr	nr	nr	nr	nr	1	ND	nr	na	ND	ND	na	na	na	nr	ns	na
Naphthalene	21	15,500	nr	nr	nr	nr	nr	nr	19	20	nr	na	ND	ND	na	na	na	nr	ns	na
n-Propyl benzene	70	30,000	nr	nr	nr	nr	nr	nr	2	5	nr	na	ND	ND	na	na	na	nr	ns	na
Toluene	1000	257,500	6.0	ND	ND	ND	ND	14.0	ND	ND	ND	ND	ND	ND	<1.00	<1.00	0.349 J	ND	ns	1.54
1,2,4-Trimethylbenzene	350	28,500	nr	nr	nr	nr	nr	nr	19	12	nr	na	ND	ND	na	na	na	nr	ns	na
1,3,5-Trimethylbenzene	350	25,000	nr	nr	nr	nr	nr	nr	ND	3	nr	na	ND	ND	na	na	na	nr	ns	na
Total Xylenes	530	87,500	nr	ND	ND	ND	ND	nr	2.7	2	nr	ND	ND	ND	<4.00	<4.00	<4.00	nr	ns	120.2
TCLP Full Scan (ug/L)																				
1,2-Dichloroethane	0.38	380	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	ns	na
EPA Method 625 (ug/L)																				
Acenaphthene	80	2120	na	nr	ND	ND	nr	na	ND	ND	na	ND	ND	ND	<10.0	<10.0	<10.0	na	ns	4.00 J
Benzo[a]anthracene	0.0479	22	na	nr	nr	nr	nr	na	ND	ND	na	ND	ND	ND	<10.0	<10.0	<10.0	na	ns	<10.0
Benzyl butyl phthalate	100	NE	na	ND	ND	ND	nr	na	ND	ND	na	ND	ND	ND	<10.0	<10.0	<10.0	na	ns	<10.0
BIs(2-ethylhexyl)phthalate	3	3000	na	ND	ND	ND	nr	na	ND	ND	na	ND	ND	ND	<10.0	<10.0	<10.0	na	ns	<10.0
Di-n-octylphthalate	140	NE	na	ND	ND	ND	nr	na	ND	ND	na	ND	ND	ND	<10.0	<10.0	<10.0	na	ns	<10.0
Fluorene	280	950	na	ND	ND	ND	nr	na	ND	ND	na	ND	ND	ND	<10.0	<10.0	<10.0	na	ns	5.90 J
N-Nltrosodi-n-propylamine	0.0007	NE	na	ND	ND	ND	nr	na	ND	ND	na	ND	ND	ND	<10.0	<10.0	<10.0	na	ns	<10.0
Naphthalene	21	15,500	na	ND	ND	ND	ND	na	15	12	na	ND	ND	ND	<10.0	<10.0	<10.0	na	ns	114
Phenanthrene	210	410	na	nr	ND	ND	ND	na	ND	ND	na	ND	ND	ND	<10.0	<10.0	<10.0	na	ns	6.20 J
TICs (total)			na	nr	nr	nr	nr	na	108 J	179.2 J	na	76 J	ND	ND	None	None	None	na	ns	727.1 J
MADEP VPH + EPH (ug/L)																				
C ₉ -C ₁₈ Aliphatics	4200	NE	na	nr	nr	nr	ND	na	350	590	na	ND	ND	ND	<200	<200	<200	na	4680	460.2
C ₉ -C ₂₂ Aromatics	210	NE	na	nr	nr	nr	ND	na	220	350	na	ND	ND	ND	<200	<200	<200	na	3020	2032

J: Estimated concentration below reporting limits or estimated concentration for TIC quantitations
na: Not Analyzed; compound not quantitated in the analytic suite specified for the sample
nr: Not Reported; compound not reported in source document summary table (either not analyzed or not detected)
ns: Not Sampled
ND: Not Detected; compound quantitated and not detected; detection limit not specified in source document summary table
<#: Not detected at the indicated detection limit
None: TIC analysis conducted, no TICs detected

GCL:Gross Contamination Level
NE: Not Established; a GCL has not been established for the analyte
NCGWQS: North Carolina Groundwater Quality Standard
TICs (total): Tentatively Identified Compound; sum of all TICs; all TIC concentrations are estimated
ug/L: micrograms per liter

Bold type indicates analyte detection
Shaded area in bold indicates analyte detection at a concentration above the NCGWQS
Shaded area in bold italics indicates analyte detection at a concentration above the GCL

May 1992 data from Baker, 1994
January 1998 from Law, 1998b
April and July 1998 data from Law, 1998c
August 1999 data for MW-7 and MW-11, and October 1999 data for MW-9 from Law, 2000a
October 2000 and April 2001 data for wells MW-6, MW-8, and MW-9 from Law, 2001
June 2004 data from EEI, 2004b
December 2004 data in Appendix B

⁽¹⁾ MADEP VPH and EPH samples collected 13 August 1999; other analyses were to be collected 20 August 1999 but were not as free product was identified at that time (Law, 2000a)

Table 4-3
Summary of Product Thickness Data Over Time
Site H-28

Date	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9	MW-10	MW-11
12 May 1992	ni	ni	ni	ni	ni	ni	ni	NP	NP	NP	ni
20 May 1992	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	ni
29 January 1998	NP	NP	NP	nl	NP	NP	NP	nm	NP	nl	ni
3 April 1998	nm	nm	nm	nl	nm	NP	NP	nm	nm	nm	ni
7 July 1998	nm	nm	nm	nl	nm	NP	NP	nm	nm	nm	ni
13 August 1999	nm	nm	nm	nl	nm	NP	NP	nm	NP	nm	NP
20 August 1999	nm	nm	nm	nl	nm	NP	NP	nm	NP	nm	0.27
22 October 1999	nm	nm	nm	nl	nm	nm	nm	nm	NP	nm	0.85
20 July 2000	NP	NP	NP	nl	NP	NP	NP	NP	NP	NP	0.30
17 October 2000	NP	NP	NP	nl	NP	NP	NP	NP	NP	NP	0.33
16 January 2001	NP	NP	NP	nl	NP	NP	NP	NP	NP	NP	0.02
12 April 2001	NP	NP	NP	nl	NP	NP	NP	NP	NP	NP	0.02
21 October 2002	nm	nm	nm	nl	nm	nm	nm	nm	nm	nm	NP ⁽¹⁾
30 January 2003	nm	nm	nm	nl	nm	nm	nm	nm	nm	nm	NP
30 April 2003	nm	nm	nm	nl	nm	nm	nm	nm	nm	nm	NP ⁽¹⁾
21 August 2003	nm	nm	nm	nl	nm	nm	nm	nm	nm	nm	NP
15 June 2004	NP	NP	NP	nl	NP	NP	NP	0.05	NP	NP	NP ⁽¹⁾
30 September 2004	NP	NP	NP	nl	NP	NP	NP	0.01	NP	NP	0.10
17 December 2004	NP	NP	NP	nl	NP	NP	NP	0.01	NP	NP	NP

⁽¹⁾ Sorbent sock present in well immediately prior to gauging; product thickness data is considered compromised

Product thickness data expressed in feet

ni: Not Installed; well not installed at the time gauging was conducted

nl: Not Located; well could not be located

nm: Not Measured; well not measured during the gauging event

NP: Not Present; no measurable thickness of free product present in the well

APPENDIX A
FIELD DATA SAMPLING SHEETS

EEL,Water Level Sheet Bld. H28	Date 12/17/2004
---------------------------------------	------------------------

Date 12/17/2004

[illegible]



ENGINEERING AND ENVIRONMENT, INC.

H28 Field Data

Project #LD03-011

Date Time Weather

Sampler Well/Sample #

Depth To Bottom (ft) Depth To Water (ft) Water Depth (ft)

Well Vol. Purge Vol. Vol. Purged

Sampling Device (pump/Bailer)

	ONE	TWO	THREE	FOUR	FIVE	SIX	UNIT
Time	12:15	12:18	12:21	12:24	12:28		N/A
Temperature	19.29	19.96	20.27	20.26	20.04		°
Spec. Conductivity	0.212	0.168	0.162	0.145	0.056		(m s/m)
Dissolved Oxygen	3.72	2.8	1.99	1.7	0.66		ms/L
PH	6.01	5.5	5.34	5.39	5.32		STD
ORP	8.9	25.7	31.1	34.6	35.3		(G/L)
Turbidity	138	353	266	83.4	12.3		(NTU)
Analyte	Size	Preserv.					
VOC 602	3 X 40 ml	HCL					
625	2 X 1L	None					
Comments:	DUP						

2" well vol.=water depth X 0.1632 4" well vol.=water depth x 0.6528

Pid	0						
Time	12:08	12:15	12:20	12:22			
SWL	9.41	10.22	10.22	10.22			
Pump Depth	15	15	15	15			



ENGINEERING AND ENVIRONMENT, INC.

H28 Field Data

Project #LD03-011

Date 12/17/2004 Time 13:55 Weather sunny, 58 degrees

Sampler BS Well/Sample # USTH28- MW9

Depth To Bottom (ft) 12 Depth To Water (ft) 9.83 Water Depth (ft) 2.13

Well Vol. 0.35 Purge Vol. 1.05 Vol. Purged

Sampling Device (pump/Bailer)

	ONE	TWO	THREE	FOUR	FIVE	SIX	UNIT
Time	13:40	13:44	13:47	13:50	13:53		N/A
Temperature	20.57	20.9	20.88	20.98	20.74		©
Spec. Conductivity	0.15	0.149	0.147	0.147	0.145		(m s/m)
Dissolved Oxygen	5.18	3.9	3.29	2.82	2.43		ms/L
PH	5.78	5.72	5.67	5.64	5.6		STD
ORP	64.5	81.7	89.2	93.4	100.3		(G/L)
Turbidity	O/L	428	224	248	245		(NTU)
Analyte	Size	Preserv.					
VOC 602	3 X 40 ml	HCL					
625	2 X 1L	None					
Comments:							

2" well vol.=water depth X 0.1632 4" well vol.=water depth x 0.6528

Pid	0						
Time	13:38	13:41	13:42	13:45			
SWL	10.23	10.32	10.36	10.36			
Pump Depth	11.6	11.6	11.6	11.6			



ENGINEERING AND ENVIRONMENT, INC.

H28 Field Data

Project #LD03-011

Date 12/17/2004 Time 13:21 Weather sunny, 58 degrees

Sampler BS Well/Sample # USTH28- MW11

Depth To Bottom (ft) 15 Depth To Water (ft) 9.78 Water Depth (ft) 5.61

Well Vol. 0.91 Purge Vol. 2.73 Vol. Purged

Sampling Device (pump/Bailer)

	ONE	TWO	THREE	FOUR	FIVE	SIX	UNIT
Time	13:05	13:08	13:12	13:16	13:20		N/A
Temperature	19.69	19.92	20.08	20.13	20.25		°C
Spec. Conductivity	0.073	0.074	0.08	0.086	0.09		(m s/m)
Dissolved Oxygen	1.31	0.74	0.5	0.38	0.33		ms/L
PH	5.24	5.23	5.21	5.19	5.18		STD
ORP	14.3	9.8	7.1	4.3	2.8		(G/L)
Turbidity	19.6	7.73	7.46	8.69	14.6		(NTU)
Analyte	Size	Preserv.					
VOC 602	3 X 40 ml	HCL					
625	2 X 1L	None					
Comments:							

2" well vol.=water depth X 0.1632 4" well vol.=water depth x 0.6528							
Pid	0						
Time	13:00	13:04	13:07	13:09	13:13	13:19	
SWL	9.78	10.28	10.39	10.43	10.49	10.49	
Pump Depth	14.6	14.6	14.6	14.6	14.6	14.6	

APPENDIX B

LABORATORY ANALYTICAL REPORTS

Mr. Fred Kozminski
Engineering & Environment, Inc.
195 South Rosemont Rd.
Suite 118
Virginia Beach VA 23452-4353
Report Number: G546-19
Client Project: H28

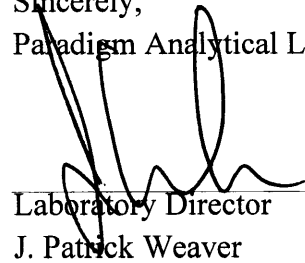
Dear Mr. Kozminski:

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

If there are any questions about the report or the services performed during this project, please call Paradigm at (910) 350-1903. 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

1/11/05
Date

VPH (Aliphatics/Aromatics) Laboratory Reporting Form

Client Name: Engineering & Environment, Inc.

Project Name: H28

Sample Information and Analytical Results	
Sample Identification	USTH28-MW6
Sample Matrix	Water
Collection Option (for Soil)*	
Date Collected	12/17/04
Date Received	12/18/04
Date Extracted	12/30/04
Date Analyzed	12/30/04
Dry Weight	
Dilution Factor	1
C ₅ -C ₈ Aliphatics**	< 100 (µg/L)
C ₉ -C ₁₂ Aliphatics**	< 100 (µg/L)
C ₉ -C ₁₀ Aromatics**	< 100 (µg/L)
Surrogate % Recovery - PID	110
Surrogate % Recovery - FID	88

* = 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: g546-19-1d

Reviewed By: 

VPH (Aliphatics/Aromatics) Laboratory Reporting Form

Client Name: Engineering & Environment, Inc.

Project Name: H28

Sample Information and Analytical Results	
Sample Identification	USTH28-MW09
Sample Matrix	Water
Collection Option (for Soil)*	
Date Collected	12/17/04
Date Received	12/18/04
Date Extracted	12/30/04
Date Analyzed	12/30/04
Dry Weight	
Dilution Factor	1
C ₅ -C ₈ Aliphatics**	< 100 (µg/L)
C ₉ -C ₁₂ Aliphatics**	< 100 (µg/L)
C ₉ -C ₁₀ Aromatics**	< 100 (µg/L)
Surrogate % Recovery - PID	110
Surrogate % Recovery - FID	89

* = 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: g546-19-2d

Reviewed By: 

VPH (Aliphatics/Aromatics) Laboratory Reporting Form

Client Name: Engineering & Environment, Inc.

Project Name: H28

Sample Information and Analytical Results	
Sample Identification	USTH28-MW11
Sample Matrix	Water
Collection Option (for Soil)*	
Date Collected	12/17/04
Date Received	12/18/04
Date Extracted	12/30/04
Date Analyzed	12/30/04
Dry Weight	
Dilution Factor	1
C ₅ -C ₈ Aliphatics**	< 100 (µg/L)
C ₉ -C ₁₂ Aliphatics**	300 (µg/L)
C ₉ -C ₁₀ Aromatics**	670 (µg/L)
Surrogate % Recovery - PID	110
Surrogate % Recovery - FID	91

* = 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: g546-19-3d

Reviewed By: me

VPH (Aliphatics/Aromatics) Laboratory Reporting Form

Client Name: Engineering & Environment, Inc.

Project Name: H28

Sample Information and Analytical Results	
Sample Identification	USTH28-Dup
Sample Matrix	Water
Collection Option (for Soil)*	
Date Collected	12/17/04
Date Received	12/18/04
Date Extracted	12/30/04
Date Analyzed	12/30/04
Dry Weight	
Dilution Factor	1
C ₅ -C ₈ Aliphatics**	< 100 (µg/L)
C ₉ -C ₁₂ Aliphatics**	< 100 (µg/L)
C ₉ -C ₁₀ Aromatics**	< 100 (µg/L)
Surrogate % Recovery - PID	100
Surrogate % Recovery - FID	88

* = 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: g546-19-4d

Reviewed By: 

Attachment 2

VPH Laboratory Reporting Form

Calibration and QA/QC Information

FID Initial Calibration Date: 12/17/04PID Initial Calibration Date: 12/17/04

Calibration Ranges and Limits

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

Calibration Concentration Levels

Range	Levels (µg/L)	%RSD or CCC	Method of Quantitation
C ₅ -C ₈ Aliphatics	40	4.8	Calibration Factor
	1000		
	2000		
	3000		
	4000		
C ₉ -C ₁₂ Aliphatics	10	0.993	Linear Regression
	250		
	500		
	750		
	1000		
C ₉ -C ₁₀ Aromatics	10	6.8	Calibration Factor
	250		
	500		
	750		
	1000		

Calibration Check Date: 12/30/04

Calibration Check

Range	Levels (µg/L) (mg/Kg)		RPD
C ₅ -C ₈ Aliphatics	2000	200	-1.9
C ₉ -C ₁₂ Aliphatics	500	50	1.9
C ₉ -C ₁₀ Aromatics	500	50	-6.4

MDL = Method Detection Limit

ML = Minimum Limit

RL = Reportable Limit

RPD = Relative Percent Difference

%RSD = Percent Relative Standard Deviation

CCC = Correlation Coefficient of Curve

EPH (Aliphatics/Aromatics) Results

by MDEP-EPH

Client Name: Engineering & Environment, Inc.Project Name: H28

Sample Information and Analytical Results	
Sample Identification	USTH28-MW6
Sample Matrix	Water
Date Collected	12/17/04
Date Received	12/18/04
Date Extracted	12/22/04
Date Analyzed	01/03/05
Dry Weight	
Dilution Factor	1:1
C ₉ -C ₁₈ Aliphatics*	< 100 (ug/L)
C ₁₉ -C ₃₆ Aliphatics*	< 100 (ug/L)
C ₁₁ -C ₂₂ Aromatics*	< 100 (ug/L)
Aliphatic Surrogate % Recovery	84
Aromatic Surrogate % Recovery	79
Fractionation Surrogate 1 % Recovery	68

Comments:

* = Excludes any surrogates or internal standards.

Note: Low surrogates confirmed by duplicate analysis.

Lab info: G546-19-1J

Reviewed By: me

EPH (Aliphatics/Aromatics) Results

by MDEP-EPH

Client Name: Engineering & Environment, Inc.Project Name: H28

Sample Information and Analytical Results	
Sample Identification	USTH28-MW09
Sample Matrix	Water
Date Collected	12/17/04
Date Received	12/18/04
Date Extracted	12/22/04
Date Analyzed	12/27/04
Dry Weight	
Dilution Factor	1
C ₉ -C ₁₈ Aliphatics*	< 100 (ug/L)
C ₁₉ -C ₃₆ Aliphatics*	< 100 (ug/L)
C ₁₁ -C ₂₂ Aromatics*	< 100 (ug/L)
Aliphatic Surrogate % Recovery	81
Aromatic Surrogate % Recovery	85

Comments:

* = Excludes any surrogates or internal standards.

Sample did not require fractionation.

Lab info: G546-19-2J

Reviewed By: me

EPH (Aliphatics/Aromatics) Results

by MDEP-EPH

Client Name: Engineering & Environment, Inc.Project Name: H28

Sample Information and Analytical Results	
Sample Identification	USTH28-MW11
Sample Matrix	Water
Date Collected	12/17/04
Date Received	12/18/04
Date Extracted	12/22/04
Date Analyzed	12/29/04
Dry Weight	
Dilution Factor	1:1
C ₉ -C ₁₈ Aliphatics*	160.2 (ug/L)
C ₁₉ -C ₃₆ Aliphatics*	< 100 (ug/L)
C ₁₁ -C ₂₂ Aromatics*	1362 (ug/L)
Aliphatic Surrogate % Recovery	71
Aromatic Surrogate % Recovery	80
Fractionation Surrogate 1 % Recovery	110

Comments:

* = Excludes any surrogates or internal standards.

Lab info: G546-19-3J

Reviewed By: me

EPH (Aliphatics/Aromatics) Results

by MDEP-EPH

Client Name: Engineering & Environment, Inc.Project Name: H28

Sample Information and Analytical Results	
Sample Identification	USTH28-Dup
Sample Matrix	Water
Date Collected	12/17/04
Date Received	12/18/04
Date Extracted	12/22/04
Date Analyzed	01/03/05
Dry Weight	
Dilution Factor	1:1
C ₉ -C ₁₈ Aliphatics*	< 100 (ug/L)
C ₁₉ -C ₃₆ Aliphatics*	< 100 (ug/L)
C ₁₁ -C ₂₂ Aromatics*	< 100 (ug/L)
Aliphatic Surrogate % Recovery	92
Aromatic Surrogate % Recovery	81
Fractionation Surrogate 1 % Recovery	71

Comments:

* = Excludes any surrogates or internal standards.

Note: Low surrogates confirmed by duplicate analysis.

Lab info: G546-19-4K

Reviewed By: 

Attachment 3

EPH Laboratory Reporting Form

Calibration and QA/QC Information

Initial Calibration Date: 12/15/04

Calibration Ranges and Limits

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

Calibration Concentration Levels

Range	Levels (µg/mL)	%RSD or CCC	Method of Quantitation
C ₉ -C ₁₈ Aliphatics	6	4.80	Calibration Factor
	30		
	60		
	120		
	240		
C ₁₉ -C ₃₆ Aliphatics	8	8.3	Calibration Factor
	40		
	80		
	160		
	320		
C ₁₁ -C ₂₂ Aromatics	17	5.4	Calibration Factor
	85		
	170		
	340		
	680		

Calibration Check Date: 12/27/04

Calibration Check

Range	Levels (µg/mL)	RPD
C ₉ -C ₁₈ Aliphatics	120	0.6
C ₁₉ -C ₃₆ Aliphatics	160	-17.7
C ₁₁ -C ₂₂ Aromatics	340	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

Attachment 3

EPH Laboratory Reporting Form

Calibration and QA/QC Information

Initial Calibration Date: 12/15/04

Calibration Ranges and Limits

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

Calibration Concentration Levels

Range	Levels (µg/mL)	%RSD or CCC	Method of Quantitation
C ₉ -C ₁₈ Aliphatics	6	4.80	Calibration Factor
	30		
	60		
	120		
	240		
C ₁₉ -C ₃₆ Aliphatics	8	8.3	Calibration Factor
	40		
	80		
	160		
	320		
C ₁₁ -C ₂₂ Aromatics	17	5.4	Calibration Factor
	85		
	170		
	340		
	680		

Calibration Check Date: 12/29/04

Calibration Check

Range	Levels (µg/mL)	RPD
C ₉ -C ₁₈ Aliphatics	120	1.0
C ₁₉ -C ₃₆ Aliphatics	160	-20.2
C ₁₁ -C ₂₂ Aromatics	340	1.3

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: 12/30/04

Calibration Ranges and Limits

Range	MDL (2/2004) ($\mu\text{g/L}$)	ML ($\mu\text{g/L}$)	RL ($\mu\text{g/L}$)	RL (mg/Kg)
C ₉ -C ₁₈ Aliphatics	3.84	12.2	100	10
C ₁₉ -C ₃₆ Aliphatics	0.57	1.8	100	10
C ₁₁ -C ₂₂ Aromatics	4.54	14.4	100	10

Calibration Concentration Levels

Range	Levels ($\mu\text{g/mL}$)	%RSD or CCC	Method of Quantitation
C ₉ -C ₁₈ Aliphatics	6	9.00	Calibration Factor
	30		
	60		
	120		
	240		
C ₁₉ -C ₃₆ Aliphatics	8	6.1	Calibration Factor
	40		
	80		
	160		
	320		
C ₁₁ -C ₂₂ Aromatics	17	5.4	Calibration Factor
	85		
	170		
	340		
	680		

Calibration Check Date: 01/03/05

Calibration Check

Range	Levels ($\mu\text{g/mL}$)	RPD
C ₉ -C ₁₈ Aliphatics	120	-3.5
C ₁₉ -C ₃₆ Aliphatics	160	-10.0
C ₁₁ -C ₂₂ Aromatics	340	16.8

MDL = Method Detection Limit

ML = Minimum Limit

RL = Reportable Limit

RPD = Relative Percent Difference

%RSD = Percent Relative Standard Deviation

CCC = Correlation Coefficient of Curve

Results for Volatiles

by GC 602

Client Sample ID: USTH28-MW6

Analyzed By: JTF

Client Project ID: H28

Date Collected: 12/17/2004 12:30

Lab Sample ID: G546-19-1A

Date Received: 12/18/04

Lab Project ID: G546-19

Matrix: Water

Analyte	Result ug/L	RL ug/L	MDL ug/L	Dilution Factor	Date Analyzed	Flags
Benzene	BQL	1.00	0.316	1	12/28/2004	
Diisopropyl ether (DIPE)	BQL	1.00	0.294	1	12/28/2004	
Ethylbenzene	BQL	1.00	0.299	1	12/28/2004	
Methyl-tert butyl ether (MTBE)	BQL	2.00	0.588	1	12/28/2004	
Toluene	BQL	1.00	0.302	1	12/28/2004	
m/p-Xylene	BQL	2.00	0.608	1	12/28/2004	
o-Xylene	BQL	2.00	0.596	1	12/28/2004	

Surrogate Spike Recoveries

	Spike Added	Spike Result	Percent Recovery
Trifluorotoluene	40	35.4	88.5

Comments:

All values corrected for dilution.

BQL = Below quantitation limit.

Reviewed By: 

Results for Volatiles

by GC 602

Client Sample ID: USTH28-MW09

Analyzed By: JTF

Client Project ID: H28

Date Collected: 12/17/2004 13:55

Lab Sample ID: G546-19-2A

Date Received: 12/18/04

Lab Project ID: G546-19

Matrix: Water

Analyte	Result ug/L	RL ug/L	MDL ug/L	Dilution Factor	Date Analyzed	Flags
Benzene	BQL	1.00	0.316	1	12/28/2004	
Diisopropyl ether (DIPE)	BQL	1.00	0.294	1	12/28/2004	
Ethylbenzene	BQL	1.00	0.299	1	12/28/2004	
Methyl-tert butyl ether (MTBE)	BQL	2.00	0.588	1	12/28/2004	
Toluene	0.349	1.00	0.302	1	12/28/2004	J
m/p-Xylene	BQL	2.00	0.608	1	12/28/2004	
o-Xylene	BQL	2.00	0.596	1	12/28/2004	

Surrogate Spike Recoveries

	Spike Added	Spike Result	Percent Recovery
Trifluorotoluene	40	35.4	88.5

Comments:

All values corrected for dilution.

BQL = Below quantitation limit.

Reviewed By: 

Results for Volatiles

by GC 602

Client Sample ID: USTH28-MW11

Analyzed By: JTF

Client Project ID: H28

Date Collected: 12/17/2004 13:21

Lab Sample ID: G546-19-3A

Date Received: 12/18/04

Lab Project ID: G546-19

Matrix: Water

Analyte	Result ug/L	RL ug/L	MDL ug/L	Dilution Factor	Date Analyzed	Flags
Benzene	BQL	1.00	0.316	1	12/28/2004	
Diisopropyl ether (DIPE)	BQL	1.00	0.294	1	12/28/2004	
Ethylbenzene	35.6	1.00	0.299	1	12/28/2004	
Methyl-tert butyl ether (MTBE)	BQL	2.00	0.588	1	12/28/2004	
Toluene	1.54	1.00	0.302	1	12/28/2004	
m/p-Xylene	54.2	2.00	0.608	1	12/28/2004	
o-Xylene	66.0	2.00	0.596	1	12/28/2004	

Surrogate Spike Recoveries

	Spike Added	Spike Result	Percent Recovery
Trifluorotoluene	40	35.8	89.4

Comments:

All values corrected for dilution.

BQL = Below quantitation limit.

Reviewed By: 

Results for Volatiles

by GC 602

Client Sample ID: USTH28-Dup

Analyzed By: JTF

Client Project ID: H28

Date Collected: 12/17/2004 00:00

Lab Sample ID: G546-19-4A

Date Received: 12/18/04

Lab Project ID: G546-19

Matrix: Water

Analyte	Result ug/L	RL ug/L	MDL ug/L	Dilution Factor	Date Analyzed	Flags
Benzene	BQL	1.00	0.316	1	12/28/2004	
Diisopropyl ether (DIPE)	BQL	1.00	0.294	1	12/28/2004	
Ethylbenzene	BQL	1.00	0.299	1	12/28/2004	
Methyl-tert butyl ether (MTBE)	BQL	2.00	0.588	1	12/28/2004	
Toluene	BQL	1.00	0.302	1	12/28/2004	
m/p-Xylene	BQL	2.00	0.608	1	12/28/2004	
o-Xylene	BQL	2.00	0.596	1	12/28/2004	

Surrogate Spike Recoveries

	Spike Added	Spike Result	Percent Recovery
Trifluorotoluene	40	35.1	87.8

Comments:

All values corrected for dilution.

BQL = Below quantitation limit.

Reviewed By: 

Results for Volatiles

by GC 602

Client Sample ID: Method Blank

Analyzed By: JTF

Client Project ID:

Date Collected:

Lab Sample ID: VBLK122804D

Date Received:

Lab Project ID:

Matrix: Water

Analyte	Result ug/L	RL ug/L	MDL ug/L	Dilution Factor	Date Analyzed	Flags
Benzene	BQL	1.00	0.316	1	12/28/2004	
Diisopropyl ether (DIPE)	BQL	1.00	0.294	1	12/28/2004	
Ethylbenzene	BQL	1.00	0.299	1	12/28/2004	
Methyl-tert butyl ether (MTBE)	BQL	2.00	0.588	1	12/28/2004	
Toluene	BQL	1.00	0.302	1	12/28/2004	
m/p-Xylene	BQL	2.00	0.608	1	12/28/2004	
o-Xylene	BQL	2.00	0.596	1	12/28/2004	

Surrogate Spike Recoveries

	Spike Added	Spike Result	Percent Recovery
Trifluorotoluene	40	35.5	88.7

Comments:

All values corrected for dilution.

BQL = Below quantitation limit.

Reviewed By: 

Control Limits for QC Check / Laboratory Control Spike

Method: 602 Spike[ppb]: 10
 Instrument : gc3
 Filename : 122804\021r0101.txt

Compound	ppb	Q(%)	QC Limits		P _s (%)	LCS Limits	
			Lower	Upper		Lower	Upper
Benzene	10.2	102.4	77.0	123.0	102	39	150
Chlorobenzene	10.3	103.3	80.5	119.5	103	55	135
1,2-Dichlorobenzene	10.8	107.9	68.0	132.0	108	37	154
1,3-Dichlorobenzene	10.4	104.2	72.5	127.5	104	50	141
1,4-Dichlorobenzene	10.6	106.1	69.5	130.5	106	42	143
• Diisopropyl ether	9.6	96.3	43.1	156.9	96	30	170
Ethylbenzene	10.8	108.0	63.0	137.0	108	32	160
• MTBE	10.0	100.4	46.8	153.2	100	35	165
Toluene	10.4	103.7	77.5	127.0	104	46	148
• m,p-Xylene	21.5	107.4	11.2	188.8	107	D	239
• o-Xylene	10.7	106.9	47.6	152.4	107	36	164

Flags :

- + = out of QC limits.
- ♦ = lab generated limits.
- D = Detected

Reviewed by: me

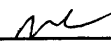
Control Limits for MS-MSD

Method: 602 Spike[ppb]: 10
 Instrument : gc3
 Sample : 122804\024r0101.txt
 MS : 122804\034r0101.txt
 MSD : 122804\035r0101.txt

Compound	µg/L			P(%)		P Limits	
	Sam.	MS	MSD	MS	MSD	Lower	Upper
Benzene	ND	10.3	10.4	103	104	39	150
Chlorobenzene	ND	10.4	10.5	104	105	55	135
1,2-Dichlorobenzene	ND	11.2	11.2	109	110	37	154
1,3-Dichlorobenzene	ND	10.7	10.8	105	105	50	141
1,4-Dichlorobenzene	ND	10.8	10.8	108	108	42	143
• Diisopropyl ether	ND	9.7	9.9	97	99	30	170
Ethylbenzene	ND	11.0	11.0	110	110	32	160
• MTBE	ND	10.0	10.2	100	102	35	165
Toluene	ND	10.6	10.6	105	106	46	148
• m,p-Xylene	ND	22.0	22.0	110	110	D	239
• o-Xylene	ND	10.9	10.7	109	107	36	164

Flags :

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

Reviewed by: 

**Results for Semivolatiles
by GCMS 625**

Client Sample ID: USTH28-MW6

Client Project ID: H28

Lab Sample ID: G546-19-11

Lab Project ID: G546-19

Analyzed By: MRC

Date Collected: 12/17/2004 12:30

Date Received: 12/18/2004

Date Extracted: 12/20/2004

Matrix: Water

Compound	Result ug/L	Quantitation Limit ug/L	MDL ug/L	Dilution Factor	Date Analyzed	Flag
Acenaphthene	BQL	10.0	1.22	1	12/22/2004	
Acenaphthylene	BQL	10.0	1.12	1	12/22/2004	
Anthracene	BQL	10.0	1.75	1	12/22/2004	
Benzo[a]anthracene	BQL	10.0	1.36	1	12/22/2004	
Benzo[a]pyrene	BQL	10.0	1.27	1	12/22/2004	
Benzo[b]fluoranthene	BQL	10.0	1.43	1	12/22/2004	
Benzo[g,h,i]perylene	BQL	10.0	4.57	1	12/22/2004	
Benzo[k]fluoranthene	BQL	10.0	1.09	1	12/22/2004	
Bis(2-chloroethoxy)methane	BQL	10.0	1.11	1	12/22/2004	
Bis(2-chloroethyl)ether	BQL	10.0	1.09	1	12/22/2004	
Bis(2-chloroisopropyl)ether	BQL	10.0	1.57	1	12/22/2004	
Bis(2-ethylhexyl)phthalate	BQL	10.0	1.33	1	12/22/2004	
4-bromophenyl phenyl ether	BQL	10.0	1.99	1	12/22/2004	
Butylbenzylphthalate	BQL	10.0	1.53	1	12/22/2004	
2-Chloronaphthalene	BQL	10.0	1.25	1	12/22/2004	
2-Chlorophenol	BQL	10.0	4.22	1	12/22/2004	
4-Chloro-3-methylphenol	BQL	10.0	3.26	1	12/22/2004	
4-Chlorophenyl phenyl ether	BQL	10.0	1.42	1	12/22/2004	
Chrysene	BQL	10.0	1.11	1	12/22/2004	
Dibenzo[a,h]anthracene	BQL	10.0	4.87	1	12/22/2004	
Di-n-Butylphthalate	BQL	10.0	1.65	1	12/22/2004	
1,2-Dichlorobenzene	BQL	10.0	1.25	1	12/22/2004	
1,3-Dichlorobenzene	BQL	10.0	1.24	1	12/22/2004	
1,4-Dichlorobenzene	BQL	10.0	1.20	1	12/22/2004	
3,3'-Dichlorobenzidine	BQL	20.0	4.10	1	12/22/2004	
2,4-Dichlorophenol	BQL	10.0	3.75	1	12/22/2004	
Diethylphthalate	BQL	10.0	1.48	1	12/22/2004	
Dimethylphthalate	BQL	10.0	1.04	1	12/22/2004	
2,4-Dimethylphenol	BQL	10.0	9.25	1	12/22/2004	
Di-n-octylphthalate	BQL	10.0	1.16	1	12/22/2004	
4,6-Dinitro-2-methylphenol	BQL	50.0	3.71	1	12/22/2004	
2,4-Dinitrophenol	BQL	50.0	4.20	1	12/22/2004	
2,4-Dinitrotoluene	BQL	10.0	1.52	1	12/22/2004	
2,6-Dinitrotoluene	BQL	10.0	1.41	1	12/22/2004	
Fluoranthene	BQL	10.0	1.41	1	12/22/2004	
Fluorene	BQL	10.0	1.22	1	12/22/2004	
Hexachlorobenzene	BQL	10.0	1.22	1	12/22/2004	
Hexachlorobutadiene	BQL	10.0	1.58	1	12/22/2004	
Hexachlorocyclopentadiene	BQL	20.0	20.0	1	12/22/2004	
Hexachloroethane	BQL	10.0	1.58	1	12/22/2004	
Indeno(1,2,3-c,d)pyrene	BQL	10.0	4.57	1	12/22/2004	
Isophorone	BQL	10.0	1.27	1	12/22/2004	

**Results for Semivolatiles
by GCMS 625**

Client Sample ID: USTH28-MW6

Client Project ID: H28

Lab Sample ID: G546-19-11

Lab Project ID: G546-19

Analyzed By: MRC

Date Collected: 12/17/2004 12:30

Date Received: 12/18/2004

Date Extracted: 12/20/2004

Matrix: Water

Compound	Result ug/L	Quantitation Limit ug/L	MDL ug/L	Dilution Factor	Date Analyzed	Flag
Naphthalene	BQL	10.0	1.08	1	12/22/2004	
Nitrobenzene	BQL	10.0	1.32	1	12/22/2004	
2-Nitrophenol	BQL	10.0	3.52	1	12/22/2004	
4-Nitrophenol	BQL	50.0	3.17	1	12/22/2004	
N-Nitrosodi-n-propylamine	BQL	10.0	1.87	1	12/22/2004	
N-Nitrosodiphenylamine	BQL	10.0	1.53	1	12/22/2004	
Pentachlorophenol	BQL	50.0	2.83	1	12/22/2004	
Phenanthrene	BQL	10.0	1.38	1	12/22/2004	
Phenol	BQL	10.0	3.38	1	12/22/2004	
Pyrene	BQL	10.0	2.08	1	12/22/2004	
1,2,4-Trichlorobenzene	BQL	10.0	1.33	1	12/22/2004	
2,4,6-Trichlorophenol	BQL	10.0	2.92	1	12/22/2004	

	Spike Added	Spike Result	Percent Recovered
2-Fluorobiphenyl	10	8.4	84
2-Fluorophenol	10	8.7	87
Nitrobenzene-d5	10	8.2	82
Phenol-d6	10	8.6	86
2,4,6-Tribromophenol	10	7.8	78
4-Terphenyl-d14	10	12.3	123

Comments:**Flags:**

BQL = Below Quantitation Limits.

J = Detected below the quantitation limit.

Reviewed By: 

Results of Library Search for Semivolatile Compounds
by GCMS

Client Sample ID: USTH28-MW6
Client Project ID: H28
Lab Sample ID: G546-19-1I
Lab Project ID: G546-19
Sample Wt/Vol: 500 ML
Dilution: 1

Analyzed By: MRC
Date Collected: 12/17/2004 12:30
Date Received: 12/18/2004
Date Analyzed: 12/22/2004
Date Extracted: 12/20/2004
Matrix: Water

No.	Compound	Retention Time	CAS#	Match Probability	Result (ug/L)
1	Know solvent peak (added by lab)	3.85			1510
2	Know Compound peak (added by lab)	11.85			156
3					
4					
5					
6					
7					
8					
9					
10					

Comment:

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

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

Reviewed by: 

**Results for Semivolatiles
by GCMS 625**

Client Sample ID: USTH28-MW09

Client Project ID: H28

Lab Sample ID: G546-19-2I

Lab Project ID: G546-19

Analyzed By: MRC

Date Collected: 12/17/2004 13:55

Date Received: 12/18/2004

Date Extracted: 12/20/2004

Matrix: Water

Compound	Result ug/L	Quantitation Limit ug/L	MDL ug/L	Dilution Factor	Date Analyzed	Flag
Acenaphthene	BQL	10.0	1.22	1	12/22/2004	
Acenaphthylene	BQL	10.0	1.12	1	12/22/2004	
Anthracene	BQL	10.0	1.75	1	12/22/2004	
Benzo[a]anthracene	BQL	10.0	1.36	1	12/22/2004	
Benzo[a]pyrene	BQL	10.0	1.27	1	12/22/2004	
Benzo[b]fluoranthene	BQL	10.0	1.43	1	12/22/2004	
Benzo[g,h,i]perylene	BQL	10.0	4.57	1	12/22/2004	
Benzo[k]fluoranthene	BQL	10.0	1.09	1	12/22/2004	
Bis(2-chloroethoxy)methane	BQL	10.0	1.11	1	12/22/2004	
Bis(2-chloroethyl)ether	BQL	10.0	1.09	1	12/22/2004	
Bis(2-chloroisopropyl)ether	BQL	10.0	1.57	1	12/22/2004	
Bis(2-ethylhexyl)phthalate	BQL	10.0	1.33	1	12/22/2004	
4-bromophenyl phenyl ether	BQL	10.0	1.99	1	12/22/2004	
Butylbenzylphthalate	BQL	10.0	1.53	1	12/22/2004	
2-Chloronaphthalene	BQL	10.0	1.25	1	12/22/2004	
2-Chlorophenol	BQL	10.0	4.22	1	12/22/2004	
4-Chloro-3-methylphenol	BQL	10.0	3.26	1	12/22/2004	
4-Chlorophenyl phenyl ether	BQL	10.0	1.42	1	12/22/2004	
Chrysene	BQL	10.0	1.11	1	12/22/2004	
Dibenzo[a,h]anthracene	BQL	10.0	4.87	1	12/22/2004	
Di-n-Butylphthalate	BQL	10.0	1.65	1	12/22/2004	
1,2-Dichlorobenzene	BQL	10.0	1.25	1	12/22/2004	
1,3-Dichlorobenzene	BQL	10.0	1.24	1	12/22/2004	
1,4-Dichlorobenzene	BQL	10.0	1.20	1	12/22/2004	
3,3'-Dichlorobenzidine	BQL	20.0	4.10	1	12/22/2004	
2,4-Dichlorophenol	BQL	10.0	3.75	1	12/22/2004	
Diethylphthalate	BQL	10.0	1.48	1	12/22/2004	
Dimethylphthalate	BQL	10.0	1.04	1	12/22/2004	
2,4-Dimethylphenol	BQL	10.0	9.25	1	12/22/2004	
Di-n-octylphthalate	BQL	10.0	1.16	1	12/22/2004	
4,6-Dinitro-2-methylphenol	BQL	50.0	3.71	1	12/22/2004	
2,4-Dinitrophenol	BQL	50.0	4.20	1	12/22/2004	
2,4-Dinitrotoluene	BQL	10.0	1.52	1	12/22/2004	
2,6-Dinitrotoluene	BQL	10.0	1.41	1	12/22/2004	
Fluoranthene	BQL	10.0	1.41	1	12/22/2004	
Fluorene	BQL	10.0	1.22	1	12/22/2004	
Hexachlorobenzene	BQL	10.0	1.22	1	12/22/2004	
Hexachlorobutadiene	BQL	10.0	1.58	1	12/22/2004	
Hexachlorocyclopentadiene	BQL	20.0	20.0	1	12/22/2004	
Hexachloroethane	BQL	10.0	1.58	1	12/22/2004	
Indeno(1,2,3-c,d)pyrene	BQL	10.0	4.57	1	12/22/2004	
Isophorone	BQL	10.0	1.27	1	12/22/2004	

Results for Semivolatiles by GCMS 625

Client Sample ID: USTH28-MW09

Client Project ID: H28

Lab Sample ID: G546-19-2I

Lab Project ID: G546-19

Analyzed By: MRC

Date Collected: 12/17/2004 13:55

Date Received: 12/18/2004

Date Extracted: 12/20/2004

Matrix: Water

Compound	Result ug/L	Quantitation Limit ug/L	MDL ug/L	Dilution Factor	Date Analyzed	Flag
Naphthalene	BQL	10.0	1.08	1	12/22/2004	
Nitrobenzene	BQL	10.0	1.32	1	12/22/2004	
2-Nitrophenol	BQL	10.0	3.52	1	12/22/2004	
4-Nitrophenol	BQL	50.0	3.17	1	12/22/2004	
N-Nitrosodi-n-propylamine	BQL	10.0	1.87	1	12/22/2004	
N-Nitrosodiphenylamine	BQL	10.0	1.53	1	12/22/2004	
Pentachlorophenol	BQL	50.0	2.83	1	12/22/2004	
Phenanthrene	BQL	10.0	1.38	1	12/22/2004	
Phenol	BQL	10.0	3.38	1	12/22/2004	
Pyrene	BQL	10.0	2.08	1	12/22/2004	
1,2,4-Trichlorobenzene	BQL	10.0	1.33	1	12/22/2004	
2,4,6-Trichlorophenol	BQL	10.0	2.92	1	12/22/2004	

	Spike Added	Spike Result	Percent Recovered
2-Fluorobiphenyl	10	8.8	88
2-Fluorophenol	10	9.2	92
Nitrobenzene-d5	10	8.5	85
Phenol-d6	10	9.2	92
2,4,6-Tribromophenol	10	7.3	73
4-Terphenyl-d14	10	13	130

Comments:**Flags:**

BQL = Below Quantitation Limits.

J = Detected below the quantitation limit.

Reviewed By: mc

Results of Library Search for Semivolatile Compounds

by GCMS

Client Sample ID: USTH28-MW09
 Client Project ID: H28
 Lab Sample ID: G546-19-2I
 Lab Project ID: G546-19
 Sample Wt/Vol: 500 ML
 Dilution: 1

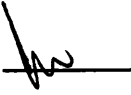
Analyzed By: MRC
 Date Collected: 12/17/2004 13:55
 Date Received: 12/18/2004
 Date Analyzed: 12/22/2004
 Date Extracted: 12/20/2004
 Matrix: Water

No.	Compound	Retention Time	CAS#	Match Probability	Result (ug/L)
1	Know solvent peak (added by lab)	3.88			1000
2	Know Compound peak (added by lab)	11.85			146
3	Solvent stabilizer peak (added by lab)	5.03			19.3
4					
5					
6					
7					
8					
9					
10					

Comment:

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

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

Reviewed by: 

**Results for Semivolatiles
by GCMS 625**

Client Sample ID: USTH28-MW11

Client Project ID: H28

Lab Sample ID: G546-19-3I

Lab Project ID: G546-19

Analyzed By: MRC

Date Collected: 12/17/2004 13:21

Date Received: 12/18/2004

Date Extracted: 12/20/2004

Matrix: Water

Compound	Result ug/L	Quantitation Limit ug/L	MDL ug/L	Dilution Factor	Date Analyzed	Flag
Acenaphthene	4.00	10.0	1.22	1	12/22/2004	J
Acenaphthylene	BQL	10.0	1.12	1	12/22/2004	
Anthracene	BQL	10.0	1.75	1	12/22/2004	
Benzo[a]anthracene	BQL	10.0	1.36	1	12/22/2004	
Benzo[a]pyrene	BQL	10.0	1.27	1	12/22/2004	
Benzo[b]fluoranthene	BQL	10.0	1.43	1	12/22/2004	
Benzo[g,h,i]perylene	BQL	10.0	4.57	1	12/22/2004	
Benzo[k]fluoranthene	BQL	10.0	1.09	1	12/22/2004	
Bis(2-chloroethoxy)methane	BQL	10.0	1.11	1	12/22/2004	
Bis(2-chloroethyl)ether	BQL	10.0	1.09	1	12/22/2004	
Bis(2-chloroisopropyl)ether	BQL	10.0	1.57	1	12/22/2004	
Bis(2-ethylhexyl)phthalate	BQL	10.0	1.33	1	12/22/2004	
4-bromophenyl phenyl ether	BQL	10.0	1.99	1	12/22/2004	
Butylbenzylphthalate	BQL	10.0	1.53	1	12/22/2004	
2-Chloronaphthalene	BQL	10.0	1.25	1	12/22/2004	
2-Chlorophenol	BQL	10.0	4.22	1	12/22/2004	
4-Chloro-3-methylphenol	BQL	10.0	3.26	1	12/22/2004	
4-Chlorophenyl phenyl ether	BQL	10.0	1.42	1	12/22/2004	
Chrysene	BQL	10.0	1.11	1	12/22/2004	
Dibenzo[a,h]anthracene	BQL	10.0	4.87	1	12/22/2004	
Di-n-Butylphthalate	BQL	10.0	1.65	1	12/22/2004	
1,2-Dichlorobenzene	BQL	10.0	1.25	1	12/22/2004	
1,3-Dichlorobenzene	BQL	10.0	1.24	1	12/22/2004	
1,4-Dichlorobenzene	BQL	10.0	1.20	1	12/22/2004	
3,3'-Dichlorobenzidine	BQL	20.0	4.10	1	12/22/2004	
2,4-Dichlorophenol	BQL	10.0	3.75	1	12/22/2004	
Diethylphthalate	BQL	10.0	1.48	1	12/22/2004	
Dimethylphthalate	BQL	10.0	1.04	1	12/22/2004	
2,4-Dimethylphenol	BQL	10.0	9.25	1	12/22/2004	
Di-n-octylphthalate	BQL	10.0	1.16	1	12/22/2004	
4,6-Dinitro-2-methylphenol	BQL	50.0	3.71	1	12/22/2004	
2,4-Dinitrophenol	BQL	50.0	4.20	1	12/22/2004	
2,4-Dinitrotoluene	BQL	10.0	1.52	1	12/22/2004	
2,6-Dinitrotoluene	BQL	10.0	1.41	1	12/22/2004	
Fluoranthene	BQL	10.0	1.41	1	12/22/2004	
Fluorene	5.90	10.0	1.22	1	12/22/2004	J
Hexachlorobenzene	BQL	10.0	1.22	1	12/22/2004	
Hexachlorobutadiene	BQL	10.0	1.58	1	12/22/2004	
Hexachlorocyclopentadiene	BQL	20.0	20.0	1	12/22/2004	
Hexachloroethane	BQL	10.0	1.58	1	12/22/2004	
Indeno(1,2,3-c,d)pyrene	BQL	10.0	4.57	1	12/22/2004	
Isophorone	BQL	10.0	1.27	1	12/22/2004	

**Results for Semivolatiles
by GCMS 625**

Client Sample ID: USTH28-MW11

Client Project ID: H28

Lab Sample ID: G546-19-3I

Lab Project ID: G546-19

Analyzed By: MRC

Date Collected: 12/17/2004 13:21

Date Received: 12/18/2004

Date Extracted: 12/20/2004

Matrix: Water

Compound	Result ug/L	Quantitation Limit ug/L	MDL ug/L	Dilution Factor	Date Analyzed	Flag
Naphthalene	114	10.0	1.08	1	12/22/2004	
Nitrobenzene	BQL	10.0	1.32	1	12/22/2004	
2-Nitrophenol	BQL	10.0	3.52	1	12/22/2004	
4-Nitrophenol	BQL	50.0	3.17	1	12/22/2004	
N-Nitrosodi-n-propylamine	BQL	10.0	1.87	1	12/22/2004	
N-Nitrosodiphenylamine	BQL	10.0	1.53	1	12/22/2004	
Pentachlorophenol	BQL	50.0	2.83	1	12/22/2004	
Phenanthrene	6.20	10.0	1.38	1	12/22/2004	J
Phenol	BQL	10.0	3.38	1	12/22/2004	
Pyrene	BQL	10.0	2.08	1	12/22/2004	
1,2,4-Trichlorobenzene	BQL	10.0	1.33	1	12/22/2004	
2,4,6-Trichlorophenol	BQL	10.0	2.92	1	12/22/2004	

	Spike Added	Spike Result	Percent Recovered
2-Fluorobiphenyl	10	8.1	81
2-Fluorophenol	10	8	80
Nitrobenzene-d5	10	8.2	82
Phenol-d6	10	8.4	84
2,4,6-Tribromophenol	10	8	80
4-Terphenyl-d14	10	11.3	113

Comments:**Flags:**

BQL = Below Quantitation Limits.

J = Detected below the quantitation limit.

Reviewed By: mc

Results of Library Search for Semivolatile Compounds

by GCMS

Client Sample ID: USTH28-MW11
 Client Project ID: H28
 Lab Sample ID: G546-19-3I
 Lab Project ID: G546-19
 Sample Wt/Vol: 500 ML
 Dilution: 1

Analyzed By: MRC
 Date Collected: 12/17/2004 13:21
 Date Received: 12/18/2004
 Date Analyzed: 12/22/2004
 Date Extracted: 12/20/2004
 Matrix: Water

No.	Compound	Retention Time	CAS#	Match Probability	Result (ug/L)
1	Know solvent peak (added by lab)	3.85			1330
2	2-Methylnaphthalene	10.04	000091-57-6	100	165
3	Trimethylbenzene, Isomer of	6.73			142
4	1-Methylnaphthalene	10.19	000090-12-0	99	114
5	Know compound peak (added by lab)	11.86			104
6	Ethylmethylbenzene, Isomer of	7.06			92.8
7	Dimethylbenzene, Isomer of	5.46			57.8
8	Methylpropenylbenzene, Isomer of	8.50			54.4
9	Aromatic, Unknown	7.23			52.6
10	Diethylbenzene, Isomer of	7.45			48.5

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: *nl*

**Results for Semivolatiles
by GCMS 625**

Client Sample ID: USTH28-Dup

Client Project ID: H28

Lab Sample ID: G546-19-4I

Lab Project ID: G546-19

Analyzed By: MRC

Date Collected: 12/17/2004 00:00

Date Received: 12/18/2004

Date Extracted: 12/20/2004

Matrix: Water

Compound	Result ug/L	Quantitation Limit ug/L	MDL ug/L	Dilution Factor	Date Analyzed	Flag
Acenaphthene	BQL	10.0	1.22	1	12/22/2004	
Acenaphthylene	BQL	10.0	1.12	1	12/22/2004	
Anthracene	BQL	10.0	1.75	1	12/22/2004	
Benzo[a]anthracene	BQL	10.0	1.36	1	12/22/2004	
Benzo[a]pyrene	BQL	10.0	1.27	1	12/22/2004	
Benzo[b]fluoranthene	BQL	10.0	1.43	1	12/22/2004	
Benzo[g,h,i]perylene	BQL	10.0	4.57	1	12/22/2004	
Benzo[k]fluoranthene	BQL	10.0	1.09	1	12/22/2004	
Bis(2-chloroethoxy)methane	BQL	10.0	1.11	1	12/22/2004	
Bis(2-chloroethyl)ether	BQL	10.0	1.09	1	12/22/2004	
Bis(2-chloroisopropyl)ether	BQL	10.0	1.57	1	12/22/2004	
Bis(2-ethylhexyl)phthalate	BQL	10.0	1.33	1	12/22/2004	
4-bromophenyl phenyl ether	BQL	10.0	1.99	1	12/22/2004	
Butylbenzylphthalate	BQL	10.0	1.53	1	12/22/2004	
2-Chloronaphthalene	BQL	10.0	1.25	1	12/22/2004	
2-Chlorophenol	BQL	10.0	4.22	1	12/22/2004	
4-Chloro-3-methylphenol	BQL	10.0	3.26	1	12/22/2004	
4-Chlorophenyl phenyl ether	BQL	10.0	1.42	1	12/22/2004	
Chrysene	BQL	10.0	1.11	1	12/22/2004	
Dibenzo[a,h]anthracene	BQL	10.0	4.87	1	12/22/2004	
Di-n-Butylphthalate	BQL	10.0	1.65	1	12/22/2004	
1,2-Dichlorobenzene	BQL	10.0	1.25	1	12/22/2004	
1,3-Dichlorobenzene	BQL	10.0	1.24	1	12/22/2004	
1,4-Dichlorobenzene	BQL	10.0	1.20	1	12/22/2004	
3,3'-Dichlorobenzidine	BQL	20.0	4.10	1	12/22/2004	
2,4-Dichlorophenol	BQL	10.0	3.75	1	12/22/2004	
Diethylphthalate	BQL	10.0	1.48	1	12/22/2004	
Dimethylphthalate	BQL	10.0	1.04	1	12/22/2004	
2,4-Dimethylphenol	BQL	10.0	9.25	1	12/22/2004	
Di-n-octylphthalate	BQL	10.0	1.16	1	12/22/2004	
4,6-Dinitro-2-methylphenol	BQL	50.0	3.71	1	12/22/2004	
2,4-Dinitrophenol	BQL	50.0	4.20	1	12/22/2004	
2,4-Dinitrotoluene	BQL	10.0	1.52	1	12/22/2004	
2,6-Dinitrotoluene	BQL	10.0	1.41	1	12/22/2004	
Fluoranthene	BQL	10.0	1.41	1	12/22/2004	
Fluorene	BQL	10.0	1.22	1	12/22/2004	
Hexachlorobenzene	BQL	10.0	1.22	1	12/22/2004	
Hexachlorobutadiene	BQL	10.0	1.58	1	12/22/2004	
Hexachlorocyclopentadiene	BQL	20.0	20.0	1	12/22/2004	
Hexachloroethane	BQL	10.0	1.58	1	12/22/2004	
Indeno(1,2,3-c,d)pyrene	BQL	10.0	4.57	1	12/22/2004	
Isophorone	BQL	10.0	1.27	1	12/22/2004	

**Results for Semivolatiles
by GCMS 625**

Client Sample ID: USTH28-Dup
Client Project ID: H28
Lab Sample ID: G546-19-4I
Lab Project ID: G546-19

Analyzed By: MRC
Date Collected: 12/17/2004 00:00
Date Received: 12/18/2004
Date Extracted: 12/20/2004
Matrix: Water

Compound	Result ug/L	Quantitation Limit ug/L	MDL ug/L	Dilution Factor	Date Analyzed	Flag
Naphthalene	BQL	10.0	1.08	1	12/22/2004	
Nitrobenzene	BQL	10.0	1.32	1	12/22/2004	
2-Nitrophenol	BQL	10.0	3.52	1	12/22/2004	
4-Nitrophenol	BQL	50.0	3.17	1	12/22/2004	
N-Nitrosodi-n-propylamine	BQL	10.0	1.87	1	12/22/2004	
N-Nitrosodiphenylamine	BQL	10.0	1.53	1	12/22/2004	
Pentachlorophenol	BQL	50.0	2.83	1	12/22/2004	
Phenanthrene	BQL	10.0	1.38	1	12/22/2004	
Phenol	BQL	10.0	3.38	1	12/22/2004	
Pyrene	BQL	10.0	2.08	1	12/22/2004	
1,2,4-Trichlorobenzene	BQL	10.0	1.33	1	12/22/2004	
2,4,6-Trichlorophenol	BQL	10.0	2.92	1	12/22/2004	

	Spike Added	Spike Result	Percent Recovered
2-Fluorobiphenyl	10	8.3	83
2-Fluorophenol	10	8.4	84
Nitrobenzene-d5	10	7.9	79
Phenol-d6	10	8.3	83
2,4,6-Tribromophenol	10	7.6	76
4-Terphenyl-d14	10	12.6	126

Comments:

Flags:

BQL = Below Quantitation Limits.

J = Detected below the quantitation limit.

Reviewed By: ml

Results of Library Search for Semivolatile Compounds
by GCMS

Client Sample ID: USTH28-Dup
Client Project ID: H28
Lab Sample ID: G546-19-4I
Lab Project ID: G546-19
Sample Wt/Vol: 500 ML
Dilution: 1

Analyzed By: MRC
Date Collected: 12/17/2004 00:00
Date Received: 12/18/2004
Date Analyzed: 12/22/2004
Date Extracted: 12/20/2004
Matrix: Water

No.	Compound	Retention Time	CAS#	Match Probability	Result (ug/L)
1	Know solvent peak (added by lab)	3.85	000108-88-3	95	1270
2	Know compound peak (added by lab)	11.85			144
3					
4					
5					
6					
7					
8					
9					
10					

Comment:

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

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

Reviewed by: 

**Results for Semivolatiles
by GCMS 625**

Client Sample ID: Method Blank

Client Project ID:

Lab Sample ID: PB2158

Lab Project ID:

Analyzed By: MRC

Date Collected:

Date Received:

Date Extracted: 12/20/2004

Matrix: WATER

Compound	Result ug/L	Quantitation Limit ug/L	MDL ug/L	Dilution Factor	Date Analyzed	Flag
Acenaphthene	BQL	10.0	1.22	1	12/22/2004	
Acenaphthylene	BQL	10.0	1.12	1	12/22/2004	
Anthracene	BQL	10.0	1.75	1	12/22/2004	
Benzo[a]anthracene	BQL	10.0	1.36	1	12/22/2004	
Benzo[a]pyrene	BQL	10.0	1.27	1	12/22/2004	
Benzo[b]fluoranthene	BQL	10.0	1.43	1	12/22/2004	
Benzo[g,h,i]perylene	BQL	10.0	4.57	1	12/22/2004	
Benzo[k]fluoranthene	BQL	10.0	1.09	1	12/22/2004	
Bis(2-chloroethoxy)methane	BQL	10.0	1.11	1	12/22/2004	
Bis(2-chloroethyl)ether	BQL	10.0	1.09	1	12/22/2004	
Bis(2-chloroisopropyl)ether	BQL	10.0	1.57	1	12/22/2004	
Bis(2-ethylhexyl)phthalate	BQL	10.0	1.33	1	12/22/2004	
4-bromophenyl phenyl ether	BQL	10.0	1.99	1	12/22/2004	
Butylbenzylphthalate	BQL	10.0	1.53	1	12/22/2004	
2-Chloronaphthalene	BQL	10.0	1.25	1	12/22/2004	
2-Chlorophenol	BQL	10.0	4.22	1	12/22/2004	
4-Chloro-3-methylphenol	BQL	10.0	3.26	1	12/22/2004	
4-Chlorophenyl phenyl ether	BQL	10.0	1.42	1	12/22/2004	
Chrysene	BQL	10.0	1.11	1	12/22/2004	
Dibenzo[a,h]anthracene	BQL	10.0	4.87	1	12/22/2004	
Di-n-Butylphthalate	BQL	10.0	1.65	1	12/22/2004	
1,2-Dichlorobenzene	BQL	10.0	1.25	1	12/22/2004	
1,3-Dichlorobenzene	BQL	10.0	1.24	1	12/22/2004	
1,4-Dichlorobenzene	BQL	10.0	1.20	1	12/22/2004	
3,3'-Dichlorobenzidine	BQL	20.0	4.10	1	12/22/2004	
2,4-Dichlorophenol	BQL	10.0	3.75	1	12/22/2004	
Diethylphthalate	BQL	10.0	1.48	1	12/22/2004	
Dimethylphthalate	BQL	10.0	1.04	1	12/22/2004	
2,4-Dimethylphenol	BQL	10.0	9.25	1	12/22/2004	
Di-n-octylphthalate	BQL	10.0	1.16	1	12/22/2004	
4,6-Dinitro-2-methylphenol	BQL	50.0	3.71	1	12/22/2004	
2,4-Dinitrophenol	BQL	50.0	4.20	1	12/22/2004	
2,4-Dinitrotoluene	BQL	10.0	1.52	1	12/22/2004	
2,6-Dinitrotoluene	BQL	10.0	1.41	1	12/22/2004	
Fluoranthene	BQL	10.0	1.41	1	12/22/2004	
Fluorene	BQL	10.0	1.22	1	12/22/2004	
Hexachlorobenzene	BQL	10.0	1.22	1	12/22/2004	
Hexachlorobutadiene	BQL	10.0	1.58	1	12/22/2004	
Hexachlorocyclopentadiene	BQL	20.0	20.0	1	12/22/2004	
Hexachloroethane	BQL	10.0	1.58	1	12/22/2004	
Indeno(1,2,3-c,d)pyrene	BQL	10.0	4.57	1	12/22/2004	
Isophorone	BQL	10.0	1.27	1	12/22/2004	

**Results for Semivolatiles
by GCMS 625**

Client Sample ID: Method Blank

Client Project ID:

Lab Sample ID: PB2158

Lab Project ID:

Analyzed By: MRC

Date Collected:

Date Received:

Date Extracted: 12/20/2004

Matrix: WATER

Compound	Result ug/L	Quantitation Limit ug/L	MDL ug/L	Dilution Factor	Date Analyzed	Flag
Naphthalene	BQL	10.0	1.08	1	12/22/2004	
Nitrobenzene	BQL	10.0	1.32	1	12/22/2004	
2-Nitrophenol	BQL	10.0	3.52	1	12/22/2004	
4-Nitrophenol	BQL	50.0	3.17	1	12/22/2004	
N-Nitrosodi-n-propylamine	BQL	10.0	1.87	1	12/22/2004	
N-Nitrosodiphenylamine	BQL	10.0	1.53	1	12/22/2004	
Pentachlorophenol	BQL	50.0	2.83	1	12/22/2004	
Phenanthrene	BQL	10.0	1.38	1	12/22/2004	
Phenol	BQL	10.0	3.38	1	12/22/2004	
Pyrene	BQL	10.0	2.08	1	12/22/2004	
1,2,4-Trichlorobenzene	BQL	10.0	1.33	1	12/22/2004	
2,4,6-Trichlorophenol	BQL	10.0	2.92	1	12/22/2004	

	Spike Added	Spike Result	Percent Recovered
2-Fluorobiphenyl	10	7.6	76
2-Fluorophenol	10	8.7	87
Nitrobenzene-d5	10	8	80
Phenol-d6	10	8.4	84
2,4,6-Tribromophenol	10	6.9	69
4-Terphenyl-d14	10	11.3	113

Comments:**Flags:**

BQL = Below Quantitation Limits.

J = Detected below the quantitation limit.

Reviewed By: ME

Results For Water Laboratory Control Standard (LCS)
by GCMS

Client Sample ID: Batch QC
 Client Project ID:
 Lab Sample ID: W-LCS-2158
 Lab Project ID:
 Matrix: Water

Date Collected:
 Date Received:
 Date Analyzed: 12/22/04
 Analyzed By: MRC

	Spiked ng	LCS ng	LCS % Rec.	LIMITS	
				LOWER	UPPER
Acenaphthylene	10	9.77	98	84	114
4-Chloro-3-methylphenol	10	9.13	91	63	110
2-Chlorophenol	10	8.40	84	64	94
1,4-Dichlorobenzene	10	5.29	53	27	78
2,4-Dinitrotoluene	10	8.42	84	73	103
N-Nitrosodi-n-propylamine	10	10.17	102 *	73	100
4-Nitrophenol	10	8.72	87	45	127
Pentachlorophenol	10	8.48	85	54	99
Phenol	10	8.94	89	64	94
Pyrene	10	7.79	78	58	114
1,2,4-Trichlorobenzene	10	7.41	74	51	96

Comments:

Concentrations are on column amounts.

Flags:

* = Out of limits.

NA = Not applicable.

Reviewed By: mc

Results For Water Matrix Spike / Matrix Spike Duplicate (MS/MSD)
by GCMS

Client Sample ID: Batch QC
 Client Project ID:
 Lab Sample ID: W-MS-2158
 Lab Project ID:
 Matrix: Water

Date Collected:
 Date Received:
 Date Analyzed: 12/22/04
 Analyzed By: MRC
 Dilution: 1

	Sample ng	Spiked ng	MS %	MSD %	Limits		RPD %	Limit Max. %
					Lower %	Upper %		
Acenaphthylene	BQL	10	89	84	79	118	5.5	30
4-Chloro-3-methylphenol	BQL	10	87	86	63	112	2.0	30
2-Chlorophenol	BQL	10	82	77	57	102	5.8	30
1,4-Dichlorobenzene	BQL	10	51	49	40	89	4.8	30
2,4-Dinitrotoluene	BQL	10	84	80	70	108	4.6	30
N-Nitrosodi-n-propylamine	BQL	10	96	95	66	109	1.9	30
4-Nitrophenol	BQL	10	106	102	50	130	4.2	30
Pentachlorophenol	BQL	10	91	87	52	110	4.6	30
Phenol	BQL	10	85	81	59	100	4.3	30
Pyrene	BQL	10	67	68	58	112	1.0	30
1,2,4-Trichlorobenzene	BQL	10	68	64	46	103	6.2	30

Comments:

Concentrations are on column amounts.

Flags:

* = Out of limits.

NA = Not applicable.

Reviewed By: 

List of Reporting Abbreviations and Data Qualifiers

B = Compound also detected in batch blank

BQL = Below Quantitation Limit

DF = Dilution Factor

Dup = Duplicate

E = Estimated concentration, exceeds calibration range.

J = Estimated concentration, below calibration range and above MDL

LCS(D) = Laboratory Control Spike (Duplicate)

MDL = Method Detection Limit

MS(D) = Matrix Spike (Duplicate)

PQL = Practical Quantitation Limit

RL = Reporting Limit

RPD = Relative Percent Difference

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

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

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

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

% Rec = Percent Recovery

% solids = Percent Solids

Special Notes:

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

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

PARADIGM ANALYTICAL LABORATORIES, INC.

5500 Business Drive, Wilmington, NC 28405

Phone: (910)-350-1903 FAX: (910)-350-1557

Chain-of-Custody Record & Analytical Request

COC# 43617

Page 1 of 1

Client: Engineering & Environment Project ID: H28

Address: 814 Gunbranch rd
Project no: 1128
Contact: Bill Morris

Address: Suite S Jacksonville NC 28580 Phone: 910-989-3214

Quote #: _____ Fax: 710-989-3341

Date: 17-17-07

Report To:

Turnaround: Standard

Job Number:

P.O. Number:

Invoice To:

Analyses

Preservatives

Sample ID

Date

Time Matrix

1721

Hd $H d$

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(MT8E)
xy/245

25 + 0 Tics

L

your	
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Comments:
Please specify any special reporting requirements

61-9859

Relinquished By

Received By

Time

Date _____

Time	Temperature
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State Certification Requested

Julie Carson

2/18/17	5401
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1950

NC _____ SC _____ Other _____

**SEE REVERSE FOR
TERMS AND CONDITIONS**

ORIGINAL