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August 26, 2003

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

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

Re: **FINAL** Leaking Underground Storage Tank (LUST)
Comprehensive Site Assessment
Rapid Refueler A-B Tanks
Marine Corps Air Station
New River, North Carolina

Navy Contract No. N62470-01-D-3009
Delivery Order No. 0068
CATLIN Project No. 203-005

Dear Mr. Conway:

Please find enclosed one electronic copy of the above referenced Comprehensive Site Assessment document. Additionally, please find attached CATLIN's response to comments by Ms. Kimberly L. Hakola of Camp Lejeune to the Draft CSA.

CATLIN Engineers and Scientists appreciate the opportunity to continue to provide services to LANTDIV and the MCB on your environmental projects.

Sincerely,

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

Steven V. Hudson, P.G., C.W.D.
Project Manager

Attachments: Final CSA

cc: Mr. Roger R. Marce, Jr. - Code AQ 135 Contracts, (correspondence only)
Commanding General, Attn: Director I&E/EMD/EQB (w/two attachment)

203005_final-ltr.doc

**Response to Comments for
Comprehensive Site Assessment - DRAFT
Rapid Refueler A-B Tanks
Reviewer - Ms. Kimberly L. Hakola**

**Comprehensive Site Assessment
Rapid Refueler A-B Tanks
July 31, 2003**

Cover Sheet

Capitalize "BOX" in MCB address.

Text has been modified.

Executive Summary

***1st paragraph, 2nd sentence
Delete "MCAS" in front of "Campbell Street."***

Text has been modified.

***2nd paragraph, 1st sentence
Replace "five" with "six" and "four" with "five." This sentence is long; consider revising.***

Text has been modified.

***2nd paragraph, 2nd sentence
Insert "also" after "...water sample was..."***

Text has been modified to read "Additionally, a surface water sample was collected."

***3rd paragraph, 1st sentence
Replace "at the" with "aboard" and insert "which is" after "River." Delete "the" in front of MCB.***

Text has been modified.

***3rd paragraph, 5th sentence
Delete "to the" and replace "immediate" with "immediately."***

Text has been modified.

5th paragraph, 1st sentence

Revise to read, "Groundwater samples were collected from 8 wells – USTAS497-MW01, USTAS497-MW... RR-11, and RR-14."

Text has been changed to.... "Groundwater samples were collected from two existing (RR-11 and RR-14) and six newly installed (USTAS497-MW01 through USTAS497-MW06) monitoring wells".

5th paragraph, 2nd sentence

Insert "also" after "was."

Sentence has been relocated in the paragraph.

5th paragraph, 3rd sentence

Cut "and analyzed per EPA Method 625" and move to 5th sentence.

Text has been deleted.

5th paragraph, 5th sentence

Delete "additionally."

Sentence has been deleted.

6th paragraph

What do you suppose happened in the month between sampling (no free product observed) and gauging (1-4' free product discovered)?

Free product was identified in monitoring wells during the sampling event.

7th paragraph

Discuss AFVR proposal for elimination of free product.

Discussion has been included.

7th paragraph

A LUCIP is not being prepared for this site.

Reference to LUCIP has been deleted.

8th paragraph

Replace "may" with "will."

Text has been modified and "may" has been replaced with "are proposed to".

Section 1.1

***1st paragraph, last sentence
What do you mean by “modified?”***

“modified” has been deleted from the text

Section 1.3

***2nd paragraph, 1st sentence
Replace “five” with “six” and “four” with “five.” This sentence is long; consider revising.***

Words have been replaced. Sentence has not been modified.

***2nd paragraph, 2nd sentence
Insert “also” after “was.”***

Text has been modified. Additionally has been added to the beginning of the sentence.

Section 1.4

***1st paragraph, 1st sentence
Replace “at the” with “aboard” and insert “which is” after “River.” Delete “the” in front of MCB.***

Text has been modified.

***1st paragraph, last sentence
Delete “to the” and replace “immediate” with “immediately.”***

Text has been modified.

Section 2.2

***2nd paragraph, heading
Delete “in the vicinity.”***

Text has been modified.

***PS #4 and PS #5
Insert space between paragraphs.***

Text has been modified.

Section 2.3

1st paragraph, 2nd sentence

Delete sentence. Insert "Several releases, both recorded and unrecorded have occurred over the site."

Text has been modified to read "According to base personnel, several releases, both recorded and unrecorded have occurred."

2nd paragraph, 1st sentence

Insert "line" after "transfer."

Text has been modified.

2nd paragraph, 5th sentence

Insert "2" in front of "B."

Text has been modified.

Section 2.4

1st paragraph, 1st sentence

Consider replacing "produced" with "resulted in."

Text has been modified.

Section 3.1

1st paragraph, last sentence

Insert commas after "survey" and "reports."

Text has been modified.

Section 3.1.6

1st paragraph, 2nd sentence

Insert "Action" in front of "Plan."

Text has been modified.

Indented paragraphs, numerous locations

Insert hyphen between number and "inch" when referring to diameter.

Text has been modified.

Fuel paragraphs, last sentence

Revise to read, "The lines are typically buried three feet below grade."

Text has been modified.

Section 3.1.7

1st paragraph, 1st sentence

Delete "The."

Text has been modified.

Section 3.1.8

Revise address:

Commanding General

Marine Corps Base

I&E/EMD/EQB

PSC 20004

Camp Lejeune, NC 28542

Text has been modified.

Section 4.2

3rd paragraph, 4th sentence

Do you mean below sea level?

Text has been modified to "below" sea level..

Section 5.1

1st paragraph, last sentence

Consider moving this sentence to the beginning of the paragraph. Were any samples taken next to the area of the release? Confirm that Shaw did not take samples when they performed the excavation.

Text has not been modified. According to Shaw personnel, no confirmatory soil samples were collected during excavation activities.

Section 8.1

1st paragraph, 3rd and 5th sentences

Insert hyphen between "two" and "inch."

Text has been modified.

1st paragraph, 7th sentence

Insert commas before and after “licensed in the State of North Carolina.”

Text has been modified.

1st paragraph, 8th sentence

Insert commas before and after “specializing in subsurface investigations.”

Text has been modified.

1st paragraph, 12th sentence

Delete second “well” so it reads “as-built details.”

Text has been modified.

Section 8.2

1st paragraph, 1st sentence

Insert hyphens between “depth to water.”

Text has not been modified.

2nd paragraph

Note that sampling occurred in June. Why weren’t wells gauged in June?

Reference to June sampling has been incorporated in text. Newley installed wells were gauged during field activities. However, a comprehensive gauging event was not conducted until July after the wellheads were completed and surveyed.

Section 8.3

1st paragraph

Note that free product was observed in July, but not in June.

Free product was observed in June.

Section 9.1

1st paragraph, last sentence

Do you attribute the groundwater “mound” to backfill material?

The cause of the groundwater mounding is unknown. It is possible that the backfill is responsible.

Section 9.3

1st paragraph, 1st sentence
Italicize title of report.

Text has been modified.

Section 10.0

1st paragraph, 1st sentence
Fix format error with second quotation mark. May want to include this explanatory sentence earlier in the report.

Format error has been changed.

Section 11.0

1st paragraph, 2nd sentence
Add to sentence that this fact prohibited sampling in the area of the release.

Text has been modified.

4th paragraph, 2nd and 3rd sentences
Insert hyphen after "down." Move comma behind parenthesis.

Down gradient has been combined into one word. Comma has been deleted.

Section 12.0

2nd paragraph, 1st sentence
How do you propose additional sampling, given the "constraints" mentioned in the previous paragraph?

In order to obtain soil samples within the area of the release, it will be necessary to core through the concrete in the A-B tank basin. Concrete coring was not incorporated in the original scope of work because an excavation had previously been performed and it was assumed that samples were collected during that time.

2nd paragraph, 2nd sentence
Explain where these monitoring points should be located.

Description of monitoring locations has been added.

2nd paragraph, last sentence

Discuss recommendation to consolidate assessment/remediation activities for the various incident numbers at this site. Replace "may" with "will."

It is our opinion that a CAP will be required for the A-B Tanks that should address the plume(s) associated with this CSA. We will propose consolidation of the three sites as part of the Remediation System Optimization Plan currently under consideration.

4th paragraph, 1st sentence

Insert "product" after "dissolved."

Entire sentence has been deleted.

NOTE: We will need to address in the CAP whether or not soil excavation is cost effective given area's construction.

COMPREHENSIVE SITE ASSESSMENT

RAPID REFUELER A-B TANKS

MARINE CORPS AIR STATION
NEW RIVER, NORTH CAROLINA

AUGUST 26, 2003

LATITUDE: 34° 42' 44"
LONGITUDE: 77° 26' 40"

SITE INFORMATION		RELEASE INFORMATION	
NCDENR Incident No.	32004	Date Discovered	October 10, 2002
Facility Identification No.	N/A	Estimated Quantity	Unknown
Risk Classification	Intermediate	Cause of Release	Breach in Pipeline
Site Priority Ranking	N/A	Source of Release	Underground Fuel Transfer Pipeline
NCDENR Assigned Land Use	Industrial/ Commercial	Size and Contents of System	Six-inch diameter JP-5 Pipeline

CONTRACT NO. N62470-01-D-3009
DELIVERY ORDER NO. 0068
CATLIN PROJECT NO. 203-005

Prepared by:

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EXECUTIVE SUMMARY

COMPREHENSIVE SITE ASSESSMENT RAPID REFUELER A-B TANKS

MARINE CORPS AIR STATION NEW RIVER, NORTH CAROLINA

AUGUST 26, 2003

The purpose of this Comprehensive Site Assessment (CSA) was to determine the extent of soil and groundwater contamination and free product accumulation in the vicinity of Rapid Refueler A-B tanks aboard Marine Corps Air Station (MCAS), New River, North Carolina. The investigation was conducted in response to a reported breach in a six-inch diameter underground fuel (JP-5) transfer line utilized to transport fuel from the Campbell Street bulk storage facility to the Rapid Refueler A-B and C-D tank areas. The breach in the fuel line reportedly occurred on October 10, 2002 within the A-B fuel distribution pit. Subsequent to the breach, the line was repaired and contaminated soils were excavated and disposed off-site in October 2002. No confirmatory samples were collected during excavation activities.

The project consisted of the advancement of six soil borings for the collection of soil samples into which five Type II monitoring wells and one Type III monitoring well were installed in the vicinity of the fuel release to facilitate collection of groundwater samples for offsite laboratory analysis. Additionally, a surface water sample was collected from a retention pond located on the subject site for offsite laboratory analysis. All water samples were laboratory analyzed per EPA Methods 602+xylenes and MTBE, 610, and MADEP EPH/VPH. Soil samples submitted to the offsite laboratory were analyzed per EPA Methods 8260B, 8270, and MADEP EPH/VPH. The laboratory results have been utilized to assist in determining the potential impact to soil and/or groundwater.

The site is located aboard MCAS, New River, which is west of Marine Corps Base (MCB), Camp Lejeune, North Carolina. The area consists of the A-B and C-D fuel farms and six aircraft rapid fueling stations. The Rapid Refueler facility is located in the central portion of the MCAS, New River airfield. The entire refueling area is surrounded by open, flat terrain that is comprised of active taxiways, runways, and grasslands. A concrete parking area for aircraft is located immediately north of the site. The only potential receptors identified in the vicinity are a retention pond and the associated drainage ditch located along the northeast boundary of the site.

No petroleum constituents were detected above North Carolina Division of Environment and Natural Resources (NCDENR) Soil to Groundwater (STGW) Maximum Soil Contaminant Concentrations (MSCCs) in any of the soil samples submitted to the laboratory for analysis during this investigation. The area of release is located in the central portion of a fuel distribution pit and is completely covered with concrete.

Groundwater samples were collected from two existing (RR-11 and RR-14) and six newly installed (USTAS497-MW01 through USTAS497-MW06) monitoring wells. Naphthalene was identified at a

concentration of 31 µg/L in the groundwater sample collected from USTAS497-MW05. This concentration is above the applicable 2L GWQS of 21 µg/L but is substantially below the GCL for naphthalene of 15,500 µg/L. No additional petroleum constituents were identified above 2L GWQS in any of the groundwater samples. Additionally, a surface water sample (pond) was collected from the retention pond located adjacent to the site. No petroleum constituents were identified in the surface water sample collected from the retention pond.

Free product was identified during the sampling/gauging event conducted on July 11, 2003, in monitoring wells USTAS497-MW05 and RR-12 at a thickness of 1.08 feet and 4.30 feet, respectively. These monitoring wells are located adjacent to the release point in a hydraulically down-gradient direction. The horizontal extent of free product was not identified during this investigation.

Based on the findings of this CSA, CATLIN concludes that the subject site meets the criteria for Industrial/Commercial land use. Additionally, the site appears to be suitable for Intermediate Risk Classification. Elimination of the free product may assist in changing the Risk Classification of the site to Low Risk. Utilization of AFVR appears to be an appropriate means of removal of identified free product.

Additional monitoring, gauging, and remedial action are necessary to assess and remedy the impact of free product on the site groundwater. An additional monitoring well may need to be installed hydraulically downgradient of the known contaminant plume. The additional assessment activities are proposed to be incorporated into the CAP activities. Furthermore, it is recommended that a copy of this report be submitted to the NCDENR – Wilmington Regional Office.

TABLE OF CONTENTS

	<u>PAGE</u>
1.0 INTRODUCTION	1
<i>1.1 AUTHORIZATION</i>	<i>1</i>
<i>1.2 PURPOSE OF INVESTIGATION</i>	<i>1</i>
<i>1.3 SCOPE OF WORK</i>	<i>1</i>
<i>1.4 AREA OF INVESTIGATION</i>	<i>1</i>
2.0 SITE HISTORY AND SOURCE CHARACTERIZATION	2
<i>2.1 SITE HISTORY AND OPERATIONS</i>	<i>2</i>
<i>2.2 CONTAMINANT SOURCE INVENTORY</i>	<i>2</i>
<i>2.3 RELEASE INCIDENT HISTORY</i>	<i>3</i>
<i>2.4 PREVIOUS INVESTIGATIONS</i>	<i>3</i>
3.0 RECEPTOR INFORMATION	4
<i>3.1 POTENTIAL RECEPTOR SURVEY</i>	<i>4</i>
3.1.1 Water Supply Well Inventory	4
3.1.2 Public Water Supplies	4
3.1.3 Surface Water Bodies	5
3.1.4 Wellhead Protection Areas	5
3.1.5 Deep Aquifers in the Coastal Plain Physiographic Region	5
3.1.6 Subsurface Structures	6
3.1.7 Land Use	7
3.1.8 Property Owner and Occupants	7
4.0 REGIONAL GEOLOGY AND HYDROGEOLOGY	7
<i>4.1 REGIONAL GEOLOGY</i>	<i>7</i>
<i>4.2 REGIONAL HYDROGEOLOGY</i>	<i>8</i>
5.0 SOILS INVESTIGATION	9
<i>5.1 SOIL BORING INSTALLATION</i>	<i>9</i>
<i>5.2 FIELD SCREENING AND LABORATORY SAMPLE COLLECTION</i>	<i>9</i>
6.0 SITE GEOLOGY	10
<i>6.1 SITE TOPOGRAPHY</i>	<i>10</i>
<i>6.2 DESCRIPTION OF SUBSURFACE SAMPLES</i>	<i>10</i>
7.0 SOIL SAMPLING RESULTS	11
<i>7.1 FIELD SCREENING RESULTS</i>	<i>11</i>
<i>7.2 SOIL SAMPLING LABORATORY RESULTS</i>	<i>11</i>
7.2.1 EPA Method 8260B Volatile Organic Compounds	11
7.2.2 EPA Method 8270 Semi-Volatile Organic Compounds	11
7.2.3 MADEP EPH/VPH	11

8.0	GROUNDWATER INVESTIGATION	12
8.1	<i>MONITORING WELL INSTALLATION</i>	12
8.2	<i>GROUNDWATER GAUGING AND SAMPLING</i>	12
8.3	<i>FREE PRODUCT</i>	13
9.0	HYDROGEOLOGIC INVESTIGATION	13
9.1	<i>GROUNDWATER FLOW DIRECTION</i>	13
9.2	<i>HYDRAULIC GRADIENT</i>	14
9.3	<i>HYDRAULIC CONDUCTIVITY</i>	14
9.4	<i>AVERAGE GROUNDWATER LINEAR VELOCITY</i>	15
10.0	GROUNDWATER SAMPLING RESULTS	15
10.1	<i>EPA METHOD 602 (PURGEABLE AROMATICS)</i>	16
10.2	<i>EPA METHOD 625 (BASE, NEUTRAL AND ACID EXTRACTABLES)</i>	16
10.3	<i>MADEP EPH/VPH</i>	16
11.0	DISCUSSION	16
12.0	CONCLUSIONS AND RECOMMENDATIONS	17

TABLES

TABLE 1	PROPERTY OWNERS/OCCUPENTS
TABLE 2	WATER SUPPLY WELL INFORMATION
TABLE 3	SUMMARY OF SOIL HEADSPACE SCREENING
TABLE 4	SUMMARY OF SOIL LABORATORY RESULTS – EPA METHOD 8260B/5035
TABLE 5	SUMMARY OF SOIL LABORATORY RESULTS – EPA METHOD 8270
TABLE 6	SUMMARY OF SOIL LABORATORY RESULTS – MADEP EPH/VPH
TABLE 7	SUMMARY OF SOIL LABORATORY RESULTS – MADEP EPH/VPH AS COMPARED TO NCDENR MSCCs
TABLE 8	MONITORING WELL CONSTRUCTION AND WATER LEVEL GAUGING DATA
TABLE 9	SUMMARY OF VERTICAL HYDRAULIC GRADIENT ESTIMATES AS OF JULY 11, 2003
TABLE 10	SUMMARY OF GROUNDWATER LABORATORY RESULTS – EPA METHOD 602
TABLE 11	SUMMARY OF GROUNDWATER LABORATORY RESULTS – EPA METHOD 625
TABLE 12	SUMMARY OF GROUNDWATER LABORATORY RESULTS – MADEP EPH/VPH
TABLE 13	SUMMARY OF GROUNDWATER LABORATORY RESULTS – MADEP EPH/VPH AS COMPARED TO NCDENR IGWQS

**COMPREHENSIVE SITE ASSESSMENT
RAPID REFUELER
A-B TANKS AREA**

**MARINE CORPS AIR STATION
NEW RIVER, NORTH CAROLINA**

AUGUST 26, 2003

1.0 INTRODUCTION

1.1 AUTHORIZATION

CATLIN Engineers and Scientists (CATLIN) was authorized to perform this CSA by the LANTDIV NAVFACENGCOM in accordance with the Order of Supplies Contract Number N62470-01-D-3009, Delivery Order Number 0068, and in response to a NORR from the NCDENR dated October 17, 2002. The NORR requested preparation of either a Soil Contamination Report or a Limited Site Assessment. However, due to the presence of free product, a CSA was completed that includes pertinent information necessary to determine the site risk classification.

1.2 PURPOSE OF INVESTIGATION

(Refer to Figures 1, 2, and 2A)

The purpose of this report is to determine the magnitude of petroleum related impact to soil and groundwater and free product accumulation associated with a release of JP-5 fuel from an underground pipeline in the vicinity of the Rapid Refueler A-B tanks area (subject site) aboard MCAS, New River, North Carolina. See Figures 1, 2, and 2A for the site location.

1.3 SCOPE OF WORK

The project consisted of the advancement six soil borings for the collection of soil samples into which five Type II monitoring wells and one Type III monitoring well were installed in the vicinity of the fuel release to facilitate collection of groundwater samples for offsite laboratory analysis. Additionally, a surface water sample was collected from a retention pond located on the subject site for offsite laboratory analysis and a potential receptor survey was conducted. All of the data generated has been compiled to assist in assessing any potential petroleum related impact to soil and/or groundwater.

1.4 AREA OF INVESTIGATION

(Refer to Table 1, Figures 1, 2, and 2A)

The site is located aboard MCAS, New River, which is west of MCB, Camp Lejeune, North Carolina (see Figure 1). The area consists of the Rapid Refueler A-B and C-D tank areas with associated buildings, distribution pits and six rapid refueling stations

(see Figures 2 and 2A). The project site is located in the central portion of the MCAS, airfield. Property owners are summarized on Table 1. The entire refueling area is surrounded by open, flat terrain that is comprised of active taxiways, runways, and grasslands. A concrete parking area for aircraft is located immediately north of the site.

2.0 SITE HISTORY AND SOURCE CHARACTERIZATION

2.1 SITE HISTORY AND OPERATIONS

(Refer to Appendix B)

The project site is an active refueling facility for aircraft. The air station property surrounding the subject site has been the target of numerous subsurface contamination investigations. An investigation of the area was performed in 1987 in response to a release from the now-abandoned fuel pipeline, USTs, and from surface spills in the refueling area. CATLIN performed a CSA at the Rapid Refueler A-B site in November 1994. In addition, the area between the two most northern refueling stations was the site of the former A-B fuel farm. This fuel farm was replaced with Rapid Refueler A-B and C-D tank areas sometime in the 1990s. An active free product recovery system has been in operation at the two most northern fueling stations.

A Limited Site Assessment Risk Classification and Land Use Form was completed during this investigation and is included in Appendix B. Based on the completed form, the subject site appears to be an intermediate risk due to the presence of free product and the property appears to be suitable for a land use classification of Industrial/Commercial.

2.2 CONTAMINANT SOURCE INVENTORY

(Refer to Figure 2B)

Site reconnaissance and research of previous investigations revealed at least six potential sources of contamination in the vicinity of Buildings AS-511, 548, and 549. Additional sources may exist in areas that are not identified here.

Potential sources include:

PS #1 – A release of JP-5 on October 10, 2002 from the fuel transfer line.

PS #2 – A release of JP-5 at the Rapid Refueler C-D Tank area in May of 2002.

PS #3 - The active refueling system, including the product piping lines, distribution area, two 30,000-gallon virgin fuel USTs, and one 10,000-gallon waste fuel UST. This source also includes the active fuel line that transports fuel from the fuel farm to the Rapid Refuelers.

PS #4 - The former refueling system, including the old product piping line, distribution area, fuel USTs, and waste fuel USTs. This source also includes the former fuel supply line from the fuel farm.

PS #5 - Two active oil/water separators; one located southwest of the original fuel pump area, and one located northeast of the active fuel pumps.

PS #6 - Active free product recovery system, located northeast of the active A-B fuel pumps.

PS #7 - The aircraft parking apron where helicopter storage and general maintenance takes place.

The potential sources are additionally summarized on Figure 2B.

2.3 RELEASE INCIDENT HISTORY

(Refer to Figures 2, 2A, and 2B)

The air station properties surrounding the subject site, in conjunction with the entire Rapid Refueler facility, have been the target of numerous subsurface contamination investigations. According to base personnel, several releases, both recorded and unrecorded have occurred. A 1987 investigation of the area was performed in response to a release from the now abandoned fuel pipeline, USTs, and from surface spills in the refueling area.

According to base personnel, on October 10, 2002, a breach occurred in a six-inch diameter fuel transfer line beneath the distribution pit at the A-B Tank area. The breach resulted in the release of an unknown quantity of JP-5 fuel into the subsurface of the facility. The ruptured pipeline was excavated and repaired. The approximate area of the release and the Rapid Refueler A-B Tank Area are displayed on Figure 2A. The locations of the previous releases are presented on Figure B. The entire subject site is presented on Figure 2B.

2.4 PREVIOUS INVESTIGATIONS

Numerous investigations have been conducted on the Rapid Refueler facility. These studies have resulted in the following reports, from which the site-specific information included in this report has been obtained.

1. *Final Site Assessment Report, The Campbell Street JP-5 Pipeline, New River Marine Corps Air Station, Jacksonville, North Carolina* dated August 12, 1992, Prepared by Baker Environmental, Inc.
2. *Final Site Assessment Report, AS-527 and the South End of the Aircraft Direct Refueling Area, Marine Corps Air Station, New River, Jacksonville, North Carolina* dated January 1993. Prepared by Baker Environmental, Inc.

3. *Initial Site Assessment (Site Check) Report, UST Closure by Removal Three(3) JP-5 Fuel Tanks, one(1) Oil/Water Separator Tank, C-D Tank Farm Area, Aircraft Rapid Refueler Facility, Marine Corps Air Station, New River, Jacksonville, Onslow County, NC* dated May 1994. Prepared by Coastal Environmental Services Company.
4. *Leaking Underground Storage Tank Comprehensive Site Assessment, Rapid Refueler, Marine Corps Base, Camp Lejeune, North Carolina* dated November 1, 1994. Prepared by Richard Catlin & Associates, Inc.
5. *Leaking Underground Storage Tank Comprehensive Site Assessment, USTs AS-511-3, 548, 549 (Rapid Refueler Addendum Report), Marine Corps Air Station, New River, North Carolina*, dated June 5, 1996. Prepared by Richard Catlin & Associates, Inc.
6. *Leaking Underground Storage Tank Corrective Plan, Rapid Refueler, Marine Corps Air Station, New River, North Carolina*, dated April 6, 1998. Prepared by Richard Catlin & Associates, Inc.
7. *Preliminary Site Assessment, Rapid Refueler C-D Tank Area. Marine Corps Air Station, New River, North Carolina*, dated May 2, 2003. Prepared by CATLIN Engineers and Scientists.

3.0 RECEPTOR INFORMATION

3.1 POTENTIAL RECEPTOR SURVEY (Refer to Appendix B)

Performance of a potential receptor survey involved not only an evaluation of the presence of potential receptors, but also an evaluation of transport mechanisms by which the contaminants are transported from the source to the receptor. Furthermore, with respect to human receptors, the survey also involved a cursory evaluation of exposure pathways including ingestion, inhalation, and adsorption. Additional information pertinent to potential receptor information is included in the Risk Classification and Land Use Form presented in Appendix B. Information obtained from the potential receptor survey, in addition to a large amount of data pertaining to potential receptors presented in previous reports, is summarized below.

3.1.1 Water Supply Well Inventory (Refer to Table 2)

No potable water supply wells were identified within a 1,500 feet radius of the subject site.

3.1.2 Public Water Supplies

The MCAS, New River community water system supplies public water to the site. Water for the system is obtained from 13 groundwater wells located in

the Verona Loop area south of Jacksonville, North Carolina. The wells average approximately 180 feet deep and obtain groundwater from within the Castle Hayne Aquifer. Numerous underground water supply lines are located in the vicinity of the Rapid Refueler A-B tank area and are discussed in greater detail in Section 3.1.6 of this report.

3.1.3 Surface Water Bodies

A man-made drainage ditch is located approximately 200 feet northeast of the release. This ditch runs southeastward for approximately 400 feet, then turns toward the northeast and continues for approximately 2,600 feet, crosses under Curtis Road, then turns to the southeast and extends for another 1,100 feet before terminating in the New River. During the course of the investigation and various site visits, water was consistently observed in the ditch.

A retention pond is located east of the Rapid Refueler building and receives storm water from the storm drain system located across the site. The retention pond drains into the previously mentioned drainage ditch and is located roughly 130 feet east of the release.

3.1.4 Wellhead Protection Areas

Camp Lejeune has identified proposed wellhead protection areas on the MCAS. According to available information, the site is not located in a proposed wellhead protection area.

3.1.5 Deep Aquifers in the Coastal Plain Physiographic Region

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

To some degree, seven of the ten aquifers identified to date in the North Carolina Coastal Plain are typically present beneath portions of the MCAS, New River. In order of increasing depth, these aquifers include the surficial, Castle Hayne, Beaufort, Peedee, Black Creek, and upper and lower Cape Fear aquifers.

Aquifers below the surficial aquifer in the area of MCAS, New River include the Castle Hayne Aquifer, the Beaufort Aquifer, and the Peedee Aquifer, in order of increasing depth. Both the Beaufort and Peedee Aquifers contain saltwater in portions of the MCAS and are not generally used for water supply. The Castle Hayne Aquifer contains freshwater and is the principal aquifer used in the area for water supply.

3.1.6 Subsurface Structures

Subsurface structures were identified through field observation and information provided by the Camp Lejeune Engineering Office. The location of these structures are summarized in the *Leaking Underground Storage Tank Corrective Action Plan, Rapid Refueler, Marine Corps Air Station, New River, North Carolina*, dated April 6, 1998. Prepared by Richard Catlin & Associates, Inc., and included the following:

Water - An eight-inch diameter water main lies parallel to the abandoned fuel distribution line of the original refueling system. An extension of this line services the refueling stations. A six-inch diameter main connects a fire hydrant in front of the active Rapid Refueler building to the eight inch main. Water to the Rapid Refueler building itself is supplied by a three-inch diameter service from the six-inch main. These lines are typically installed approximately three feet below grade and are not expected to intersect the water table.

Storm Drainage - A storm drain system is located beneath the refueling islands, which empties into the retention pond located east of the subject site. The storm water is subsequently discharged to the previously mentioned drainage ditch.

Spill Containment - A spill containment system is in place at the Rapid Refueler islands. The underground piping, according to the design drawings, consists of ductile iron pipe and discharges to an oil/water separator northeast of the refueler islands.

Fuel - A six-inch diameter fuel line transports JP-5 fuel from the fuel farm to the refueling area. An abandoned fuel line is located west of the active fuel line, a portion of which has reportedly been removed. The lines are typically buried three feet below grade.

Electric - According to a representative at the site, electrical conduits are installed at a depth less than three feet below grade. Due to the complexity and high security nature of the electrical system at the site, electrical conduits are not reflected on the utilities map. Due to their typical shallow depth of installation, these utilities are not expected to be receptors.

Miscellaneous-Underground communications and telephone lines are located on-site and are generally installed at a depth of less than two feet BLS; however, their exact locations are not known. Secure communication lines are also located on site, but their exact locations and installation depths are not known. Based on expected burial depths, these lines are not expected to be impacted by contamination.

3.1.7 Land Use

Marine Corps Air Station, New River consists of approximately 2,600 acres of mixed-use land. The land is predominantly undeveloped. The land use in the immediate area consists of military use to facilitate the maintenance and refueling of aircraft.

3.1.8 Property Owner and Occupants

The subject site and surrounding property is owned by:

Commanding General
Marine Corps Base
I&E/EMD/EQB
PSC 20004
Camp Lejeune, NC 28542

4.0 REGIONAL GEOLOGY AND HYDROGEOLOGY

4.1 REGIONAL GEOLOGY

The project site lies within the southeastern portion of the Outer Coastal Plain Physiographic Province of North Carolina. The Outer Coastal Plain, as described by David R. Soller and Hugh H. Mills in *The Geology of the Carolinas* (1991), is the eastern portion of the Coastal Plain where constructional topography is evident or dominant. The Inner Coastal Plain begins at the Fall Line, narrows northerly, and is considered an area of erosional topography. According to Horton and Zullo in *The Geology of the Carolinas* (1991), the Coastal Plain is comprised of a seaward thickening wedge of post-Triassic, primarily unconsolidated, siliclastic sediments and carbonate rocks that extend from the Fall Line to the continental shelf break. Coastal Plain sediments were deposited in a number of different environments including, but not limited to, offshore marine, near-shore marine, lagoonal, and deltaic. The eustatic rise and fall of sea level has resulted in numerous sedimentary packages of transgressive and regressive sequences deposited throughout the Coastal Plain. In Onslow County, the pre-Mesozoic crystalline basement rock, onto which the Coastal Plain was deposited, lies approximately 1,300 feet below mean sea level (MSL). The dominant structural features within the surrounding area of the subject site are the Cape Fear arch, a seaward (southeasterly) plunging anticline and the Albemarle Embayment. The axis of the Cape Fear arch is located roughly 100 miles southwest of the subject site. The Albemarle Embayment lies along the northeastern border of the Cape Fear arch (Horton and Zullo, 1991).

As detailed in the Wellhead Management Program report (Geophex, 1991), geologic units identified beneath the nearby MCB, Camp Lejeune include the Cretaceous Peedee Formation that is composed of sands, clayey sands, and clay. The Peedee Formation does not outcrop anywhere on base and has only been identified from drill-hole data. The Upper Eocene Castle Hayne Formation lies unconformably on the Peedee Formation. The Castle Hayne Formation consists of widespread

limestone units that are intermixed with substantial beds of calcareous sands and silty sands. Overlying the Castle Hayne Formation is moldic limestone of the upper Oligocene River Bend Formation. The uppermost limestone unit in much of the nearby area is the lower Miocene Belgrade Formation. The Belgrade rests unconformably on the River Bend or directly on the Castle Hayne Formation where the River Bend is absent. Undifferentiated surficial sediments throughout most of the surrounding area typically overlie the Belgrade.

4.2 REGIONAL HYDROGEOLOGY

As detailed by Cardinell, et al (1993), the area is located in the Coastal Plain physiographic province that contains numerous varieties of coastal environments of deposition. The majority of the underlying sediments were deposited in marine or near-shore environments. The thickness of the sedimentary beds in the area is roughly 1500 feet. Aquifers underlying MCAS, New River includes the surficial, Castle Hayne, Beaufort, and Peedee. These aquifers are typically separated by confining units of less permeable materials consisting of beds or groups of clay and silt containing varying amounts of sand (Winner and Coble, 1989). Recharge to Coastal Plain aquifers occurs predominantly through direct surface recharge by rainfall in interstream areas (Cardinell, et al, 1993).

The surficial aquifer consists of sand, clay, sandy clay, and silts. The aquifer ranges in thickness from zero to 73 feet (Cardinell, et al, 1993). The average hydraulic conductivity of the surficial aquifer was estimated by Cardinell, et al (1993) to be about 50 feet per day (ft/d).

The Castle Hayne aquifer includes the Eocene Castle Hayne Formation and Oligocene River Bend Formation. The Castle Hayne aquifer consists of beds of sand, limestone, and cemented/calcareous sand with discontinuous lenses of clay, silt and clay/silt sand mixtures. According to Cardinell, et al (1993), the upper portion of the Castle Hayne aquifer is composed of calcareous sand with interbedded clay and silt beds. The top of the Castle Hayne aquifer was interpreted by Cardinell, et al (1993) to range from 10 to 68 feet below sea level aboard nearby Camp Lejeune and range in thickness from 156 to 400 feet. Numerous studies have been conducted to estimate the hydraulic properties of the Castle Hayne aquifer. A summary of the results as presented by Cardinell, et al (1993) include:

Transmissivity (T)	820 – 24500	[(ft ³ /d)/ft ²]ft
Hydraulic conductivity (K)	14 – 91 ft/d	(65 ft/day average)
Storage coefficients (S)	0.0002 – 0.001	

The Castle Hayne aquifer is the primary source of potable water aboard MCAS, New River and MCB, Camp Lejeune.

The Castle Hayne confining unit, where present, is composed primarily of beds of clay, silt, sandy clay/silt, and clayey/silty sand. According to Winner and Coble (1989), the beds belong chiefly to the Belgrade, Pungo River, and Yorktown Formations. The confining unit has an overall average thickness of roughly 14 feet.

Winner and Coble (1989) stated that throughout much of the unit, enough sand was contained to allow for significant leakage between the Castle Hayne aquifer and the overlying aquifers. Additionally, Cardinell, et al (1993) concluded through seismic profiling, that paleochannels as well as the New River and its major tributaries incised the unit. No spatially continuous clay beds were noted from the seismic records above the Castle Hayne aquifer by Cardinell, et al (1993).

5.0 SOILS INVESTIGATION

5.1 SOIL BORING INSTALLATION

(Refer to Figures 2, 2A, and Appendix F)

Six soil borings were advanced during this investigation utilizing conventional hollow stem auguring techniques. The borings were advanced to facilitate the construction of five Type II monitoring wells (USTAS497-MW01 through USTAS497-MW05) and one Type III monitoring well (USTAS497-MW06). All borings were advanced and sampled in general accordance with the attached CATLIN Standard Procedures (Appendix F). The information compiled was used to obtain data necessary to define the lithology beneath the subject site and ascertain the extent of any potential vadose and/or dissolved-phase contaminant impact. Monitoring well locations are illustrated on Figures 2 and 2A. Due to complexities of utilities and superstructure located within the distribution pit, no borings were advanced within area of release.

5.2 FIELD SCREENING AND LABORATORY SAMPLE COLLECTION

Field screening was conducted during advancement of the soil probes to determine if organic vapors were present in the unsaturated zone and to identify areas of suspected near-surface releases.

Each soil sample was removed from the probe or split-spoon sampler, divided laterally into two sections, and placed in two pre-labeled, airtight, plastic bags. One bag was left undisturbed for several minutes to allow the organic vapors to reach equilibrium. The headspace of the bag was then tested with an OVA and the reading recorded on the boring log. The second bag was immediately placed on ice pending selection of the appropriate laboratory sample depth. The laboratory samples were taken from the interval exhibiting the highest OVA reading and/or the interval exhibiting the greatest physical appearance of potential petroleum impact.

All soil samples collected for laboratory analyses were immediately placed on ice and transported with the appropriate COC and analyzed at Paradigm Analytical Laboratories of Wilmington, North Carolina. Soil samples selected for laboratory analysis were placed into containers in accordance with the type of analyses scheduled for that sample as follows:

Analytical Method	Bottle Type and Size	Total Number of Bottles per Sample, Off-Site Laboratory	Preservative
Volatiles EPA Method 8260B	Clear Glass Vial/40 ml	4	3 w/ $\text{Na}_2\text{S}_2\text{O}_3$ 1 w/ MEOH
Semivolatiles EPA Method 8270	Amber Glass Jar/4 oz.	1	<4°C
Aliphatics/Aromatics MADEP EPH			
Aliphatics/Aromatics Extractable Hydrocarbons MADEP VPH	Clear Glass Vial/40 ml	1	MEOH

6.0 SITE GEOLOGY

6.1 SITE TOPOGRAPHY

(Refer to Figures 2 and 2A)

The project area is dominated by relatively flat topography, in an area of little overall relief. An un-named, man-made, drainage ditch is located along the northeastern side of the subject site, approximately 200 feet from the release. The ditch is approximately eight to ten feet deep and is oriented in a northwest southeast direction. A retention pond, with dimensions of approximately 75 feet by 150 feet, is located roughly 80 feet east of the release. The depth of the pond is unknown. These features are included on Figures 2 and 2A.

6.2 DESCRIPTION OF SUBSURFACE SAMPLES

(Refer to Appendix C and Figures 3 through 5)

Borings were advanced to depths of 13 to 15 feet BLS for installation of the shallow Type II monitoring wells and 50 feet BLS for the Type III monitoring well. The plan view for the fence diagram is presented on Figure 3. As depicted in the Fence Diagrams presented on Figures 4 and 5, the surficial materials from ground surface to approximately three to six feet BLS consisted of light gray to orange brown, silty, very fine to fine grained sandy clay to clay. The clay was typically soft to stiff and exhibited moderate to high plasticity. The clay material was typically moist to wet and appeared to have the characteristics of an aquitard. Light gray to brown, moderately to well sorted, very fine to coarse grained sand with trace silt was identified beneath the clay unit to a depth of approximately 22 feet BLS. Greenish gray, moderately sorted fine grained silty sand with trace cemented sand nodules was identified beneath the sand unit and extended to a depth of 24.5 feet BLS. A sharp contact was noted in boring USTAS497-MW06 at a depth of 24.5 feet where the material changed from the fine grained silty sand to a weathered limestone. The weathered limestone consisted of "limey" sands and weathered fossiliferous limestone fragments and extended to a depth of approximately 42 feet BLS. Gray

green fine to very fine grained silty sand was identified beneath the weathered limestone and extended to the boring termination depth of 50 feet. Boring logs are included in Appendix C.

7.0 SOIL SAMPLING RESULTS

7.1 FIELD SCREENING RESULTS

(Refer to Table 3)

Results of the field screening using the OVA are provided in Table 3. Organic vapor recordings ranged from zero to 650 ppm. The highest reading was identified from the sample collected from three to five feet BLS in soil boring USTAS497-MW04. The results of the screening results assisted in selecting the soil samples for laboratory analysis.

7.2 SOIL SAMPLING LABORATORY RESULTS

(Refer to Tables 4 through 7, Figures 6 through 8, and Appendix G)

7.2.1 EPA Method 8260B Volatile Organic Compounds

(Refer to Table 4, Figure 6, and Appendix G)

No EPA Method 8260B list compounds were detected above the NCDENR STGW MSCCs in any of the soil samples submitted to the laboratory for analysis. Laboratory results are summarized in Table 4 and on Figure 6. Laboratory reports are included in Appendix G.

7.2.2 EPA Method 8270 Semi-Volatile Organic Compounds

(Refer to Table 5, Figure 7, and Appendix G)

No EPA Method 8270 semi-volatile organic compounds were identified above laboratory quantitation limits in any of the soil samples submitted for laboratory analysis. The EPA Method 8270 laboratory results are summarized in Table 5 and on Figure 7. Laboratory reports are included in Appendix G.

7.2.3 MADEP EPH/VPH

(Refer to Tables 6 and 7, Figure 8, and Appendix G)

No MADEP EPH/VPH constituents were identified above laboratory quantitation limits in any of the soil samples submitted during this CSA investigation. Laboratory results are summarized in Tables 6 and 7 and on Figure 8. Laboratory reports are included in Appendix G.

8.0 GROUNDWATER INVESTIGATION

8.1 MONITORING WELL INSTALLATION

(Refer to Figures 2 and 2A, Table 8, Appendices C and D)

Five Type II monitoring wells (USTAS497-MW01 through USTAS497-MW05) were installed at the subject site to facilitate the collection of groundwater samples to determine the magnitude of petroleum impact to the groundwater. Refer to Figures 2 and 2A for monitoring well locations. The monitoring wells were constructed with two-inch diameter PVC well screen and casing. Approximately ten feet of machine slotted (0.01-inch) well screen was installed in each Type II well to depths of 13 to 15 feet BLS. One Type III (telescoping) monitoring well (USTAS497-MW06) was installed during this investigation to a depth of 50 feet BLS. The telescoping well was constructed with 39 feet of 6-inch diameter outer casing and 45 feet of two-inch Schedule 40 PVC with five feet of 2-inch diameter machine slotted (0.01-inch) well screen. Monitoring well construction information is summarized in Table 8. A qualified driller, licensed in the State of North Carolina, installed all wells. An experienced geologist, specializing in subsurface investigations, supervised well installation. Initial monitoring well development was performed no sooner than 24 hours after well completion. Development of the wells was accomplished by bailing and continued until turbidity stabilized. The wells were constructed in general accordance with North Carolina Well Construction Standard NCAC T15:02C. Monitoring well as-built details and boring records are included in Appendix C. North Carolina Well Construction Records are presented in Appendix D.

8.2 GROUNDWATER GAUGING AND SAMPLING

(Refer to Table 8, Figure 2A, and Appendix E)

Subsequent to the initial development, groundwater was allowed sufficient time to equilibrate and a depth to water measurement was recorded by measuring the distance from the finished top of casing to the surface of the groundwater. Where free product was present, an additional measurement indicating the thickness of free product was recorded. Depths to groundwater measurements were compared to well depths to determine the volume of groundwater within each of the wells. Three volumes of groundwater were then purged from each well to be sampled to insure that representative groundwater samples were collected. As the wells were purged, groundwater turbidity was visually monitored and recorded. Groundwater samples were collected with disposable Teflon bailers, placed in the appropriate laboratory glassware, labeled, and then kept on ice ($<4^{\circ}\text{C}$) during transportation to the analytical laboratory. All groundwater samples were transported with the appropriate COC and analyzed at Paradigm Analytical Laboratories of Wilmington, North Carolina. Monitoring well field sampling records and gauging data from the June sampling events are presented in Appendix E. Groundwater was collected and placed into containers based upon the type of laboratory analyses scheduled for that sample as follows.

Analytical Method	Bottle Type and Size	Total Number of Bottles per Sample	Preservative
EPA 602 + Xylenes and MTBE	Clear Glass Vial/ 40 ml	2	HCl
EPA 625	Amber Glass Jar/ 1 Liter	1	<4°C
MADEP EPH/VPH	Clear Glass Vial/ 40 ml	2	HCl

A comprehensive gauging event was conducted on July 11, 2003 for the newly installed monitoring wells (USTAS497-MW01 through USTAS497-MW06) in addition to five existing (RR-11, RR-12, RR-14, RR-15, and RR-16) monitoring wells. Monitoring well locations are presented on Figure 2A. Monitoring well construction and water level gauging information from the July 11, 2003 gauging event is presented on Table 8.

8.3 **FREE PRODUCT** (Refer to Table 8 and Figure 9)

A measurable thickness of free product was identified in monitoring wells USTAS497MW-05 and RR-12 at 1.08 feet and 4.30 feet, respectively. No measurable thickness of free product was identified in any of the other monitoring wells gauged during this investigation. The measured free product thickness with the estimated horizontal extent of free product identified during this investigation is presented on Figure 9. Monitoring well gauging data is presented on Table 8.

9.0 **HYDROGEOLOGIC INVESTIGATION**

9.1 **GROUNDWATER FLOW DIRECTION** (Refer to Table 8 and Figure 10)

With the exception of the groundwater measurement from RR-16, depth to the shallow groundwater across the site was relatively consistent and ranged between approximately six to nine feet BLS. The depth to groundwater measured in RR-16 was approximately three feet BLS according to the July 11, 2003 gauging data. Monitoring well gauging information generated on July 11, 2003 was compared to top of casing elevations to establish groundwater elevations. Where free product was identified, an adjusted depth to water was calculated to account for the measured thickness of free product. Depth to groundwater and adjusted groundwater elevations are presented on Table 8. As exhibited on Figure 10, strict interpolation of the adjusted groundwater elevations indicates an overall groundwater flow trend to the northeast. However, there is a relatively substantial groundwater high, or "mound", located near the area of the release, within the fuel distribution pit.

9.2 HYDRAULIC GRADIENT

(Refer to Figure 10 and Tables 8 and 9)

Two horizontal vertical gradients were calculated from the July 11, 2003 gauging data. The first gradient was calculated utilizing all shallow groundwater data generated during the gauging event. The second gradient was calculated by omitting the groundwater measurement obtained from monitoring well RR-16. The gradient incorporating the suspect data obtained from RR-16 was calculated between monitoring wells RR-16 and RR-11. The wells are 248 feet apart and the difference in groundwater elevation from the gauging event was calculated at 6.64 feet. The resultant gradient is 0.027 or roughly 0.03 to the northeast. The gradient calculated omitting the data from RR-16 was calculated between monitoring wells USTAS497-MW02 and RR-11. These wells are approximately 291 feet apart with a July 11, 2003 difference in groundwater elevation of 2.8 feet and a resultant hydraulic gradient of 0.009 or approximately 0.01. Figure 10 illustrates the interpolated groundwater contours with adjusted groundwater elevations. Table 8 documents well construction information and July 11, 2003 gauging information.

Vertical hydraulic gradients were calculated between two sets of Type II/Type III monitoring wells (RR-12/USTAS497-MW06 and RR-11/RR-14) utilizing the July 11, 2003 gauging data. The calculated estimated vertical hydraulic gradients between monitoring wells RR-12 / USTAS497-MW06 and RR-11 / RR-14 are -0.02 and -0.10, respectively. The negative number indicates the potential for an "upward" (from deep to shallow) movement of groundwater. A summary of the vertical hydraulic gradient estimates is included on Table 9. Groundwater gauging data and well construction information is presented on Table 8.

9.3 HYDRAULIC CONDUCTIVITY

Although no direct testing was conducted as part of this investigation, data generated during a CSA performed at this site by CATLIN in 1994 titled *Leaking Underground Storage Tank Comprehensive Site Assessment Rapid Refueler* (dated November 1, 1994) was utilized to determine a relatively accurate estimate of the site's hydraulic conductivity. Three slug tests were conducted during the 1994 CSA on monitoring wells RR-4, RR-11, and RR-12 resulting in hydraulic conductivity values of 18 ft/day, 15 ft/day, and 20 ft/day respectively. In addition to the slug testing, grain size analysis was performed on two soil samples collected during the 1994 CSA investigation. Grain size distribution testing was performed on soil samples collected from RR-4 (five to seven feet BLS) and RR-15 (five to seven feet BLS). Comparison of the laboratory results to published information revealed hydraulic conductivity values of 23.78 ft/day for both samples. An eight-hour pumping test was performed on monitoring well RR-15 as part of the 1994 CSA. Hydraulic conductivity values were calculated using the pumping test data in accordance with the Dupuit methods and assumptions resulting with a value of 77.14 feet per day. Testing data, calculations, and results are included in the 1994 CSA completed by CATLIN. Based on these hydraulic conductivity calculations, an estimated average hydraulic conductivity value of 31 feet per day was determined for the site.

9.4 AVERAGE GROUNDWATER LINEAR VELOCITY

Groundwater travel time or average groundwater linear flow velocity serves as the basis for estimating the rate of contaminant migration across the subject site. Groundwater flow rates should represent the maximum rate of contaminant migration with variations among contaminants due to geo- and hydrochemical processes including molecular diffusion, mechanical mixing, sorption-desorption, ion exchange, hydrolysis, and biodegradation.

The average groundwater linear flow velocity was calculated using the following modification of Darcy's Law (Todd, 1980):

$$V_{avg} = (K_{avg}/n_e)(dh/dl)$$

Where:

$$\begin{aligned} K_{avg} &= \text{Average hydraulic conductivity (feet per day)} \\ n_e &= \text{Effective porosity (unitless)} \\ dh/dl &= \text{Hydraulic gradient (feet per foot)} \end{aligned}$$

Two hydraulic gradients were calculated from water level measurements obtained on July 11, 2003. As previously discussed, hydraulic gradients between monitoring wells RR-16 / RR-11 and USTAS497-MW02 / RR-11, were determined to be 0.03 and 0.01, respectively. The overall groundwater flow trend appears to be in a northeasterly direction. An average K value of 31 feet per day was used in the calculations. The effective porosity value for medium sand of 0.39 was obtained from Todd (1980). Resulting in the following calculations:

$$\begin{aligned} V_{avg} &= (31 \text{ ft/day} / 0.39) (0.03) \\ &= 2.38 \text{ ft/day} \\ \text{say} &2.4 \text{ ft/day} \end{aligned}$$
$$\begin{aligned} V_{avg} &= (31 \text{ ft/day} / 0.39) (0.01) \\ &= 0.79 \text{ ft/day} \\ \text{say} &0.8 \text{ ft/day} \end{aligned}$$

Averaging these two values results in an average groundwater linear flow velocity of approximately 1.6 feet per day in a northeasterly direction.

10.0 GROUNDWATER SAMPLING RESULTS

(Refer to Tables 10 through 13, Figures 11 through 13 and Appendix G)

In order to minimize the nomenclature in the following sections, all monitoring wells and groundwater samples referenced as MW01 through MW06 are in actuality prefaced with "USTAS497-". Additionally, a surficial water sample was collected from the retention pond located at the site. The surface water sample is identified as "Pond" and the results of the sample analysis are incorporated into the groundwater sampling results and discussion.

10.1 EPA METHOD 602 (PURGEABLE AROMATICS)

(Refer to Table 10, Figure 11, and Appendix G)

With the exception of ethylbenzene, methyl-tert-butyl ether (MTBE) and total xylenes, all EPA Method 602 constituents were determined to be below laboratory detection limits for all groundwater samples submitted during this investigation. Ethylbenzene was identified in groundwater samples MW05, MW06, and the duplicate sample from MW06 at concentrations of 8.6 µg/L, 2.9 µg/L, and 2.7 µg/L, respectively. These concentrations are substantially below the 2L GWQS of 29 µg/L for ethylbenzene. A total of 4.5 µg/L of MTBE was identified in the groundwater sample collected from monitoring well MW05. The current 2L GWQS for MTBE is 200 µg/L. Total xylenes were identified in groundwater samples MW05, MW06, and the duplicate sample from MW06 at concentrations of 26 µg/L, 7.3 µg/L, and 7 µg/L, respectively. These concentrations are substantially below the 2L GWQS for total xylenes of 530 µg/L. Laboratory results are summarized on Table 10 and Figure 11. Laboratory results and COC documentation are presented in Appendix G.

10.2 EPA METHOD 625 (BASE, NEUTRAL AND ACID EXTRACTABLES)

(Refer to Table 11, Figure 12, and Appendix G)

Naphthalene was the only EPA Method 625 constituent identified at concentrations above laboratory method detection limits in the groundwater samples collected and analyzed as part of this CSA. The detected naphthalene concentration of 31 µg/L in the groundwater sample collected from MW05 is above the current 2L GWQS of 21 µg/L for naphthalene. However, this concentration is substantially lower than the current GCL for naphthalene of 15,500 µg/L. Naphthalene was also identified in the groundwater sample collected from MW06 at a concentration of 12 µg/L. The EPA Method 625 data is summarized in Table 11 and on Figure 12. Laboratory results and COC documentation are presented in Appendix G.

10.3 MADEP EPH/VPH

(Refer to Tables 12 and 13, Figure 13, and Appendix G)

All results involving MADEP EPH/VPH concentrations were below the applicable NCDENR IGWQS for the various MADEP fractions. A summary of MADEP EPH/VPH results is presented on Table 12. A summary of MADEP EPH/VPH as compared to NCDENR IGWQS is summarized on Table 13 and Figure 13. Laboratory results and COC documentation is included in Appendix G.

11.0 DISCUSSION

No petroleum constituents were detected above NCDENR STGW MSCCs in any of the soil samples submitted to the laboratory for analysis during this investigation. The immediate area of release is located in the central portion of a fuel distribution pit and is predominantly covered with concrete. Therefore, no sample points were advanced within the immediate area of release.

Naphthalene was the only dissolved petroleum constituent identified above current 2L GWQS. The detected naphthalene concentration of 31 µg/L in the groundwater sample collected from USTAS497-MW05 is above the current 2L GWQS of 21 µg/L for naphthalene. The 31 µg/L of naphthalene is the maximum dissolved contaminant concentration identified during this CSA. No petroleum contaminants were identified in the surface water sample collected from the retention pond.

Free product was identified in monitoring well RR-12 at a thickness of 4.30 feet and monitoring well USTAS497-MW05 at a thickness of 1.08 feet. The free product plume has not been delineated and the plume's geometry indicates potential migration in a northeasterly direction similar to the groundwater flow direction.

The only potential receptors identified in the vicinity are a retention pond and the associated drainage ditch located along the northeastern boundary of the site. These receptors are located hydraulically downgradient of the plume. Analytical data in conjunction with physical observations (no petroleum sheen etc.) indicates that these receptors have not been impacted from this release.

Due to the presence of free product, the minimal risk classification that can be assigned to this site is Intermediate. Elimination of the free product, thus reducing the potential of receptor impact, would assist in reducing the risk classification of this site. According to base personnel, a study is currently underway to replace the entire JP-5 fuel transfer line.

Based on an assumed Intermediate Risk Classification and Industrial/Commercial Land Use designation, soil clean-up levels will be to Industrial/Commercial MSCCs and groundwater cleanup levels will be to current GCLs.

12.0 CONCLUSIONS AND RECOMMENDATIONS

Impact to the subsurface from petroleum (JP-5) has been confirmed during this investigation. Physical observations made during the initial response to the release, in conjunction with the free product plume geometry, indicate that this particular incident did contribute to contaminant impact on the groundwater at the Rapid Refueler A-B Tank area site. Petroleum impact to the site soils was not substantiated during this CSA. However, due to the concrete containment unit and associated fuel distribution system, no soil sampling was conducted within the immediate area of the release.

In order to address potential petroleum impact to site soils, additional sampling and analysis of site soils may be necessary in the immediate area of the release. An additional monitoring point may be necessary to adequately define the horizontal limits of free product. The monitoring point should be placed hydraulically downgradient of the known contaminant plume to establish the horizontal extent of the shallow plume. Continued monitoring, gauging, and remedial action are necessary to assess and remedy the impact of free product on the site groundwater. It is recommended that a CAP be prepared for the Rapid Refueler A-B site. The additional assessment activities necessary to fulfill the CSA requirements may be incorporated into the CAP activities.

The primary goal of this CAP should be to contain, reduce, and subsequently eliminate free product. Additionally, sufficient measures should be implemented to assure that the surficial waters (drainage ditches and retention pond) located in the vicinity are not impacted by petroleum. A number of remedial alternatives exist that would adequately address all concerns associated with the removal of the product. Cost efficient methods to contain, reduce, and subsequently eliminate free product at the subject site appear to be aggressive fluid vapor reduction utilizing a mobile multi-phase extraction system.

AFVR, also known as dual-phase extraction, multi-phase extraction, vacuum enhanced extraction or bioslurping, is a free product and dissolved recovery technology that uses vacuum pump(s) to remove various combinations of fluids, i.e., free-phase petroleum product, contaminated groundwater and vadose zone vapor from the subsurface. The extracted liquids are collected in the tank of the specially equipped vacuum truck for transport to a disposal facility. Collected vapors are discharged to the atmosphere.

AFVR has been ongoing at the subject site. However, an increase in the number of wells on which AFVR is conducted may be beneficial to the overall reduction of contaminants identified at the subject site. A more aggressive schedule (shorter interval between AFVR events) and/or Mobile Multi-Phase Extraction may be applicable for this site. Pilot testing will be necessary to determine which method will be appropriate for the subject site.

Additionally, should the proposed soil assessment activities indicate the presence of petroleum-impacted soils; the reduction and/or removal of petroleum-impacted soils in excess of applicable MSCCs may be necessary to eliminate any continued secondary source of groundwater impact.

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TABLES

TABLE 1

PROPERTY OWNERS/OCCUPANTS

Date: Jul-03 Incident No. and Name: 32004 / Rapid Refueler A-B Tank Facility ID#: N/A

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

TABLE 2**WATER SUPPLY WELL INFORMATION**Date: Jul-03 Incident Number and Name: 32004 / Rapid Refueler A-B Tank Facility ID#: N/A

Well ID#	Well Owner/User (indicate which)	Address	Phone Number	Well Use	Well Depth (ft. BGS)	Type of Well	Well Casing Depth (ft. BGS)	Well Screen Interval (x to y ft. BGS)	Distance from source area of release (ft.)
-----------------	---	----------------	---------------------	-----------------	---------------------------------	---------------------	--	--	---

NO WATER SUPPLY WELLS WITH IN 1,500 FEET OF SUBJECT SITE

TABLE 3

SUMMARY OF SOIL HEADSPACE SCREENING

Rapid Refueler A-B Tanks

Marine Corps Air Station, New River, NC

SAMPLE I.D.	Sample Depth (ft.)	OVA READING (ppm)	Sample Selected for Laboratory Analysis
USTAS497 -MW01	3 - 5	310	UST AS497- MWO1 (3-5')
USTAS497 -MW01	8 - 10	120	
USTAS497 -MW01	11 - 13	7.2	
USTAS497 -MW02	0 - 2	4.7	
USTAS497 -MW02	3 - 5	5.2	UST AS497- MWO2 (3-5')
USTAS497 -MW02	8 - 10	5.4	
USTAS497 -MW02	12 - 14	11	
USTAS497 -MW03	0 - 2	NM	
USTAS497 -MW03	3 - 5	2.0	UST AS497- MWO3 (3-5')
USTAS497 -MW03	8 - 10	8.4	
USTAS497 -MW03	11 - 13	7.1	
USTAS497 -MW04	3 - 5	650	UST AS497- MWO4 (3-5')
USTAS497 -MW04	8 - 10	160	
USTAS497 -MW04	12 - 14	12.4	
USTAS497 -MW05	0 - 2	18	
USTAS497 -MW05	3 - 5	0	UST AS497- MWO5 (3-5')
USTAS497 -MW05	8 - 10	26	
USTAS497 -MW05	13 - 15	20	
USTAS497 -MW06	0 - 2	NM	UST AS497- MWO6 (0-2')
USTAS497 -MW06	3 - 5	NM	
USTAS497 -MW06	8 - 10	NM	
USTAS497 -MW06	13 - 15	240	
USTAS497 -MW06	18 - 20	15	
USTAS497 -MW06	23 - 25	19	
USTAS497 -MW06	28 - 30	7.4	
USTAS497 -MW06	33 - 35	3.8	
USTAS497 -MW06	38 - 40	4.2	
USTAS497 -MW06	43 - 45	0	
USTAS497 -MW06	48 - 50	0	

NM = NOT MEASURED

TABLE 4 SUMMARY OF SOIL LABORATORY RESULTS

Date: June 2003

Incident Number and Name: 32004 - Rapid Refueler Tanks A-B

Facility ID#: N/A

Analytical Method: EPA Method 8260B/5035

Sample ID	Contaminant of Concern →		Acetone	n-Butylbenzene	sec-Butylbenzene	Isopropylbenzene	n-Propyl benzene	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	All Other Analytes
	Date Collected	Sample Depth (ft. BGS)								
Residential MSCC (mg/kg)			1,564	156	156	1,564	156	782	782	Varies
Industrial/Commercial MSCC (mg/kg)			40,880	4,088	4,088	40,880	4,088	20,440	20,440	Varies
Soil to Groundwater MSCC (mg/kg)			3	4	3	2	2	8	7	Varies
USTAS497-MW01 (3-5')	6/9/03	3-5	<0.051	<0.0051	<0.0051	<0.0051	<0.0051	<0.0051	<0.0051	BQL
USTAS497-MW02 (3-5')	6/9/03	3-5	<0.055	<0.0055	<0.0055	<0.0055	<0.0055	<0.0055	<0.0055	BQL
USTAS497-MW03 (3-5')	6/9/03	3-5	<0.047	<0.0047	<0.0047	<0.0047	<0.0047	<0.0047	<0.0047	BQL
USTAS497-MW04 (3-5')	6/9/03	3-5	<0.048	<0.0048	<0.0048	<0.0048	<0.0048	<0.0048	<0.0048	BQL
USTAS497-MW05 (3-5')	6/9/03	3-5	<0.048	<0.0048	<0.0048	<0.0048	<0.0048	<0.0048	<0.0048	BQL
USTAS497-MW06 (0-2')	6/16/03	0-2	<0.05	<0.005	0.013	0.015	0.021	0.085	0.024	BQL
USTAS497-MW06 (0-2') Dup.	6/16/03	0-2	0.066	0.0053	0.013	0.013	0.021	0.094	0.025	BQL

All results in mg/kg.

ft. BGS = feet below ground surface

TABLE 5 SUMMARY OF SOIL LABORATORY RESULTS

Date: June 2003

Incident Number and Name: 32004 - Rapid Refueler Tanks A-B

Facility ID#: N/A

Analytical Method: EPA Method 8270

Sample ID	Contaminant of Concern →		All Analytes
	Date Collected	Sample Depth (ft. BGS)	
Residential MSCC (mg/kg) Industrial/Commercial MSCC (mg/kg) Soil to Groundwater MSCC (mg/kg)			Varies Varies Varies
USTAS497-MW01 (3-5')	6/9/03	3-5	BQL
USTAS497-MW02 (3-5')	6/9/03	3-5	BQL
USTAS497-MW03 (3-5')	6/9/03	3-5	BQL
USTAS497-MW04 (3-5')	6/9/03	3-5	BQL
USTAS497-MW05 (3-5')	6/9/03	3-5	BQL
USTAS497-MW06 (0-2')	6/16/03	0-2	BQL

All results in mg/kg.

ft. BGS = feet below ground surface

TABLE 6 SUMMARY OF SOIL LABORATORY RESULTS

Date: June 2003

Incident Number and Name: 32004 - Rapid Refueler Tanks A-B

Facility ID#: N/A

Analytical Method: MADEP EPH/VPH

Sample ID	Contaminant of Concern →		C9-C18 Aliphatics	C19-C36 Aliphatics	C11-C22 Aromatics	C5-C8 Aliphatics	C9-C12 Aliphatics	C9-C10 Aromatics
	Date Collected	Sample Depth (ft. BGS)						
USTAS497-MW01 (3-5')	6/9/03	3-5	<10	<10	<10	<10	<10	<10
USTAS497-MW02 (3-5')	6/9/03	3-5	<10	<10	<10	<10	<10	<10
USTAS497-MW03 (3-5')	6/9/03	3-5	<10	<10	<10	<10	<10	<10
USTAS497-MW04 (3-5')	6/9/03	3-5	<10	<10	<10	<10	<10	<10
USTAS497-MW05 (3-5')	6/9/03	3-5	<10	<10	<10	<10	<10	<10
USTAS497-MW06 (0-2')	6/16/03	0-2	<10	<10	<10	<10	<10	<10

All results in mg/kg.

TABLE 7 SUMMARY OF SOIL LABORATORY RESULTS

Date: June 2003

Incident Number and Name: 32004 - Rapid Refueler Tanks A-B

Facility ID#: N/A

Analytical Method: MADEP EPH/VPH AS COMPARED TO NCDENR MSCCs

Sample ID	Contaminant of Concern →		C5-C8 Aliphatics	C9-C18 Aliphatics	C19-C36 Aliphatics	C9-C22 Aromatics
	Date Collected	Sample Depth (ft. BGS)				
Residential MSCC (mg/kg)			939	9,386	93,860	469
Industrial/Commercial MSCC (mg/kg)			24,528	245,280	#	12,264
Soil to Groundwater MSCC (mg/kg)			72	3,255	##	34
USTAS497-MW01 (3-5')	6/9/03	3-5	<10	<20	<10	<20
USTAS497-MW02 (3-5')	6/9/03	3-5	<10	<20	<10	<20
USTAS497-MW03 (3-5')	6/9/03	3-5	<10	<20	<10	<20
USTAS497-MW04 (3-5')	6/9/03	3-5	<10	<20	<10	<20
USTAS497-MW05 (3-5')	6/9/03	3-5	<10	<20	<10	<20
USTAS497-MW06 (0-2')	6/16/03	0-2	<10	<20	<10	<20

Health based level >100%

Considered immobile

All results in mg/kg.

TABLE 8

MONITORING WELL CONSTRUCTION AND WATER LEVEL GAUGING DATA

Rapid Refueler A-B

New River Air Station, NC

WELL IDENTIFICATION	DATE INSTALLED	DATE WATER LEVEL MEASURED	WELL CASING DEPTH (ft. BLS)	SCREEN INTERVAL (ft. BLS)	BOTTOM OF WELL (ft. BLS)	TOP OF CASING ELEV.* (ft.)	DEPTH TO WATER From Top of Casing (ft.)	FREE PRODUCT THICKNESS ** (ft.)	GROUND WATER ELEV. *(ft.)	OUTER CASING DEPTH (ft. BLS) Type III	THIRD CASING DEPTH (ft. BLS) Triple Cased Type III
RR-11	05/26/94	07/11/03	4.5	4.5 - 14.5	15.0	21.73	6.59	NMT	15.14	-	-
RR-12	05/26/94	07/11/03	3.5	3.5 - 13.5	14.0	21.73	9.17	4.30	16.09	-	-
RR-14	06/02/94	07/11/03	44.5	44.5 - 49.5	50.0	21.82	3.10	NMT	18.72	39.5	-
RR-15	06/07/03	07/11/03	3.5	3.5 - 32.5	33.0	21.80	6.68	NMT	15.12	-	-
RR-16		07/11/03	4.5	4.5 - 14.5	15.0	24.78	3.00	NMT	21.78	-	-
USTAS497 -MW01	06/09/03	07/11/03	2.5	2.5 - 12.5	13.0	23.46	6.63	NMT	16.83	-	-
USTAS497 -MW02	06/09/03	07/11/03	3.5	3.5 - 13.5	14.0	25.82	7.88	NMT	17.94	-	-
USTAS497 -MW03	06/09/03	07/11/03	2.5	2.5 - 12.5	13.0	23.60	6.33	NMT	17.27	-	-
USTAS497 -MW04	06/09/03	07/11/03	3.5	3.5 - 13.5	14.0	23.23	6.32	NMT	16.91	-	-
USTAS497 -MW05	06/09/03	07/11/03	4.0	4.0 - 14.0	14.0	23.11	7.47	1.08	16.53	-	-
USTAS497 -MW06	06/13/03	07/11/03	44.5	44.5 - 49.5	50.0	23.37	6.80	NMT	16.57	39.0	-

* Reference Point for Elevation Measurements (Temporary - TOC of RR-12), Assumed Elevation: (21.73ft.)

** If free product is present in a well, ground water elevation was calculated by: [Top of Casing Elevation - Depth to Water] + [Free Product Thickness x(0.82 (for JP-5 fuel))]

ft. BLS =feet below land surface

NMT = No Measurable Thickness

TABLE 9
SUMMARY OF VERTICAL HYDRAULIC
GRADIENT ESTIMATES AS OF July 11, 2003

RAPID REFUELER A-B TANKS

Marine Corps Air Station
New River, North Carolina

	WELL PAIRS			
	TYPE II	TYPE III	TYPE II	TYPE III
	RR-12	USTAS497 - MW06	RR-11	RR-14
TOCE (ft.)	21.73	23.47	21.73	21.82
DTW (ft.) *	5.64	6.80	6.59	3.10
Approx. Mid-Screen Depth (ft.)	8.5	47.0	9.5	47.0
Approx. Mid-Screen Elevation (ft.)	13.2	-23.5	12.2	-25.2
SWLE (ft)	16.09	16.67	15.14	18.72
Difference in SWLE (ft.)	-0.58		-3.58	
Difference in Mid-Screen Elevation (ft.)	36.76		37.41	
Vertical Gradient	-0.02		-0.10	

NOTES:

DTW = Depth to Water

TOCE = Top of Casing Elevation

SWLE = Static Water Level Elevation

* = DTW Adjusted for presence of free product

**NEGATIVE GRADIENT INDICATES
POTENTIAL "UPWARD" GROUNDWATER
MOVEMENT**

TABLE 10 SUMMARY OF GROUNDWATER LABORATORY RESULTS

Date: June 2003

Incident Number and Name: 32004 - Rapid Refueler Tanks A-B

Facility ID#: N/A

Analytical Method: EPA Method 602

Well ID	Contaminant of Concern →		Benzene	Diisopropyl ether	Ethylbenzene	Methyl-tert-butyl ether	Toluene	Total Xylenes
	Sample ID	Date Collected						
GCL (µg/L) 2L GWQS (µg/L)			5,000 1	70,000 70	29,000 29	200,000 200	257,500 1,000	87,500 530
USTAS497-MW01	USTAS497-MW01	6/10/03	<1	<1	<1	<2	<1	<2
USTAS497-MW02	USTAS497-MW02	6/10/03	<1	<1	<1	<2	<1	<2
USTAS497-MW03	USTAS497-MW03	6/10/03	<1	<1	<1	<2	<1	<2
USTAS497-MW04	USTAS497-MW04	6/10/03	<1	<1	<1	<2	<1	<2
USTAS497-MW05	USTAS497-MW05	6/10/03	<1	<1	8.6	4.5	<1	26
USTAS497-MW06	USTAS497-MW06	6/16/03	<1	<1	2.9	<2	<1	7.3
USTAS497-MW06 Dup.	USTAS497-MW06 Dup.	6/16/03	<1	<1	2.7	<2	<1	7
Pond	Pond	6/16/03	<1	<1	<1	<2	<1	<2
RR-11	RR-11	6/10/03	<1	<1	<1	<2	<1	<2
RR-14	RR-14	6/10/03	<1	<1	<1	<2	<1	<2

All results in µg/L

TABLE 11 SUMMARY OF GROUNDWATER LABORATORY RESULTS

Date: June 2003

Incident Number and Name: 32004 - Rapid Refueler Tanks A-B

Facility ID#: N/A

Analytical Method: EPA Method 625

Well ID	Contaminant of Concern →		Naphthalene	All Other Analytes
	Sample ID	Date Collected		
GCL (µg/L) 2L GWQS (µg/L)			15,500 21	Varies Varies Varies
USTAS497-MW01	USTAS497-MW01	6/10/03	<10	BQL
USTAS497-MW02	USTAS497-MW02	6/10/03	<10	BQL
USTAS497-MW03	USTAS497-MW03	6/10/03	<10	BQL
USTAS497-MW04	USTAS497-MW04	6/10/03	<10	BQL
USTAS497-MW05	USTAS497-MW05	6/10/03	31	BQL
USTAS497-MW06	USTAS497-MW06	6/16/03	12	BQL
Pond	Pond	6/16/03	<10	BQL
RR-11	RR-11	6/10/03	<10	BQL
RR-14	RR-14	6/10/03	<10	BQL

All results in µg/L.

Bold result indicates concentration greater than the 2L GWQS.

TABLE 12 SUMMARY OF GROUNDWATER LABORATORY RESULTS

Date: June 2003

Incident Number and Name: 32004 - Rapid Refueler Tanks A-B

Facility ID#: N/A

Analytical Method: MADEP EPH/VPH

Well ID	Contaminant of Concern →		C9-C18 Aliphatics	C19-C36 Aliphatics	C11-C22 Aromatics	C5-C8 Aliphatics	C9-C12 Aliphatics	C9-C10 Aromatics
	Sample ID	Date Collected						
USTAS497-MW01	USTAS497-MW01	6/10/03	<100	<100	<100	<100	<100	<100
USTAS497-MW02	USTAS497-MW02	6/10/03	<100	<100	<100	<100	<100	<100
USTAS497-MW03	USTAS497-MW03	6/10/03	<100	<100	<100	<100	<100	<100
USTAS497-MW04	USTAS497-MW04	6/10/03	<100	<100	<100	<100	<100	<100
USTAS497-MW05	USTAS497-MW05	6/10/03	<100	<100	<100	<100	300	<100
USTAS497-MW06	USTAS497-MW06	6/16/03	<100	<100	<100	<100	230	<100
Pond	Pond	6/16/03	<100	<100	<100	<100	<100	<100
RR-11	RR-11	6/10/03	<100	<100	<100	<100	<100	<100
RR-14	RR-14	6/10/03	<100	<100	<100	<100	<100	<100

All results in µg/L

TABLE 13 SUMMARY OF GROUNDWATER LABORATORY RESULTS

Date: June 2003

Incident Number and Name: 32004 - Rapid Refueler Tanks A-B

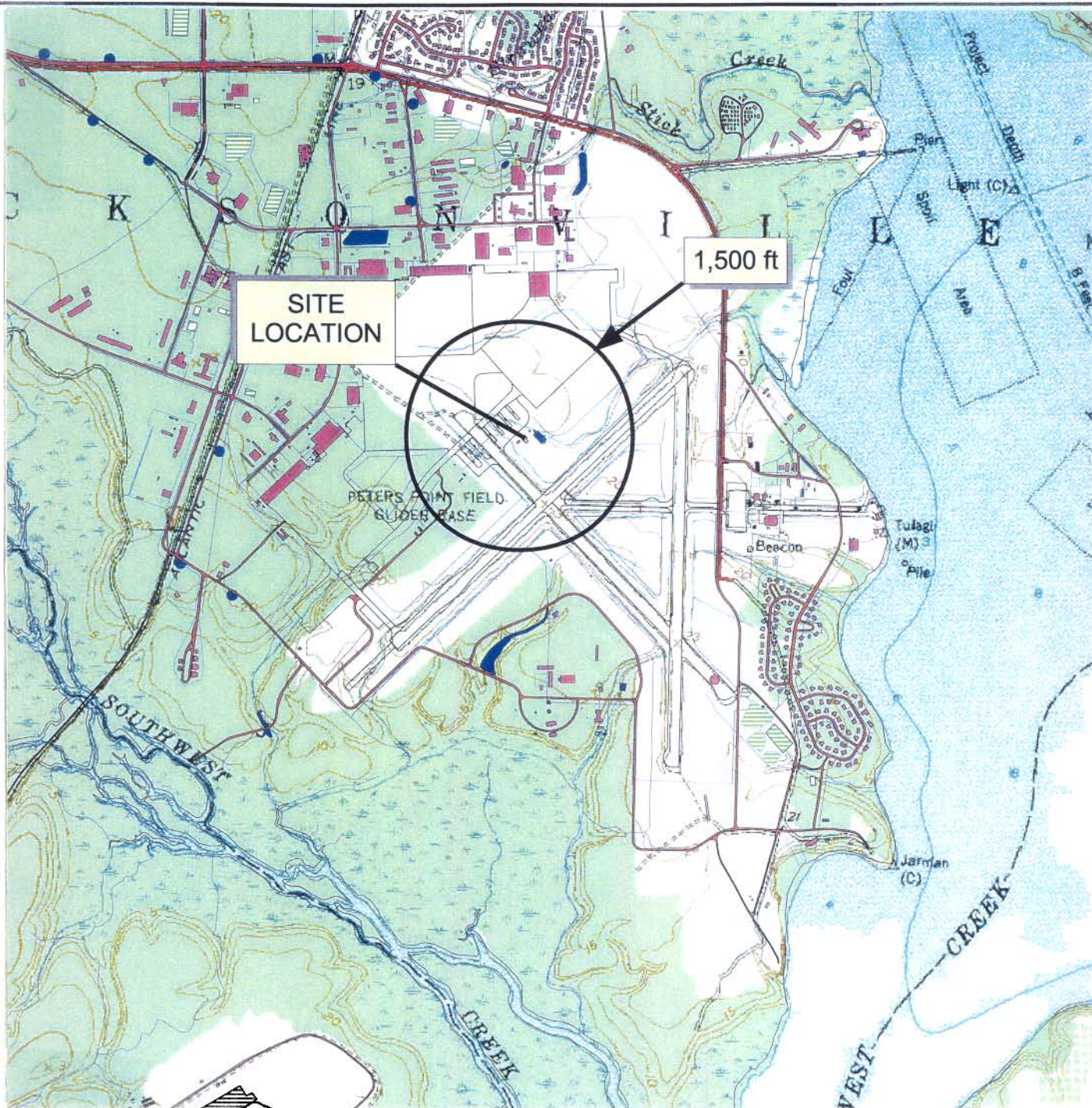
Facility ID#: N/A

Analytical Method: MADEP EPH/VPH AS COMPARED TO NCDENR IGWQS

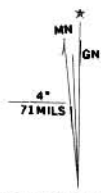
Well ID	Contaminant of Concern →		C5-C8 Aliphatics	C9-C18 Aliphatics	C19-C36 Aliphatics	C9-C22 Aromatics
	Sample ID	Date Collected				
IGWQS(µg/L)			420	4,200	42,000	210
USTAS497-MW01	USTAS497-MW01	6/10/03	<100	<200	<100	<200
USTAS497-MW02	USTAS497-MW02	6/10/03	<100	<200	<100	<200
USTAS497-MW03	USTAS497-MW03	6/10/03	<100	<200	<100	<200
USTAS497-MW04	USTAS497-MW04	6/10/03	<100	<200	<100	<200
USTAS497-MW05	USTAS497-MW05	6/10/03	<100	<400	<100	<200
USTAS497-MW06	USTAS497-MW06	6/16/03	<100	<330	<100	<200
Pond	Pond	6/16/03	<100	<200	<100	<200
RR-11	RR-11	6/10/03	<100	<200	<100	<200
RR-14	RR-14	6/10/03	<100	<200	<100	<200

All results in µg/L.

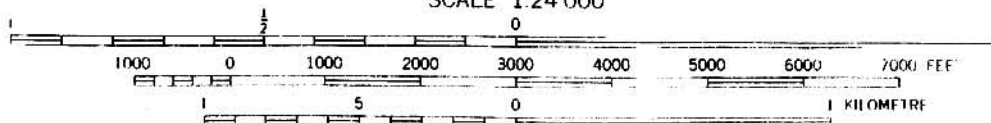
FIGURES



SCALE 1:24 000



UTM GRID AND 1952 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET



QUADRANGLE LOCATION

JACKSONVILLE SOUTH, N. C.

NW/4 NEW RIVER 15' QUADRANGLE

N3437.5—W7722.5/7.5

1952

PHOTOINSPECTED 1971

CAELIN
ENGINEERS and SCIENTISTS

WILMINGTON, NORTH CAROLINA

PROJECT

RAPID REFUELER A-B TANKS
MARINE CORPS AIR STATION
NEW RIVER, N.C.

JOB NO: 203005-39

DATE: JULY 2003

TITLE

GENERAL LOCATION
USGS TOPOGRAPHIC QUADRANGLE

SCALE: AS SHOWN

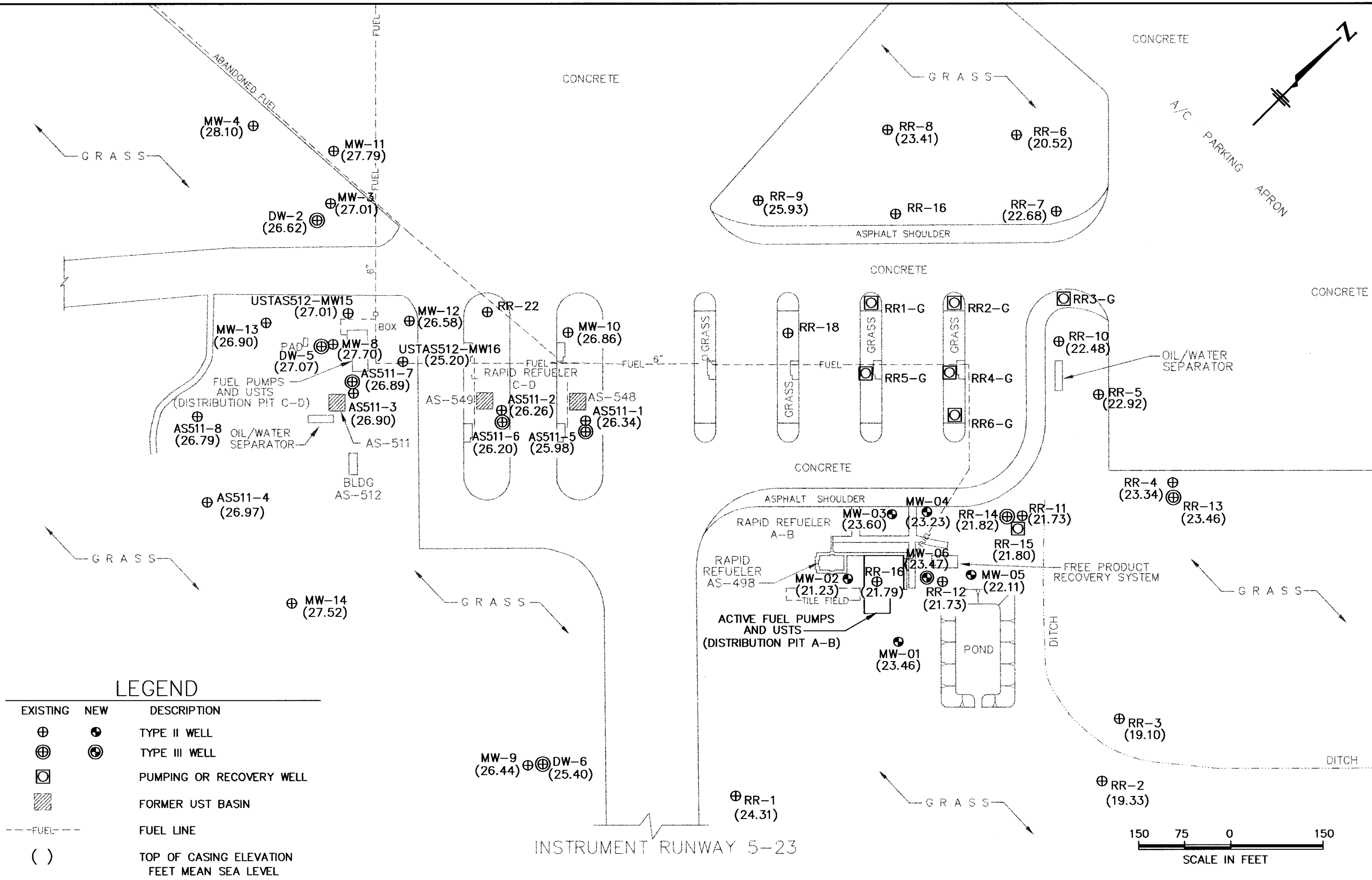
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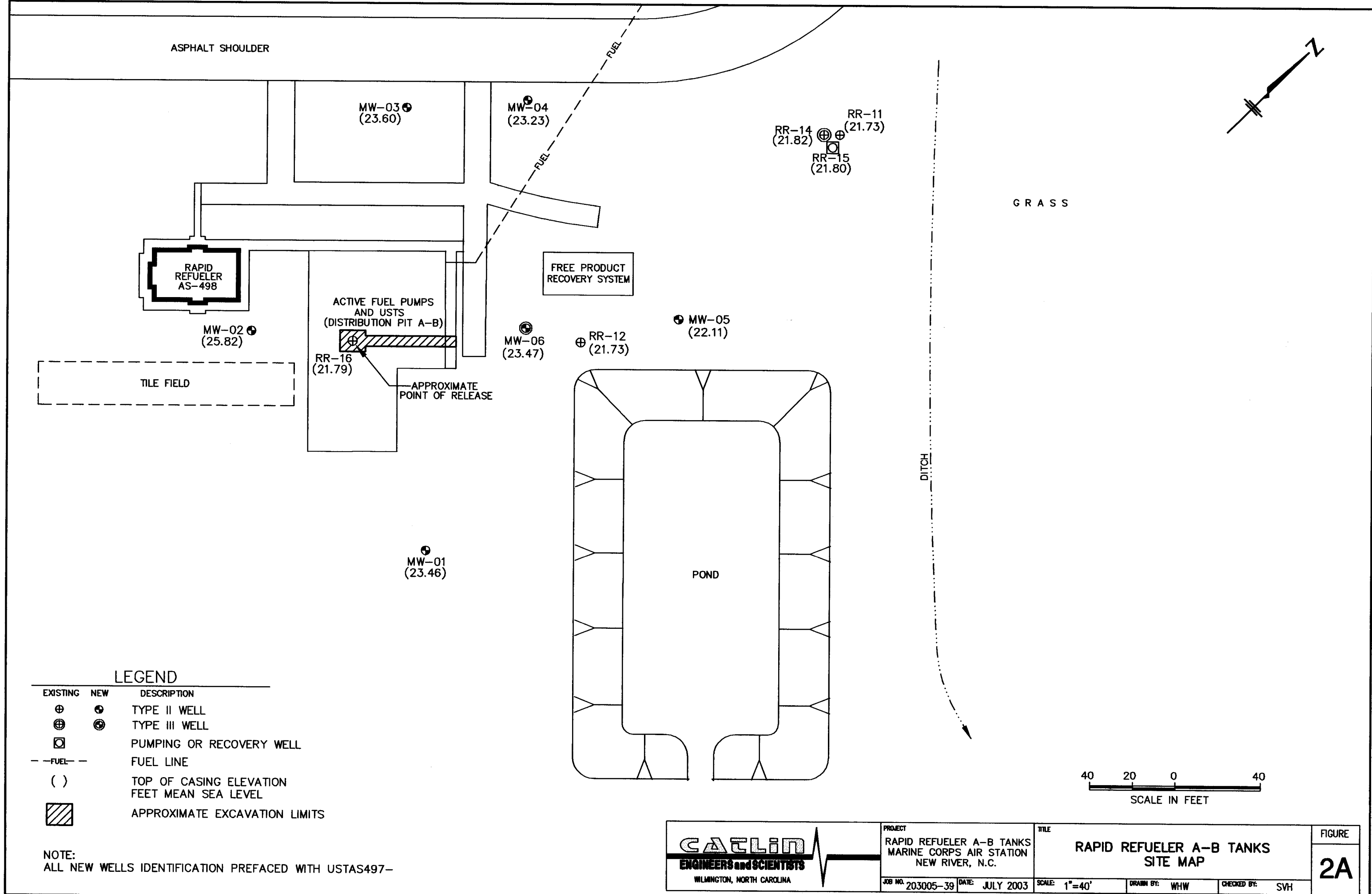
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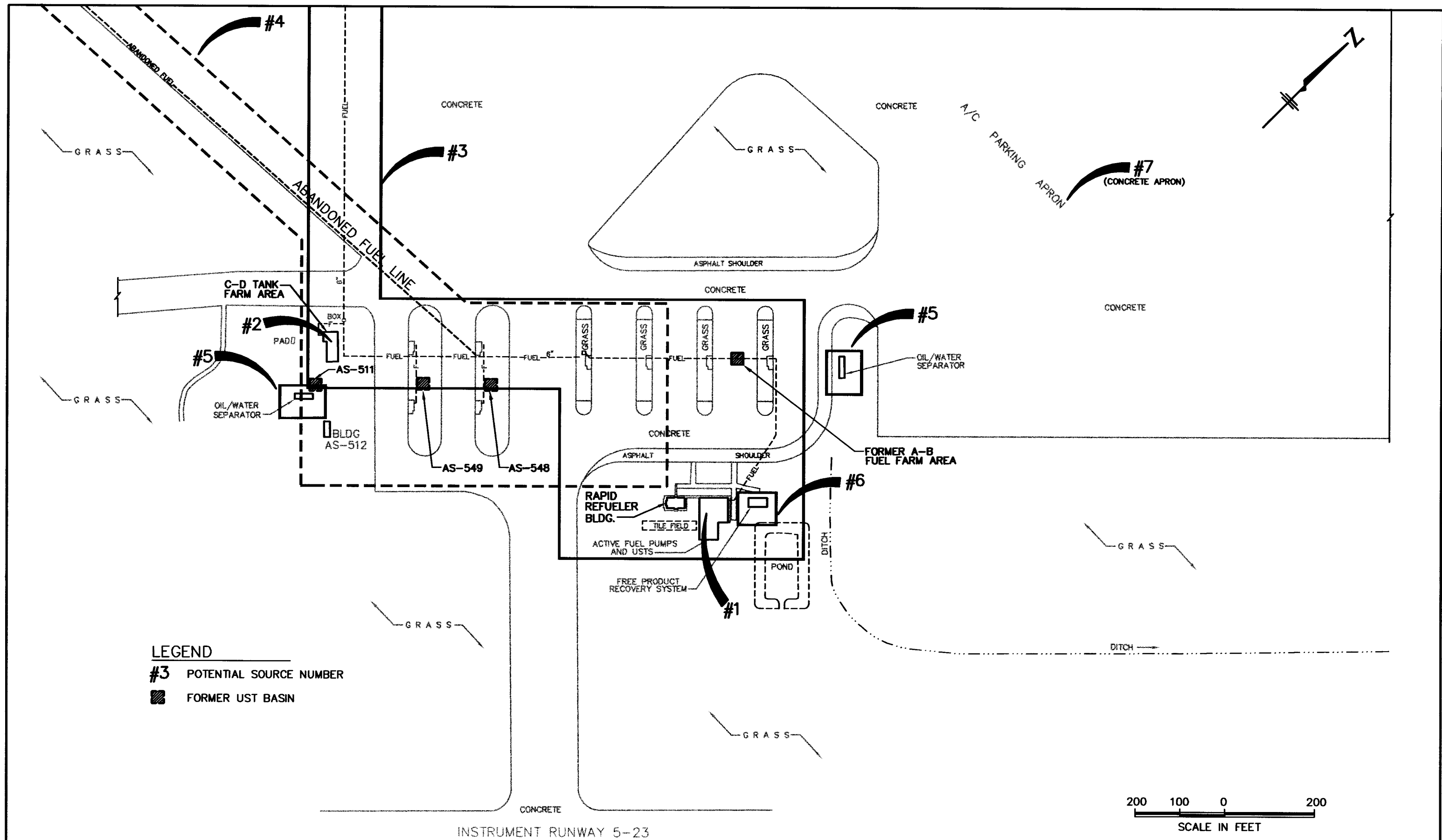
FIGURE

1

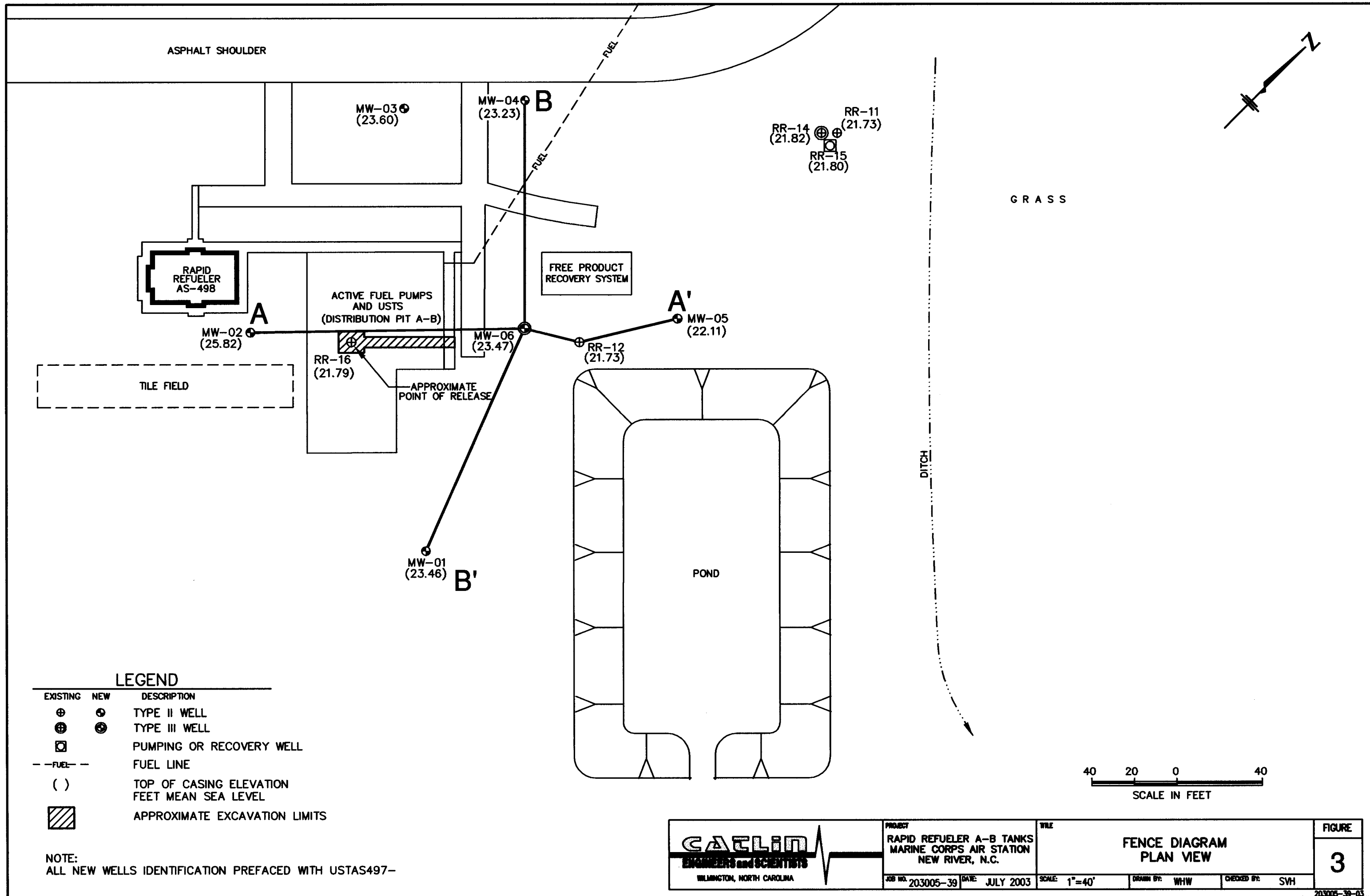
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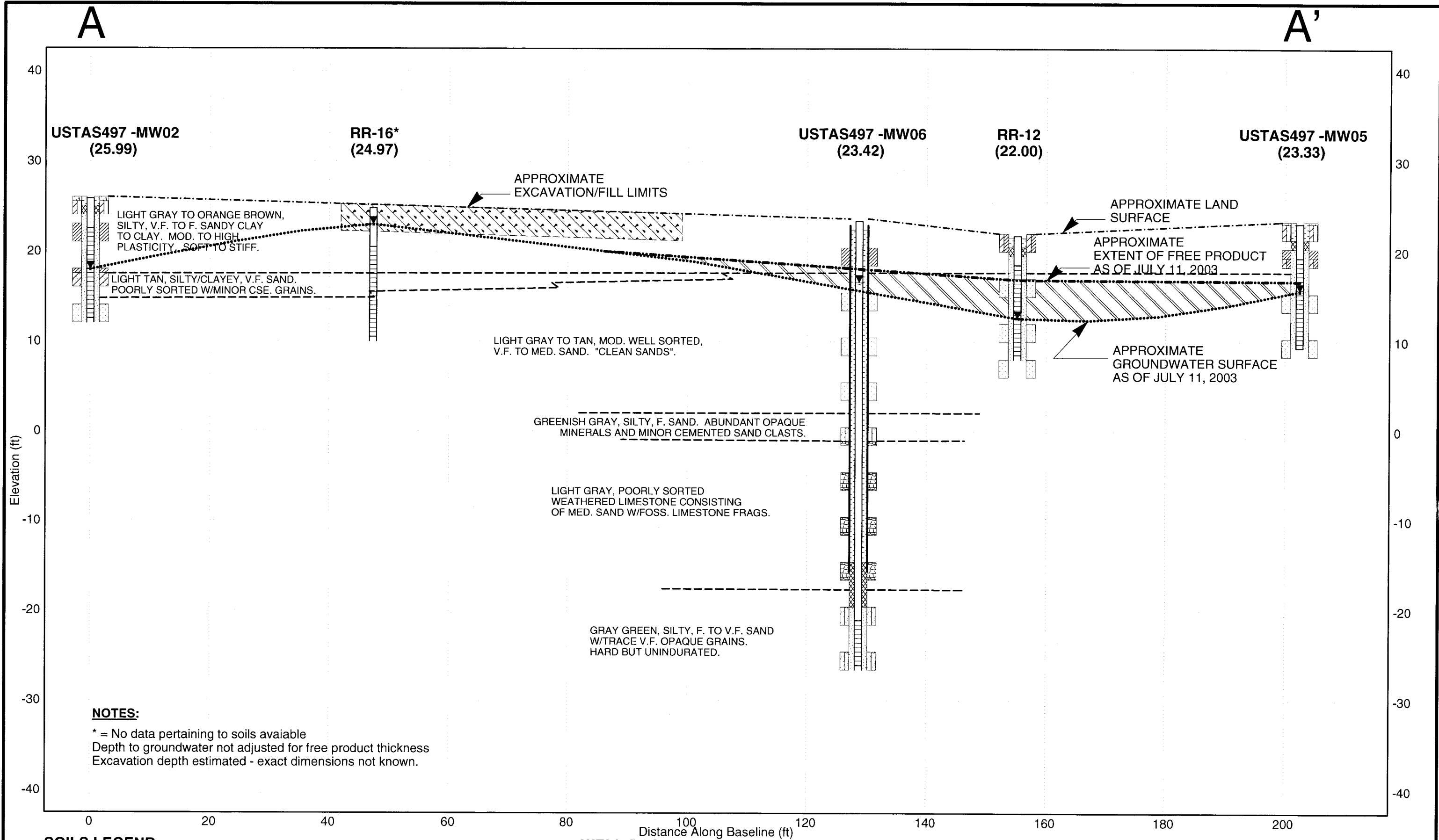






CALLIN ENGINEERS and SCIENTISTS WILMINGTON, NORTH CAROLINA	PROJECT RAPID REFUELER A-B TANKS MARINE CORPS AIR STATION NEW RIVER, N.C.		TITLE CONTAMINANT SOURCE INVENTORY		FIGURE 2B
	JOB NO. 203005-39	DATE JULY 2003	SCALE 1"=200'	DRAWN BY: WHW	CHECKED BY: SVH



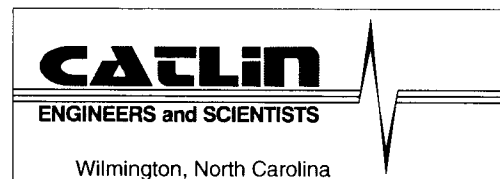


SOILS LEGEND

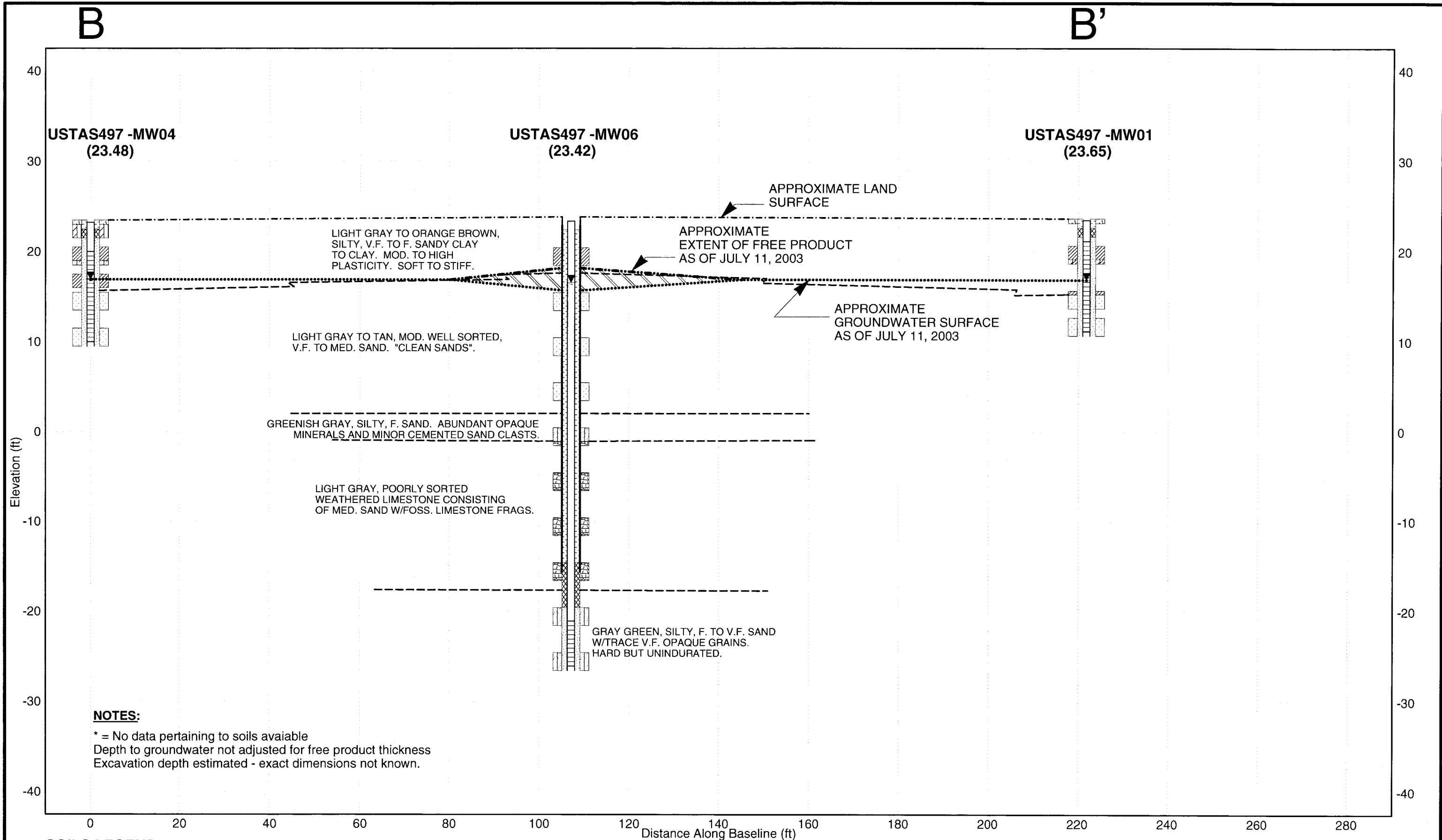
	USCS Low to High Plasticity Clay		USCS Low Plasticity Silty Clay		(CH) High Plasticity Clay to Sandy Clay
	(SP) Poorly-graded Sand		(CH) High Plasticity Clay		(SM) Silty Sand
	Topsoil		(SC) Clayey Sand		Weathered Limestone

WELL BACKFILL

	Groundwater Elevation on July 11, 2003		Portland Cement
	TOC Elevation Feet MSL		Bentonite Pellets
	#2 Medium Sand		



PROJECT RAPID REFUELER A-B TANKS MARINE CORPS AIR STATION NEW RIVER, N.C.		TITLE FENCE DIAGRAM A - A'		FIGURE 4
JOB NO. 203-005	DATE: JULY 2003	SCALE: AS SHOWN	DRAWN BY: SVH CHECKED BY: MEM	



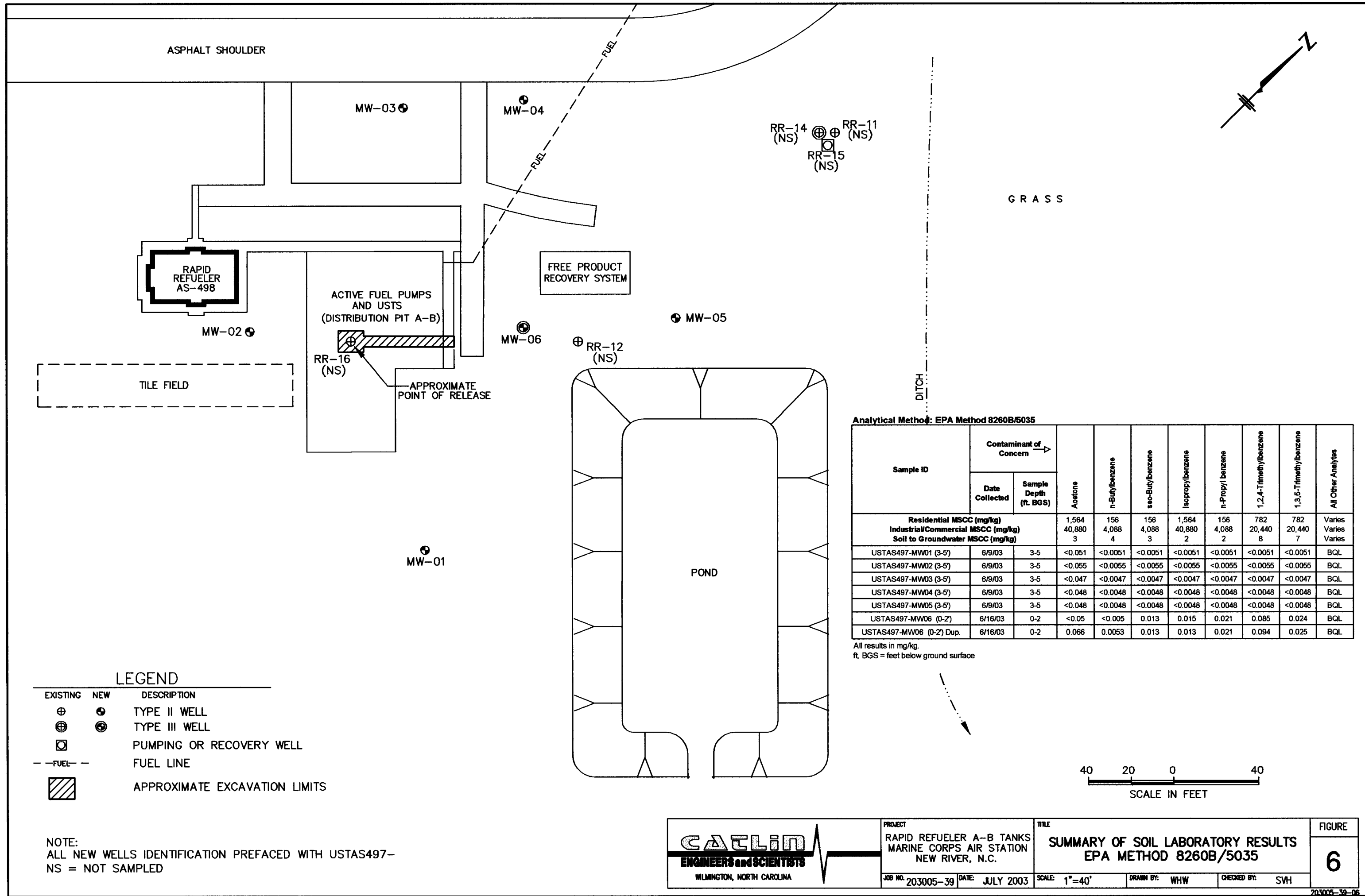
SOILS LEGEND

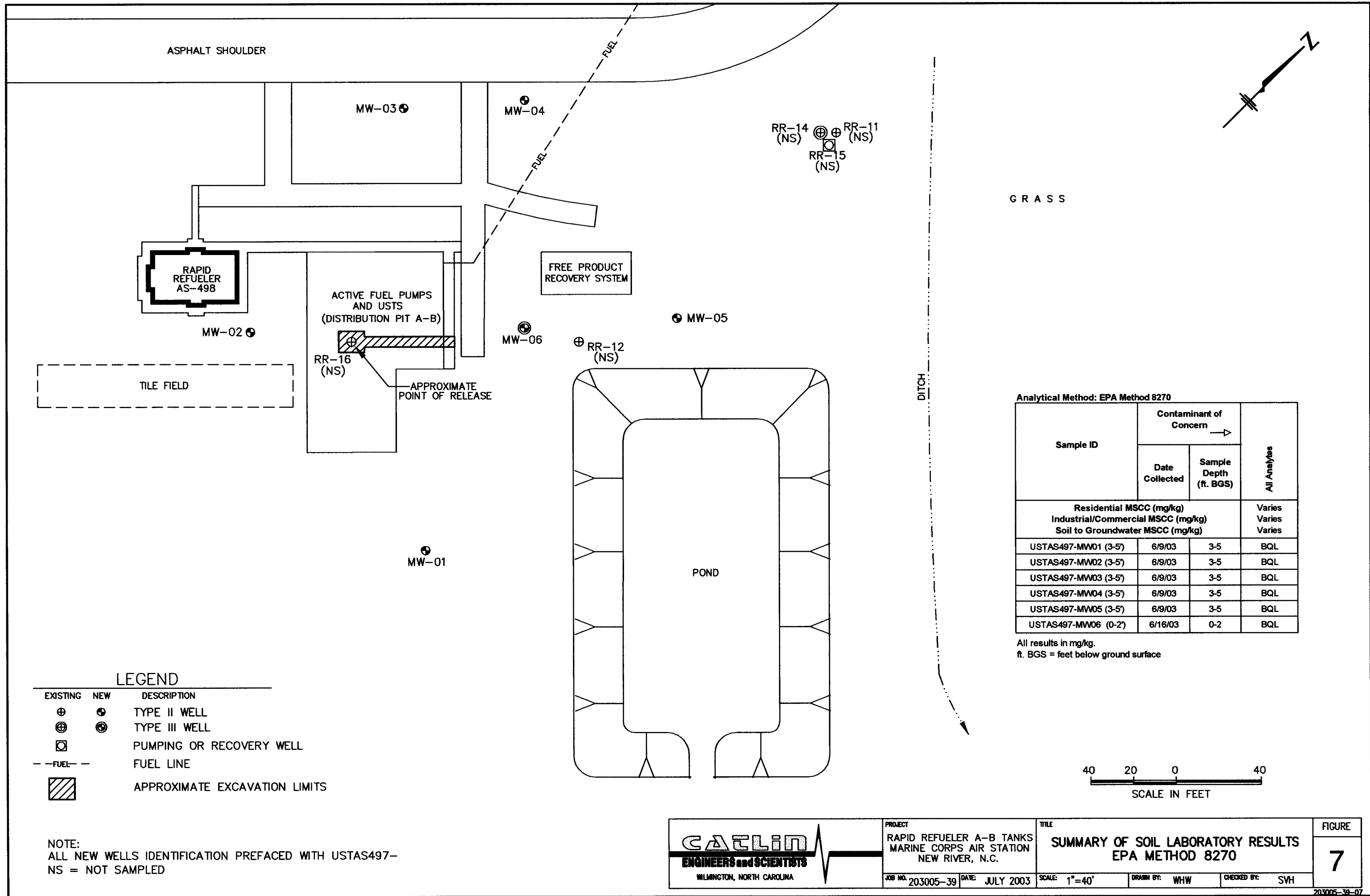
	Topsoil		(SP) Poorly-graded Sand		Weathered Limestone
	(CH) High Plasticity Clay		USCS Low Plasticity Silty Clay		
	(CH) High Plasticity Clay to Sandy Clay		(SM) Silty Sand		

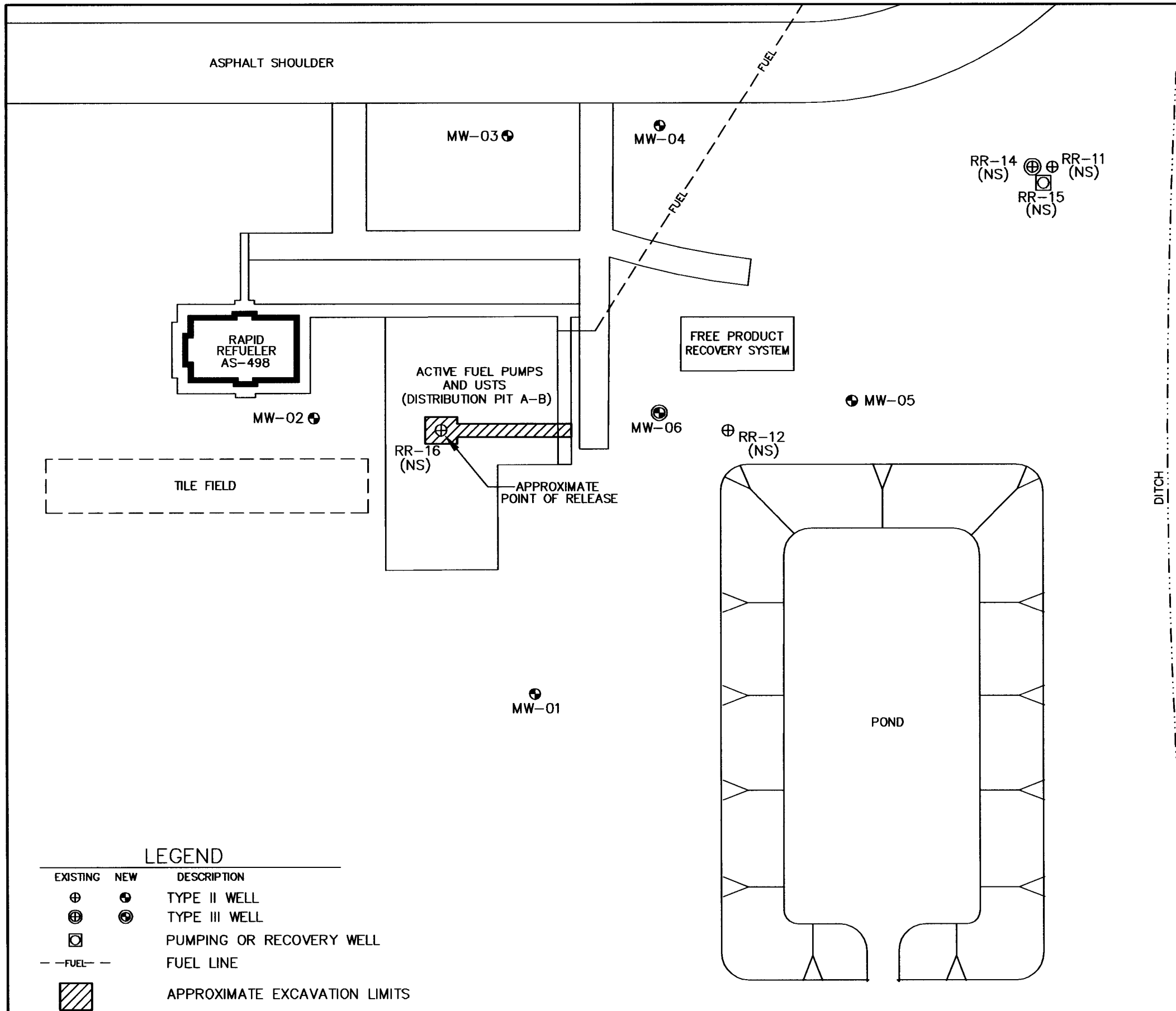
WELL BACKFILL

	Groundwater Elevation on July 11, 2003		Portland Cement
	TOC Elevation Feet MSL		Bentonite Pellets
			#2 Medium Sand

 CATLIN ENGINEERS and SCIENTISTS Wilmington, North Carolina	PROJECT RAPID REFUELER A-B TANKS MARINE CORPS AIR STATION NEW RIVER, N.C.	TITLE FENCE DIAGRAM B - B'	FIGURE 5
	JOB NO. 203-005	DATE: JULY 2003	SCALE: AS SHOWN DRAWN BY: SVH CHECKED BY: MEM







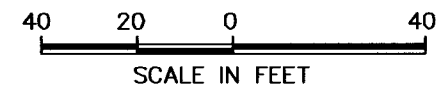
Analytical Method: MADEP EPH/VPH AS COMPARED TO NCDENR MSCCs

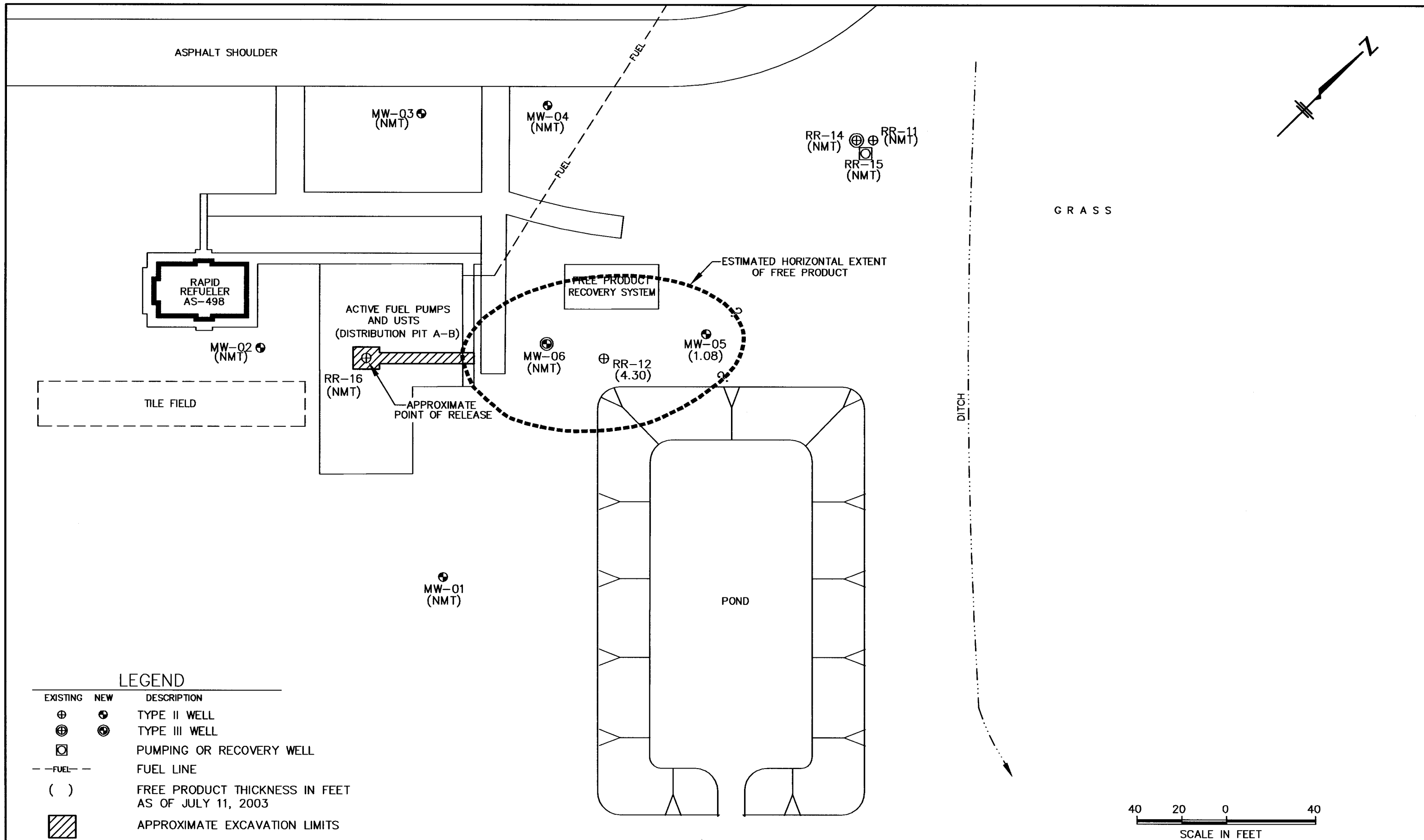
Sample ID	Contaminant of Concern →		C5-C8 Aliphatics	C9-C18 Aliphatics	C19-C36 Aliphatics	C9-C22 Aromatics
	Date Collected	Sample Depth (ft. BGS)				
Residential MSCC (mg/kg)			939	9,386	93,860	469
Industrial/Commercial MSCC (mg/kg)			24,528	245,280	#	12,264
Soil to Groundwater MSCC (mg/kg)			72	3,255	##	34
USTAS497-MW01 (3-5')	6/9/03	3-5	<10	<20	<10	<20
USTAS497-MW02 (3-5')	6/9/03	3-5	<10	<20	<10	<20
USTAS497-MW03 (3-5')	6/9/03	3-5	<10	<20	<10	<20
USTAS497-MW04 (3-5')	6/9/03	3-5	<10	<20	<10	<20
USTAS497-MW05 (3-5')	6/9/03	3-5	<10	<20	<10	<20
USTAS497-MW06 (0-2')	6/16/03	0-2	<10	<20	<10	<20

Health based level >100%

Considered immobile

All results in mg/kg.



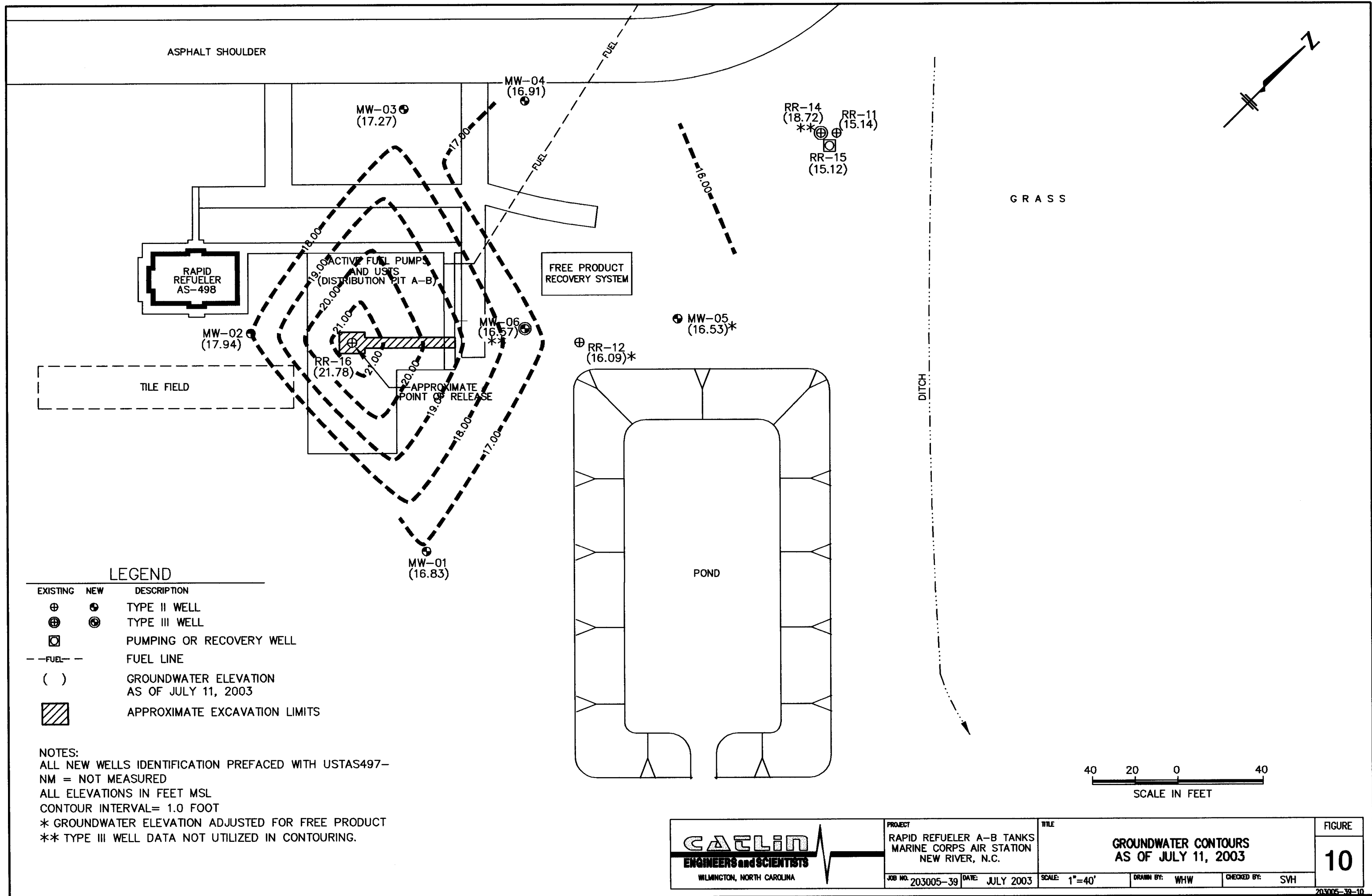


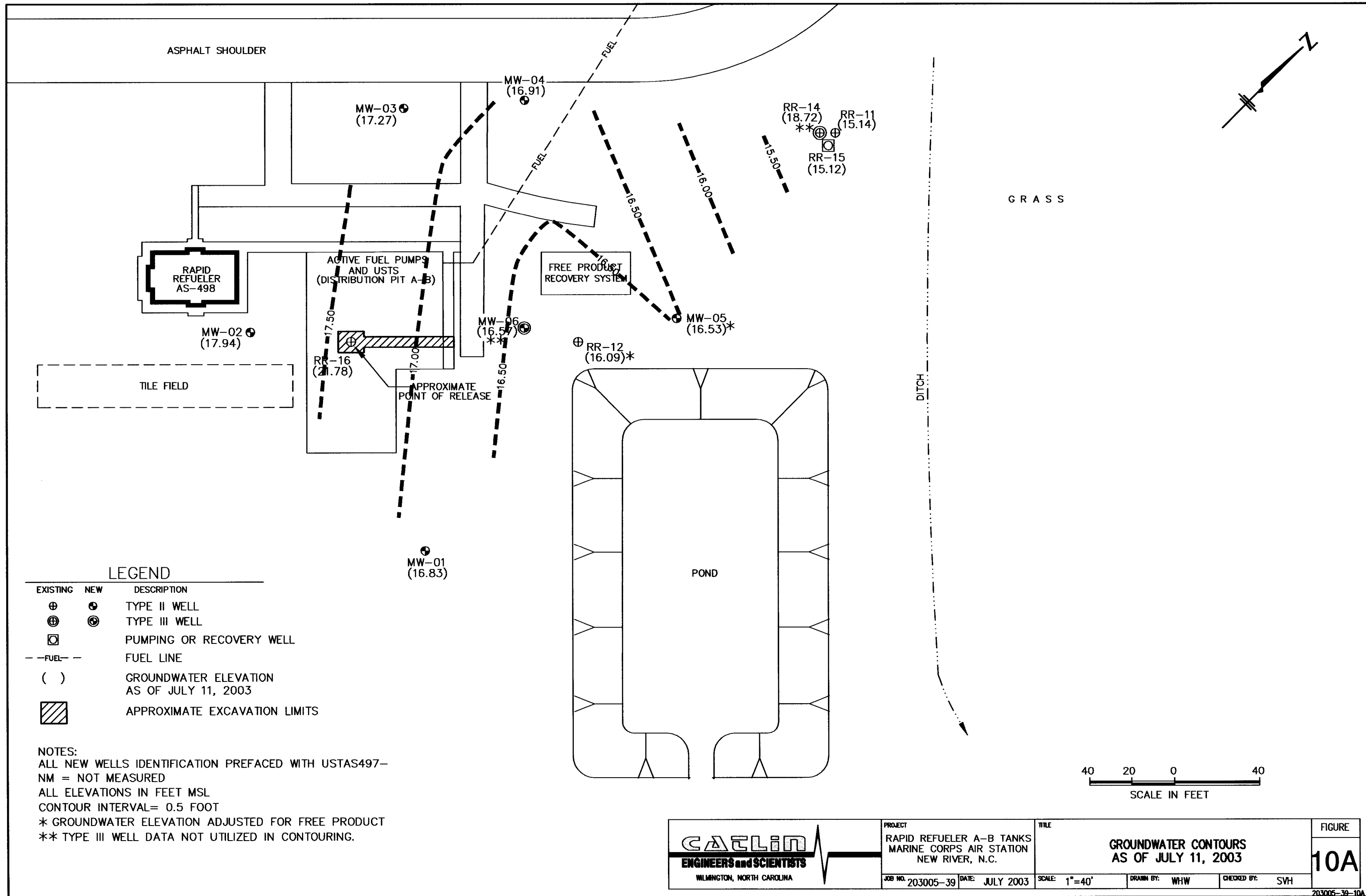
LEGEND

EXISTING	NEW	DESCRIPTION
⊕	⊙	TYPE II WELL
⊕	⊙	TYPE III WELL
⊕	⊙	PUMPING OR RECOVERY WELL
---	---	FUEL LINE
()		FREE PRODUCT THICKNESS IN FEET AS OF JULY 11, 2003
▨		APPROXIMATE EXCAVATION LIMITS

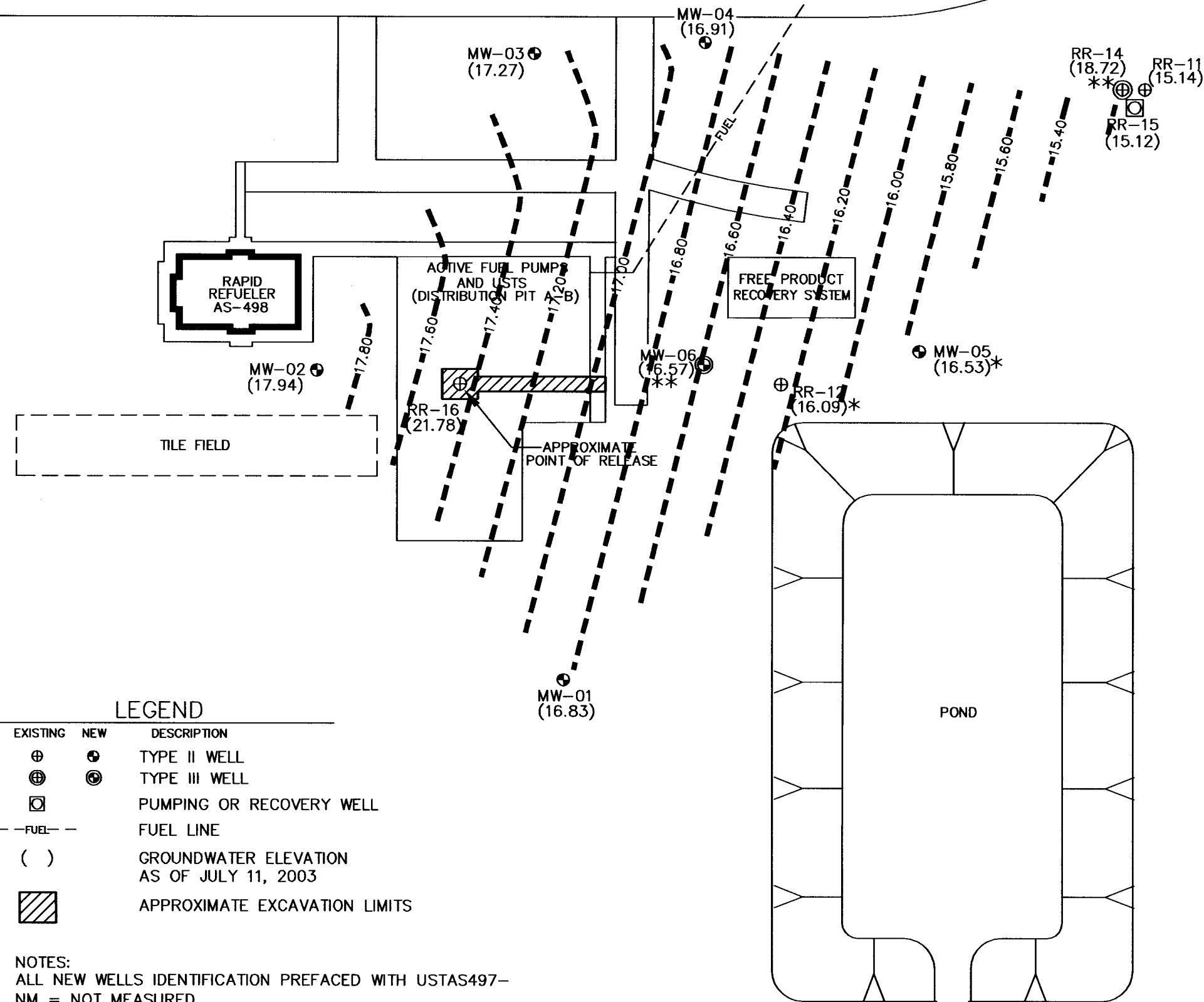
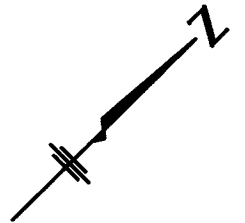
NOTE:
ALL NEW WELLS IDENTIFICATION PREFACED WITH USTAS497-
NMT = NO MEASUREABLE THICKNESS

CAELIN ENGINEERS and SCIENTISTS WILMINGTON, NORTH CAROLINA	PROJECT RAPID REFUELER A-B TANKS MARINE CORPS AIR STATION NEW RIVER, N.C.		TITLE ESTIMATED HORIZONTAL EXTENT OF FREE PRODUCT AS OF JULY 11, 2003		FIGURE 9
	JOB NO. 203005-39	DATE: JULY 2003	SCALE: 1"=40'	DRAWN BY: WHW CHECKED BY: SVH	





ASPHALT SHOULDER

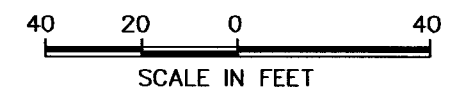


GRASS

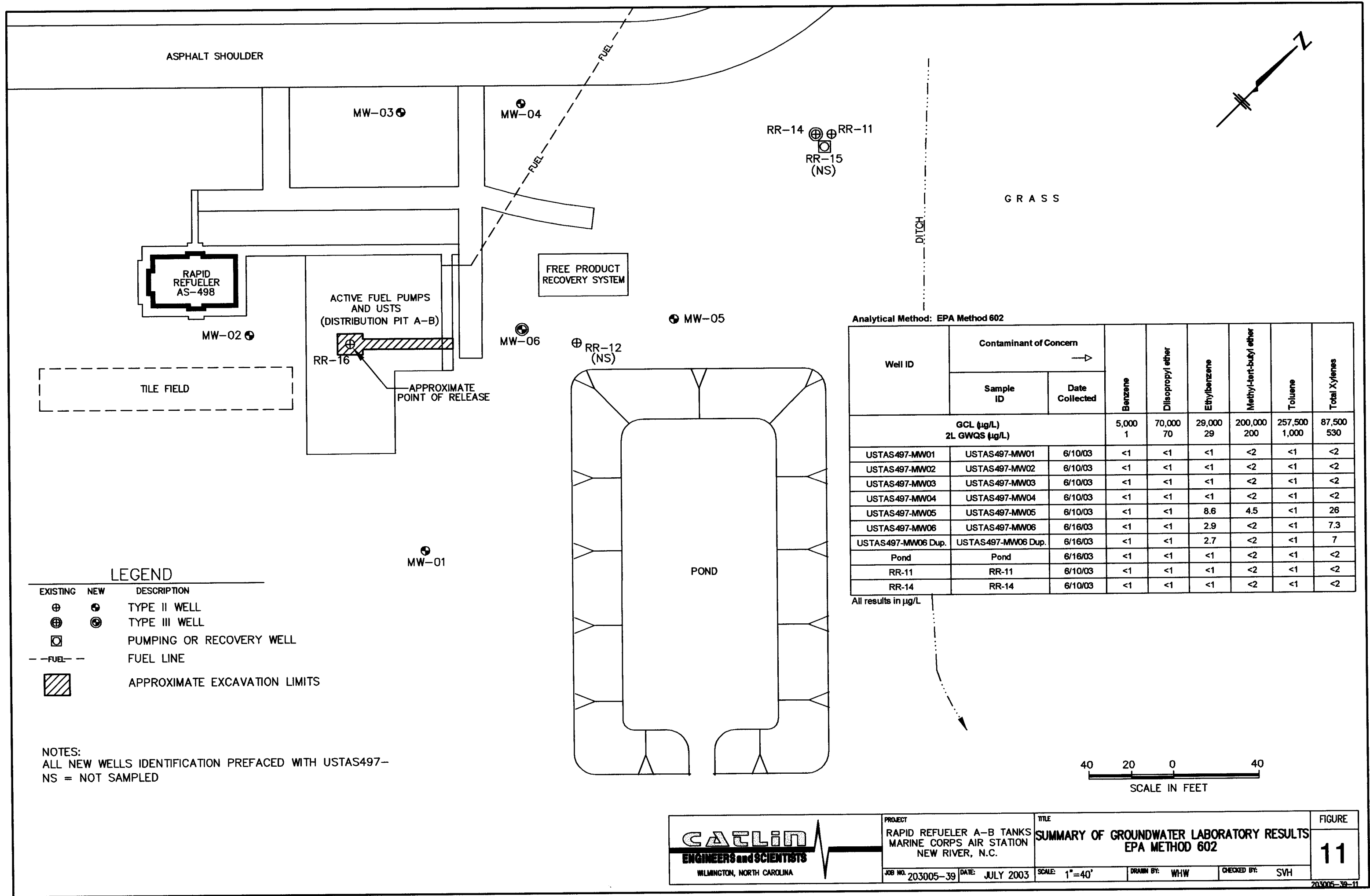
LEGEND

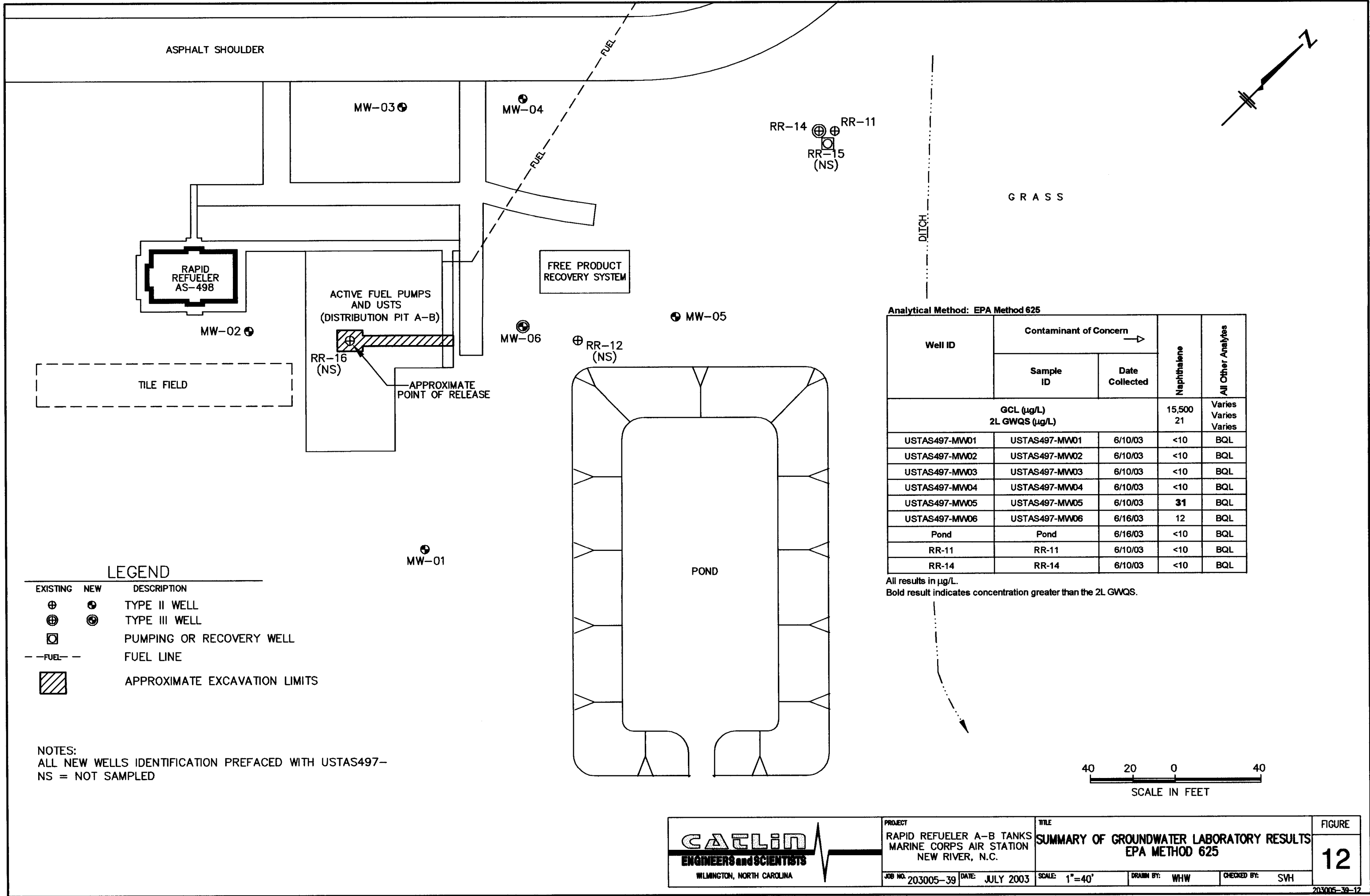
EXISTING	NEW	DESCRIPTION
⊕	⊕	TYPE II WELL
⊕	⊕	TYPE III WELL
⊕	⊕	PUMPING OR RECOVERY WELL
---	---	FUEL LINE
()		GROUNDWATER ELEVATION AS OF JULY 11, 2003
▨		APPROXIMATE EXCAVATION LIMITS

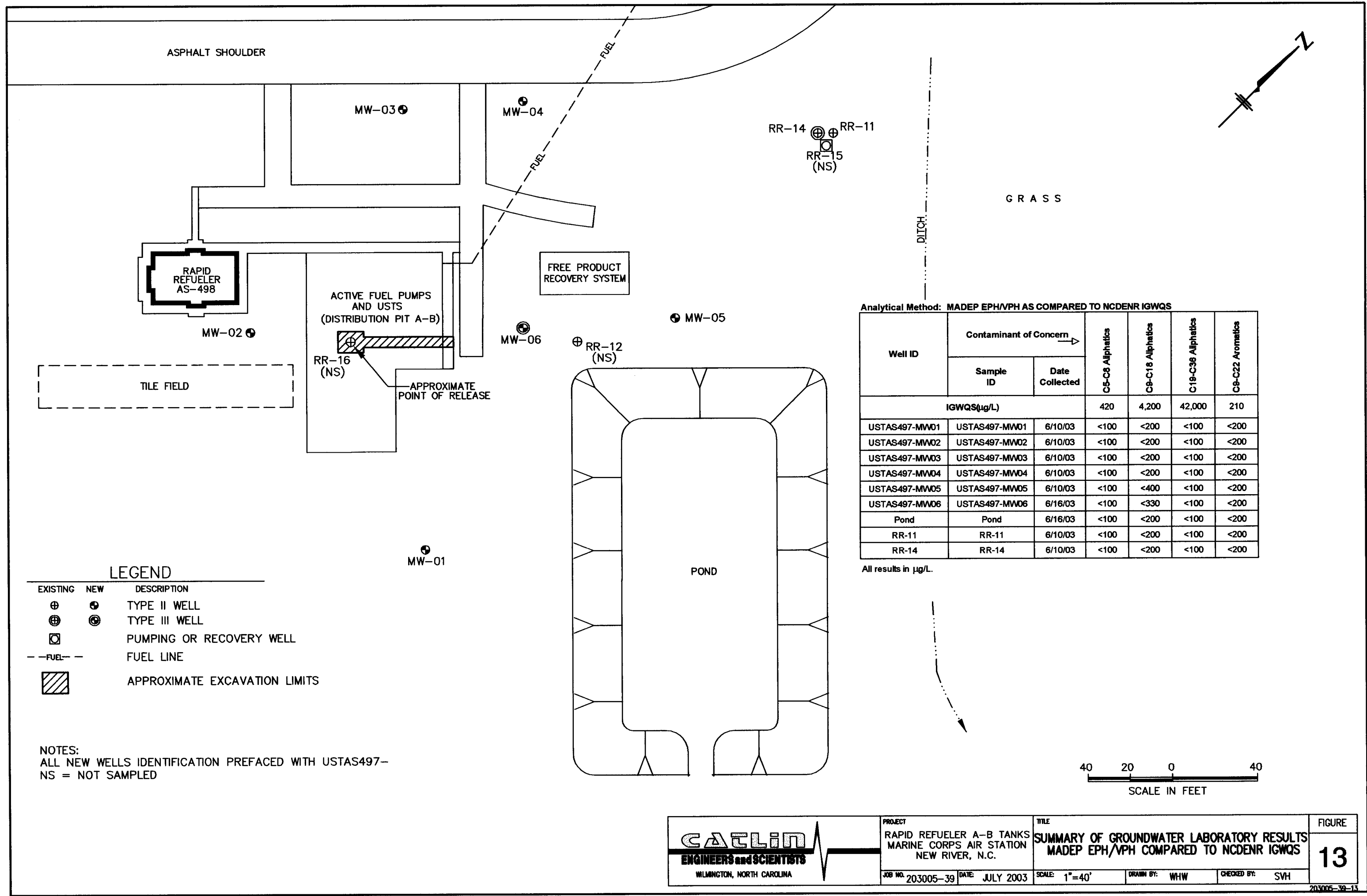
NOTES:
 ALL NEW WELLS IDENTIFICATION PREFACED WITH USTAS497-
 NM = NOT MEASURED
 ALL ELEVATIONS IN FEET MSL
 CONTOUR INTERVAL= 0.2 FOOT
 * GROUNDWATER ELEVATION ADJUSTED FOR FREE PRODUCT
 ** TYPE III WELL DATA NOT UTILIZED IN CONTOURING.



CATLIN ENGINEERS and SCIENTISTS WILMINGTON, NORTH CAROLINA	PROJECT RAPID REFUELER A-B TANKS MARINE CORPS AIR STATION NEW RIVER, N.C.	TITLE GROUNDWATER CONTOURS AS OF JULY 11, 2003	FIGURE 10B
	JOB NO. 203005-39 DATE: JULY 2003	SCALE: 1"=40' DRAWN BY: WHW CHECKED BY: SVH	203005-39-10B







APPENDIX A
LIST OF ACRONYMS

LIST OF ACRONYMS

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

Guidelines Vol. I	Groundwater Section Guidelines for Investigation and Remediation of Soil and Groundwater, Volume I, Sources Other Than Petroleum Underground Storage Tanks (May 1998)
Guidelines Vol. II	Groundwater Section Guidelines for Investigation and Remediation of Soil and Groundwater, Volume II, Petroleum Underground Storage Tanks (January 2, 1998)
HDPE	High Density Polyethylene
I/C	Industrial/Commercial
ID	Identification
I&E	Installations and Environment Department
IGWQS	Interim Groundwater Quality Standards
IPE	Isopropyl Ether
LANTDIV	Atlantic Division
LSA	Limited Site Assessment
LUST	Leaking Underground Storage Tank
m-	meta
m	meter
MADEP	Massachusetts Department of Environmental Protection
MCALF	Marine Corps Auxiliary Landing Field
MCAS	Marine Corps Air Station
MCB	Marine Corps Base
MCOLF	Marine Corps Outlying Landing Field
MEOH	Methanol
MDL	Method Detection Limit
mg/Kg	Milligrams per Kilogram
mg/L	Milligrams per Litre
MRO	Mooreville Regional Office
MSCC	Maximum Soil Contaminant Concentration
MSL	Mean Sea Level
MTBE	Methyl tertiary butyl ether
µg/Kg	Micrograms per Kilogram
µg/L	Micrograms per Litre
N/A	Not Applicable
NA	Not Analyzed
NAVFACENGCOM	Naval Facility Engineering Command
NC	North Carolina
NCAC	North Carolina Administrative Code
NCDENR	North Carolina Department of Environment and Natural Resources
NCDOC	North Carolina Department of Corrections
NCDOT	North Carolina Department of Transportation
NCSP	North Carolina State Plane
NCSPA	North Carolina State Ports Authority
NE	None Established
NM	Not Measured
NMT	No Measurable Thickness
NORR	Notice of Regulatory Requirements
NS	Not Sampled

o-	ortho
OVA	Organic Vapor Analyzer
p-	para
PAH	Polynuclear Aromatic Hydrocarbons
Pb	Lead
PPB	Parts Per Billion
PPM	Parts Per Million
PID	Photo Ionization Detector
PQL	Practical Quantitation Limit
PVC	Polyvinyl chloride
RBCA	Risk-Based Corrective Action
RCRA	Resource Conservation and Recovery Act
Res	Residential
ROI	Radius of Influence
RRO	Raleigh Regional Office
SAA	Same as Above
SOW	Scope of Work
STGW	Soil-to-Groundwater
SVE	Soil Vapor Extraction
SVOC	Semi Volatile Organic Compound
TDHF	Toxicologically Defined Hydrocarbons Fractions
TCLP	Toxicity Characteristic Leaching Procedure
TIC	Tentatively Identified Compound
TKN	Total Kjeldahl Nitrogen
TOC	Top of Casing
TPH	Total Petroleum Hydrocarbons
US	United States
USCS	Unified Soil Classification System
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
UST	Underground Storage Tank
VOC	Volatile Organic Compounds
VPH	Volatile Petroleum Hydrocarbons
WaRO	Washington Regional Office
WiRO	Wilmington Regional Office
WSRO	Winston-Salem Regional Office

APPENDIX B

RISK CHARACTERIZATION

RISK CHARACTERIZATION

Submit the following questionnaire in its entirety. Answer all questions completely. Attach additional pages as needed to fully explain answers. Base answers/explanations on information known or required to be obtained during the Limited Site Assessment.

NOTE: *Source area means point of release from a UST system.*

Limited Site Assessment Risk Classification and Land Use Form

Part I - Groundwater/Surface Water/Vapor Impacts

High Risk

1. *Has the release contaminated any water supply well including any used for non-drinking purposes?* YES NO
According to I&E/EMD/EQB, the MCB samples the raw water supply wells semi-annually and no contaminants were reported in the latest sampling event. No information provided indicates a water supply well has been contaminated as a result of the release.
2. *Is a water supply well used for drinking water located within 1,000 feet of the source area of the discharge or release?* YES NO
3. *Is a water supply well not used for drinking water (e.g., irrigation, washing cars, industrial cooling water, filling swimming pools) located within 250 feet of the source area of the release?* YES NO
4. *Does groundwater within 500 feet of the source area of the release have the potential for future use (there is no other source of water supply other than the groundwater)?* YES NO
5. *Do vapors from the release pose a threat of explosion because of accumulation of the vapors in a confined space or pose any other serious threat to public health, public safety or the environment?* YES NO
If YES describe.
6. *Are there any other factors that would cause the discharge or release to pose an imminent danger to public health, public safety, or the environment?* YES NO
If YES describe.

No evidence of accumulation has been reported in the past or identified during this investigation.

Intermediate Risk

7. *Is a surface water body located within 500 feet of the source area of the discharge or release?* YES NO
If YES, does the maximum groundwater contaminant concentration exceed the surface water quality standards and criteria found in 15A NCAC 2B.0200 by a factor of 10? YES NO
A detention pond is located approximately 120 feet east of the release area and a man-made drainage ditch is located approximately 230 feet northeast of the release area. Analytical results from a surface water sample collected from the detention pond indicated that petroleum constituents have not impacted the surface water.
8. *Is the source area of the discharge or release located within an approved or planned wellhead protection area as defined in 42 USC 300h-7(e)?* YES NO
If YES describe.
No. Wellhead protection areas defined by 42 USC 300h-7(e) have not, as of this time, been designated by the State. However, MCB Camp Lejeune has identified proposed wellhead protection areas on the base. The site is not located in a proposed wellhead protection area.
9. *Is the release located in the Coastal Plain physiographic region as designated on a map entitled "Geology of North Carolina" published by the Department in 1985?* YES NO
If YES, is the source area of the release located in an area in which there is recharge to an unconfined or semi-confined deeper aquifer that is being used or may be used as a source of drinking water? YES NO
If YES describe.
Aquifers below the surficial aquifer in the area of the site typically include the Castle Hayne Aquifer, the Beaufort Aquifer, and the Peedee Aquifer, in order of increasing depth. Both the Beaufort and Peedee Aquifers contain saltwater in portions of the MCB and are not generally used for water supply. The Castle Hayne Aquifer contains freshwater and is the principal aquifer used in the area for water supply.
- While there is likely recharge to the unconfined surficial aquifer at the MCAS, this aquifer is not used for water supply. Deeper aquifers may obtain a portion of recharge from the surficial aquifer at the air station; however, the amount of recharge provided by the surficial aquifer is expected to be substantially limited due to the presence of confining units.
10. *Do the levels of groundwater contamination for any contaminant exceed the gross contamination levels established by the Department?* YES NO

Part II - Land Use

Property Containing Source Area of Release

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

1. *Does the property contain one or more primary or secondary residences (permanent or temporary)?* YES **NO**
Describe.
The property is an active aircraft refueling facility.
2. *Does the property contain a school, daycare center, hospital, playground, park, recreation area, church, nursing home, or other place of public assembly?* YES **NO**
Describe.
The property is an active aircraft refueling facility.
3. *Does the property contain a commercial (e.g., retail, warehouse, office/business space, etc.) or industrial (e.g., manufacturing, utilities, industrial research and development, chemical/petroleum bulk storage, etc.) enterprise, an inactive commercial or industrial enterprise, or is the land undeveloped?* **YES** NO
Describe.
The property is an active aircraft refueling facility.
4. *Do children visit the property?* YES **NO**
Explain.
The subject site is a secured area and no children access the site.
Is access to the property reliably restricted consistent with its use (e.g., by fences, security personnel or both)? **YES** NO
Explain.
The subject site is consistently restricted utilizing both security personnel and fencing.
5. *Do pavement, buildings, or other structures cap the contaminated soil?* **YES** NO
Describe.
No soil contamination was confirmed during this investigation. However, the area of release and potential soil impact are located beneath a concrete distribution pit.
If YES, what mechanisms are in place or can be put into place to ensure that the contaminated soil will remain capped in the foreseeable future?
No change in the site layout is foreseen in the near future.
6. *What is the zoning status of the property?*
The MCAS, New River is not subject to local or county zoning requirements.
7. *Is the use of the property likely to change in the next 20 years?* YES **NO**
Explain.
No. The designated use of the facility on the MCAS is not likely to change in the foreseeable future.

Property Surrounding Source Area of Release

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

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

Housing barracks for military personnel are located approximately 4,000 feet west-northwest of the release. These barracks would be considered a semi-permanent residence

2. *What is the distance from the source area of the release to the **nearest** school, daycare center, hospital, playground, park, recreation area, church, nursing home or other place of public assembly?*

Athletic courts are located approximately 4,000 feet west-northwest from the source area

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

The MCAS, New River is not subject to local or county zoning requirements.

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

The surrounding area is an active Marine Corps Air Station consisting of aircraft, infrastructure, and housing necessary to operate the facility. The MCAS is bordered on the east by the New River. Much of the surrounding property is largely undeveloped.

APPENDIX C
BORING LOGS

WELL LOG

CATLIN
ENGINEERS and SCIENTISTS
Wilmington, North Carolina

SHEET 1 OF 1

PROJECT NO.: 203-005 STATE: NC COUNTY: Onslow LOCATION: New River Air Station
PROJECT NAME: Rapid Refueler A-B LOGGED BY: Tom Stetler WELL ID: USTAS497-MW01
DRILLER: Bobbie Fowler
NORTHING: 3,843,783.0 EASTING: 276,280.3 CREW: Bill Miller
SYSTEM: UTM NAD83 (m) BORING LOCATION: In field behind building T.O.C. ELEV.: 23.46
DRILL MACHINE: Diedrich D-25 METHOD: HSA 0 HOUR DTW: 4.90 BORING DEPTH: 13.0
START DATE: 06/09/03 FINISH DATE: 06/09/03 24 HOUR DTW: 5.06 WELL DEPTH: 13.0

DEPTH	BLOW COUNT				OVA (ppm)	LAB.	U S C S	L O G	SOIL AND ROCK DESCRIPTION	ELEVATION	WELL DETAIL
6in	6in	6in	6in								
									0.0 LAND SURFACE	23.7	0.0
									0.5 Dark brown TOPSOIL. Grass, roots.	23.2	-0.2
											1.0
											2.0
3.0									3.0	20.7	2.5
	1	2	2	3	310	UST AS497-MW01 (3-5')	CH		Light gray to orange-tan, mottled CLAY. Moist. Soft to moderately stiff. No HCO.	19.2	
5.0							SC/CH		4.5 Light gray to tan, vf. sandy CLAY. Similar to above, but high sand content. Moist. No HCO.	18.7	
8.0							CH		8.0 S. A. A. CLAY. Top .4' of spoon. Relatively sharp contact with below.	15.7	
	1	2	3	2	120		SP		8.4 Light gray f. to vf. SAND. Minor vf. opaque mineral grains and greenish-gray clay-rich lenses (up to 1 cm in length). Saturated. No HCO.	15.3	
10.0									10.0	13.7	
11.0									11.0	12.7	
	4	6	5	7	7.2		SP		S. A. A. Light gray f. to vf. SAND. Minor opaque grains, greenish-gray clay-rich lenses. Saturated. No HCO.	12.5	
13.0									13.0	10.7	13.0
									Boring Terminated at Elevation 10.7 ft		

CATLIN BORING LOG 203-005 RAPIDREF-A-B.GPJ CATLIN.GDT 07/17/03

 Portland Cement
  Bentonite Pellets
  #2 Medium Sand

WELL LOG

CATLIN
ENGINEERS and SCIENTISTS

Wilmington, North Carolina

SHEET 1 OF 1

PROJECT NO.: 203-005 STATE: NC COUNTY: Onslow LOCATION: New River Air Station
PROJECT NAME: Rapid Refueler A-B LOGGED BY: Tom Stetler WELL ID: USTAS497-MW02
DRILLER: Bobbie Fowler
NORTHING: 3,843,789.1 EASTING: 276,239.4 CREW: Bill Miller
SYSTEM: UTM NAD83 (m) BORING LOCATION: Behind building in grass T.O.C. ELEV.: 25.82
DRILL MACHINE: Diedrich D-25 METHOD: HSA 0 HOUR DTW: 5.26 BORING DEPTH: 14.0
START DATE: 06/09/03 FINISH DATE: 06/09/03 24 HOUR DTW: 6.21 WELL DEPTH: 14.0

DEPTH	BLOW COUNT				OVA (ppm)	LAB.	USCS	LOG	DEPTH	SOIL AND ROCK DESCRIPTION	ELEVATION	WELL DETAIL
6in	6in	6in	6in									
									0.0	LAND SURFACE	26.0	0.0
0.0									0.5	TOPSOIL. Dark brown, poorly sorted f. sandy to silty CLAY. Brick fragments.	25.5	-0.2
	G	R	A	B	4.7		CL/ML		2.0	Dark brown to reddish brown, vf. sandy to silty CLAY. Moist. No HCO (sample taken from auger cuttings).	24.0	1.0
2.0									3.0		23.0	2.0
3.0	3	3	6	5	5.2	UST AS497-MW02 (3-5')	CH		5.0	Dark brown @ top of spoon, grades into light gray to orange, mottled CLAY to silty CLAY. Stiff. Moderate plasticity. Moist. No HCO.	21.0	3.5
5.0									8.0		18.0	
8.0	1	3	4	7	5.4		CH		8.5	Top of spoon S. A. A. Light gray to orange, mottled, silty CLAY.	17.5	
							SC		10.0	Bottom of spoon. Light tan, silty to clayey, vf. SAND. Saturated. Minor pebble sized grains (~3 mm in diameter, rounded quartz pea-gravel to coarse sand-sized grains). Poorly sorted. No HCO.	16.0	
10.0									12.0		14.0	
12.0	4	9	11	12	11		SP		14.0	Light gray f. to vf. SAND. Relatively clean. Well sorted. Minor greenish-gray, clay-rich lenses. Saturated. No HCO.	12.0	13.5
14.0										Boring Terminated at Elevation 12.0 ft		14.0

CATLIN BORING LOG 203-005 RAPIDREF-AB.GPJ CATLIN.GDT 07/17/03

Portland Cement Bentonite Pellets #2 Medium Sand

WELL LOG

CATLIN
ENGINEERS and SCIENTISTS
Wilmington, North Carolina

SHEET 1 OF 1

PROJECT NO.: 203-005	STATE: NC	COUNTY: Onslow	LOCATION: New River Air Station
PROJECT NAME: Rapid Refueler A-B		LOGGED BY: Tom Stetler	WELL ID: USTAS497-MW03
		DRILLER: Bobbie Fowler	
NORTHING: 3,843,828.8	EASTING: 276,233.6	CREW: Bill Miller	
SYSTEM: UTM NAD83 (m)	BORING LOCATION: Front of building		T.O.C. ELEV.: 23.60
DRILL MACHINE: Diedrich D-25	METHOD: HSA	0 HOUR DTW: 4.48	BORING DEPTH: 13.0
START DATE: 06/09/03	FINISH DATE: 06/09/03	24 HOUR DTW: 5.18	WELL DEPTH: 13.0

DEPTH	BLOW COUNT				OVA (ppm)	LAB.	USCS	LOG	SOIL AND ROCK DESCRIPTION		ELEVATION	WELL DETAIL
	6in	6in	6in	6in					DEPTH			
									0.0	LAND SURFACE	23.8	0.0
0.0									0.6	TOPSOIL	23.2	-0.2
	G	R	A	B			CL/ML		2.0	Dark brown, silty to vf. sandy CLAY. Minor, thin (~3 mm) vf. sandy layering. Relatively soft. Moist. No HCO (from auger cuttings).	21.8	0.5
2.0									3.0		20.8	1.5
3.0									5.0		18.8	2.5
	2	3	3	4	2.0	UST AS497-MW03 (3-5')	SC/SM		8.0	Dark gray, silty to clayey, f. to vf. SAND. Minor interlayered sandy CLAY layering up to 2" in thickness. Moist. No HCO.	15.8	
5.0									10.0		13.8	
	2	9	10	12	8.4		SP		11.0	Light gray to tan, f. to vf. SAND. Well sorted. Saturated. No HCO.	12.8	
8.0									13.0		10.8	
10.0												
11.0												
	6	9	10	11	7.1		SP			S. A. A. Light gray to tan f. to vf. SAND. Well sorted. Saturated. No HCO.		
13.0												
										Boring Terminated at Elevation 10.8 ft		

CATLIN BORING LOG 203-005 RAPIDREF-A-B GRJ CATLIN.GDT 07/17/03

 Portland Cement
  Bentonite Pellets
  #2 Medium Sand

WELL LOG

CATLIN
ENGINEERS and SCIENTISTS
Wilmington, North Carolina

SHEET 1 OF 1

PROJECT NO.: 203-005 STATE: NC COUNTY: Onslow LOCATION: New River Air Station
PROJECT NAME: Rapid Refueler A-B LOGGED BY: Tom Stetler WELL ID: USTAS497-MW04
DRILLER: Bobbie Fowler
NORTHING: 3,843,841.8 EASTING: 276,245.8 CREW: Bill Miller
SYSTEM: UTM NAD83 (m) BORING LOCATION: Next to tarmac T.O.C. ELEV.: 23.23
DRILL MACHINE: Diedrich D-25 METHOD: HSA 0 HOUR DTW: 4.79 BORING DEPTH: 14.0
START DATE: 06/09/03 FINISH DATE: 06/09/03 24 HOUR DTW: 5.56 WELL DEPTH: 14.0

DEPTH	BLOW COUNT				OVA (ppm)	LAB.	USCS	LOG	SOIL AND ROCK		WELL DETAIL
	6in	6in	6in	6in					DEPTH	DESCRIPTION	ELEVATION
									0.0	LAND SURFACE	23.5
									0.5	TOPSOIL	23.0
							CL/ML		2.0	Brown to dark brown, silty CLAY. Moderately well sorted. Moist. No HCO (from auger cuttings)	21.5
3.0									3.0		20.5
	3	5	6	5	650	UST AS497-MW04 (3-5')	CH		4.5	Top of spoon. Gray, CLAY to silty CLAY. Minor component of silt to vf. sand. Stiff. Moist. No HCO.	19.0
5.0							SM		5.0	Bottom of spoon. Brownish gray, silty, f. to vf. SAND. Moist. No HCO.	18.5
									6.0		17.5
							CH		7.5	Gray, CLAY to silty CLAY (from auger cuttings)	16.0
8.0									8.0		15.5
	2	5	6	7	160		SP		10.0	Gray, silty, f. to vf. SAND. Saturated. No HCO. Minor light greenish gray clay-rich lenses (~2 to 3 mm in thickness).	13.5
10.0									12.0		11.5
12.0	6	10	12	13	12.4		SP		14.0	S. A. A. Gray, silty, f. to vf. SAND. Saturated. No HCO.	9.5
14.0										Boring Terminated at Elevation 9.5 ft	

 Portland Cement
  Bentonite Pellets
  #2 Medium Sand

CATLIN BORING LOG 203-005 RAPIDREFUELER A-B CATLIN.GDT 07/17/03

WELL LOG

CATLIN
ENGINEERS and SCIENTISTS
Wilmington, North Carolina

SHEET 1 OF 1

PROJECT NO.: 203-005	STATE: NC	COUNTY: Onslow	LOCATION: New River Air Station
PROJECT NAME: Rapid Refueler A-B		LOGGED BY: Tom Stetler	WELL ID: USTAS497-MW05
NORTHING: 3,843,833.4		EASTING: 276,284.3	CREW: Bill Miller
SYSTEM: UTM NAD83 (m)	BORING LOCATION: Next to pond		T.O.C. ELEV.: 23.11
DRILL MACHINE: Diedrich D-25	METHOD: HSA	0 HOUR DTW: 5.45	BORING DEPTH: 15.0
START DATE: 06/09/03	FINISH DATE: 06/09/03	24 HOUR DTW: 5.61	WELL DEPTH: 14.0

DEPTH	BLOW COUNT				OVA (ppm)	LAB.	USCS	LOG	SOIL AND ROCK DESCRIPTION	ELEVATION	WELL DETAIL
	6in	6in	6in	6in							
									0.0 LAND SURFACE	23.3	0.0
0.0									0.2 TOPSOIL, roots, grass.	23.1	-0.2
	G	R	A	B	18		CL/ML		Brown, silty CLAY. Minor sand component. Dry. No HCO. Very difficult drilling (sample from auger cuttings).		
2.0									2.0	21.3	2.0
3.0									3.0	20.3	3.0
	5	7	6	3	0	UST AS497-MW05 (3-5')	CH		Top of spoon. Light gray to dark gray, mottled clay. Stiff. Dry. No HCO.	19.3	4.0
5.0							SC/CH		Bottom of spoon. Brownish gray, clayey, poorly sorted, c. to vf. SAND. More friable than clay above. Moist. Slight HCO?	18.3	
8.0									8.0	15.3	
	10	12	16	16	26		SP		Tan to gray, thinly layered vf. SAND. Saturated. Slight HCO. Layering up to .25" in thickness. Isolated 2" thick layer of brownish-tan, clayey vf. SAND.		
10.0									10.0	13.3	
13.0									13.0	10.3	
	6	12	18	12	20		SP		S. A. A. Relatively clean, gray to tan, vf. SAND. Saturated. Slight HCO. Helper changed from 2 wraps to 1 between 3rd and 4th blow count.		14.0
15.0									15.0	8.3	14.0
									Boring Terminated at Elevation 8.3 ft		

CATLIN BORING LOG 203-005 RAPIDREFUELER AB GRJ CATLIN.GDT 07/17/03

Portland Cement
 Bentonite Pellets
 #2 Medium Sand

WELL LOG

CATLIN
ENGINEERS and SCIENTISTS

Wilmington, North Carolina

SHEET 1 OF 2

PROJECT NO.: 203-005 STATE: NC COUNTY: Onslow LOCATION: New River Air Station
PROJECT NAME: Rapid Refueler A-B LOGGED BY: Tom Stetler WELL ID: USTAS497
DRILLER: Bobbie Fowler -MW06
NORTHING: 3,843,817.1 EASTING: 276,268.7 CREW: Bill Miller
SYSTEM: UTM NAD83 (m) BORING LOCATION: Next to release T.O.C. ELEV.: 23.37
DRILL MACHINE: Diedrich D-50 METHOD: HSA/MR 0 HOUR DTW: NM BORING DEPTH: 50.0
START DATE: 06/05/03 FINISH DATE: 06/13/03 24 HOUR DTW: 5.87 WELL DEPTH: 50.0

DEPTH	BLOW COUNT				OVA (ppm)	LAB.	U S C S	L O G	SOIL AND ROCK		WELL DETAIL
	6in	6in	6in	6in					DEPTH	DESCRIPTION	ELEVATION
									0.0	LAND SURFACE	23.4
0.0	G	R	A	B		UST AS497- MW06 (0-2')					-0.1
2.0											
3.0									3.0		20.4
4.0	W	O	H				CH			Gray, SILTY, v.f. to f. SANDY CLAY w/high plasticity. Sat. HCO.	
5.0									5.0		18.4
8.0									8.0		15.4
9.0	5	9	11	14			SP			Gray black to brown, well sorted, v.f. to f. SAND. Sat. High HCO.	
10.0									10.0		13.4
13.0									13.0		10.4
14.0	5	8	12	16	240		SP			Light gray, f. to v.f. SAND w/trace opaque fines. Sat. Very strong HCO.	
15.0									15.0		8.4
18.0									18.0		5.4
19.0	8	10	14	15	15		SP			S.A.A. w/greenish-gray lenses. Strong HCO.	
20.0									20.0		3.4
23.0									23.0		0.4
24.0	2	1	2	17	19		SM			Greenish gray, SILTY, f. SAND. Mod. sorted and soft. Abundant opaque minerals and minor cemented sand clasts.	-1.1
25.0							GW		24.5	Sharp contact. Light gray, poorly sorted, limey med. SAND and weathered FOSS. LS. frags. Sat. Strong HCO.	-1.6

2" Sch. 40 PVC

6" Sch. 40 PVC

 Portland Cement
  Bentonite Pellets
  #2 Medium Sand

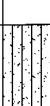
CATLIN BORING LOG-203-005 RAPIDREF-A-B.GPJ CATLIN.GDT 07/17/03

WELL LOG

CATLIN
ENGINEERS and SCIENTISTS
Wilmington, North Carolina

SHEET 2 OF 2

PROJECT NO.: 203-005	STATE: NC	COUNTY: Onslow	LOCATION: New River Air Station
PROJECT NAME: Rapid Refueler A-B		LOGGED BY: Tom Stetler	WELL ID: USTAS497-MW06
		DRILLER: Bobbie Fowler	
NORTHING: 3,843,817.1	EASTING: 276,268.7	CREW: Bill Miller	
SYSTEM: UTM NAD83 (m)		BORING LOCATION: Next to release	T.O.C. ELEV.: 23.37
DRILL MACHINE: Diedrich D-50	METHOD: HSA/MR	0 HOUR DTW: NM	BORING DEPTH: 50.0
START DATE: 06/05/03	FINISH DATE: 06/13/03	24 HOUR DTW: 5.87	WELL DEPTH: 50.0

DEPTH	BLOW COUNT				OVA (ppm)	LAB.	USCS	LOG	SOIL AND ROCK		WELL DETAIL
	6in	6in	6in	6in					DEPTH	DESCRIPTION	ELEVATION
28.0									28.0		-4.6
	2	8	13	12	7.4		GW		30.0	Light gray, poorly sorted, limey med. SAND and weathered FOSS. LS. frags. Sat. Strong HCO.	-6.6
30.0											
									33.0		-9.6
33.0	5	6	7	10	3.8		GW		35.0	S.A.A. Sat. Slight HCO.	-11.6
35.0											
									38.0		-14.6
38.0	8	10	12	17	4.2		GW		40.0	S.A.A. Slight HCO.	-16.6
40.0											
									43.0		-19.6
43.0	8	10	15	17	0		SM		45.0	Gray green, SILTY, f. to v.f. SAND w/trace v.f. opaque grains. Sat. No HCO.	-21.6
45.0											
									48.0		-24.6
48.0	7	9	15	27	0		SM		50.0	S.A.A. Mod. hard but not cemented. Sat. No HCO.	-26.6
50.0										Boring Terminated at Elevation -26.6 ft	

 Portland Cement  Bentonite Pellets  #2 Medium Sand

CATLIN BORING LOG 203-005 RAPIDREF-A-B GEL CATLIN GDT 07/17/03

APPENDIX D

NORTH CAROLINA WELL CONSTRUCTION RECORDS

WELL CONSTRUCTION RECORD

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

WELL CONTRACTOR (INDIVIDUAL) NAME (print) Bobbie Fowler CERTIFICATION # 2869
WELL CONTRACTOR COMPANY NAME CATLIN Engineers & Scientists PHONE # (910) 452-5861
STATE WELL CONSTRUCTION PERMIT # _____ ASSOCIATED WO PERMIT # N/A
(if applicable) (if applicable)

USTAS497 -MW01

1. WELL USE (Check Applicable Box): Residential ☐ Municipal/Public ☐ Industrial ☐ Agricultural ☐
Monitoring ☒ Recovery ☐ Heat Pump Water Injection ☐ Other ☐ If Other, List Use _____

2. WELL LOCATION: (Show sketch of the location below)

Nearest Town: New River Air Station County: Onslow

Marine Corps Air Station, New River

(Road Name and Numbers, Community, Subdivision, Lot No., Zip Code)

3. OWNER: LANTDIV NAVFACENGCOM Commanding General

Address: AC/S EMD/Marine Corps Base/PSC Box 20004
(Street or Route No.)

Camp Lejeune NC 28542-0004
City or Town State Zip Code

Area code - Phone number

4. DATE DRILLED: 6/9/03

5. TOTAL DEPTH: 13

6. DOES WELL REPLACE EXISTING WELL? YES ☐ NO ☒

7. STATIC WATER LEVEL Below Top of Casing 5.06 FT.
(Use "+" if Above Top of Casing)

8. TOP OF CASING IS -0.19 FT. Above Land Surface*

* Top of casing terminated at/or below land surface requires
a variance in accordance with 15A NCAC 2C.0118

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

10. WATER ZONES (depth): Surficial Aquifer

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

13. CASING: Depth Diameter Wall Thickness or Weight/Ft. Material
From 0.19 To 2.5 ft. 2 in. Sch. 40 PVC
From _____ To _____ ft. _____ in. _____
From _____ To _____ ft. _____ in. _____

14. GROUT: Depth Material Method
From 0 To 1 ft. Portland Cement Surface Pour
From 1 To 2 ft. Bent. Pellets Surface Pour

15. SCREEN: Depth Diameter Slot Size Material
From 2.5 To 12.5 ft. 2 in. Slot .010 in. PVC
From _____ To _____ ft. _____ in. _____ in. _____

16. SAND/GRAVEL PACK: Depth Size Material
From 2 To 13 ft. #2 Medium #2 Medium
From _____ To _____ ft. _____ _____

17. REMARKS: _____

Topographic/Land Setting
☐ Ridge ☐ Slope ☐ Valley ☒ Flat
(check appropriate box)

Northing/Easting of well location

3843782.979/276280.305

UTM NAD83 (m)

Latitude/longitude source: ☒ GPS ☐ Topo. map
(check box)

DEPTH DRILLING LOG
From To Formation Description

0 to 0.5	- Dark brown TOPSOIL. Grass, roots.
3 to 4.5	- Light gray to orange-tan, mottled CLAY. Moist. Soft to moderately stiff. No HCO.
4.5 to 5	- Light gray to tan, vf. sandy CLAY. Similar to above, but high sand content. Moist. No HCO.
8 to 8.4	- S. A. A. CLAY. Top .4' of spoon. Relatively sharp contact with below.
8.4 to 10	- Light gray f. to vf. SAND. Minor vf. opaque mineral grains and greenish-gray clay-rich lenses (up to 1 cm in length). Saturated. No HCO.
11 to 13	- S. A. A. Light gray f. to vf. SAND. Minor opaque grains, greenish-gray clay-rich lenses. Saturated. No HCO.

LOCATION SKETCH

Show direction and distance in miles from at least two State Roads or County Roads. Include road numbers and common road names.

SEE
FIGURE

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

SIGNATURE OF PERSON CONSTRUCTING THE WELL

DATE

Submit original to Division of Water Quality, Groundwater Section, 1636 Mail Service Center - Raleigh, NC 27699-1636 Phone No. (919) 733-3221, within 30 days.

Modified from:
GW-1 REV.07/2001

WELL CONSTRUCTION RECORD

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

WELL CONTRACTOR (INDIVIDUAL) NAME (print) Bobbie Fowler CERTIFICATION # 2869
WELL CONTRACTOR COMPANY NAME CATLIN Engineers & Scientists PHONE # (910) 452-5861
STATE WELL CONSTRUCTION PERMIT # _____ ASSOCIATED WQ PERMIT # N/A
(if applicable) (if applicable)

USTAS497 -MW02

1. WELL USE (Check Applicable Box): Residential ☐ Municipal/Public ☐ Industrial ☐ Agricultural ☐
Monitoring ☒ Recovery ☐ Heat Pump Water Injection ☐ Other ☐ If Other, List Use _____

2. WELL LOCATION: (Show sketch of the location below)

Nearest Town: New River Air Station County: Onslow

Marine Corps Air Station, New River

(Road Name and Numbers, Community, Subdivision, Lot No., Zip Code)

3. OWNER: LANTDIV NAVFACENGCOM Commanding General

Address: AC/S EMD/Marine Corps Base/PSC Box 20004
(Street or Route No.)

Camp Lejeune NC 28542-0004
City or Town State Zip Code

Area code - Phone number

4. DATE DRILLED: 6/9/03

5. TOTAL DEPTH: 14

6. DOES WELL REPLACE EXISTING WELL? YES ☐ NO ☒

7. STATIC WATER LEVEL Below Top of Casing 6.21 FT.
(Use "+" if Above Top of Casing)

8. TOP OF CASING IS -0.17 FT. Above Land Surface*

* Top of casing terminated at/or below land surface requires
a variance in accordance with 15A NCAC 2C.0118

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

10. WATER ZONES (depth): Surficial Aquifer

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

13. CASING: Depth Diameter Wall Thickness or Weight/Ft. Material
From 0.17 To 3.5 ft. 2 in. Sch. 40 PVC
From _____ To _____ ft. _____ in. _____
From _____ To _____ ft. _____ in. _____

14. GROUT: Depth Material Method
From 0 To 1 ft. Portland Cement Surface Pour
From 1 To 2 ft. Bent. Pellets Surface Pour

15. SCREEN: Depth Diameter Slot Size Material
From 3.5 To 13.5 ft. 2 in. Slot .010 in. PVC
From _____ To _____ ft. _____ in. _____ in. _____

16. SAND/GRAVEL PACK: Depth Size Material
From 2 To 14 ft. #2 Medium #2 Medium
From _____ To _____ ft. _____ _____

17. REMARKS: _____

Topographic/Land Setting
☐ Ridge ☐ Slope ☐ Valley ☒ Flat
(check appropriate box)

Northing/Easting of well location

3843789.144/276239.394

UTM NAD83 (m)

Latitude/longitude source: ☒ GPS ☐ Topo. map
(check box)

DEPTH DRILLING LOG
From To Formation Description

0 to 0.5 - TOPSOIL. Dark brown, poorly sorted f. sandy to silty CLAY. Brick fragments.
0.5 to 2 - Dark brown to reddish brown, vf. sandy to silty CLAY. Moist. No HCO (sample taken from auger cuttings).
3 to 5 - Dark brown @ top of spoon, grades into light gray to orange, mottled CLAY to silty CLAY. Stiff. Moderate plasticity. Moist. No HCO.
8 to 8.5 - Top of spoon S. A. A. Light gray to orange, mottled, silty CLAY.
8.5 to 10 - Bottom of spoon. Light tan, silty to clayey, vf. SAND. Saturated. Minor pebble sized grains (~3 mm in diameter, rounded quartz pea-gravel to coarse sand-sized grains). Poorly sorted. No HCO.
12 to 14 - Light gray f. to vf. SAND. Relatively clean. Well sorted. Minor greenish-gray, clay-rich lenses. Saturated. No HCO.

LOCATION SKETCH

Show direction and distance in miles from at least two State Roads or County Roads. Include road numbers and common road names.

SEE
FIGURE

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

SIGNATURE OF PERSON CONSTRUCTING THE WELL

DATE

Submit original to Division of Water Quality, Groundwater Section, 1636 Mail Service Center - Raleigh, NC 27699-1636 Phone No. (919) 733-3221, within 30 days.

Modified from:
GW-1 REV.07/2001

WELL CONSTRUCTION RECORD

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

WELL CONTRACTOR (INDIVIDUAL) NAME (print) Bobbie Fowler CERTIFICATION # 2869
WELL CONTRACTOR COMPANY NAME CATLIN Engineers & Scientists PHONE # (910) 452-5861
STATE WELL CONSTRUCTION PERMIT # _____ ASSOCIATED WO PERMIT # N/A
(if applicable) (if applicable)

USTAS497 -MW03

1. WELL USE (Check Applicable Box): Residential ☐ Municipal/Public ☐ Industrial ☐ Agricultural ☐
Monitoring ☒ Recovery ☐ Heat Pump Water Injection ☐ Other ☐ If Other, List Use _____

2. WELL LOCATION: (Show sketch of the location below)

Nearest Town: New River Air Station County: Onslow

Marine Corps Air Station, New River

(Road Name and Numbers, Community, Subdivision, Lot No., Zip Code)

3. OWNER: LANTDIV NAVFACENGCOM Commanding General

Address: AC/S EMD/Marine Corps Base/PSC Box 20004
(Street or Route No.)

Camp Lejeune NC 28542-0004
City or Town State Zip Code

Area code - Phone number

4. DATE DRILLED: 6/9/03

5. TOTAL DEPTH: 13

6. DOES WELL REPLACE EXISTING WELL? YES ☐ NO ☒

7. STATIC WATER LEVEL Below Top of Casing 5.18 FT.
(Use "+" if Above Top of Casing)

8. TOP OF CASING IS -0.21 FT. Above Land Surface*

* Top of casing terminated at/or below land surface requires
a variance in accordance with 15A NCAC 2C.0118

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

10. WATER ZONES (depth): Surficial Aquifer

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

13. CASING: Depth Diameter Wall Thickness or Weight/Ft. Material
From 0.21 To 2.5 ft. 2 in. Sch. 40 PVC
From _____ To _____ ft. _____ in. _____
From _____ To _____ ft. _____ in. _____

14. GROUT: Depth Material Method
From 0 To 0.5 ft. Portland Cement Surface Pour
From 0.5 To 1.5 ft. Bent. Pellets Surface Pour

15. SCREEN: Depth Diameter Slot Size Material
From 2.5 To 12.5 ft. 2 in. Slot .010 in. PVC
From _____ To _____ ft. _____ in. _____ in. _____

16. SAND/GRAVEL PACK: Depth Size Material
From 1.5 To 13 ft. #2 Medium #2 Medium
From _____ To _____ ft. _____ _____

17. REMARKS: _____

Topographic/Land Setting
☐ Ridge ☐ Slope ☐ Valley ☒ Flat
(check appropriate box)

Northing/Easting of well location

3843828.836/276233.551

UTM NAD83 (m)

Latitude/longitude source: ☒ GPS ☐ Topo. map
(check box)

DEPTH DRILLING LOG
From To Formation Description

0 to 0.6	- TOPSOIL
0.6 to 2	- Dark brown, silty to vf. sandy CLAY. Minor, thin (~3 mm) vf. sandy layering. Relatively soft. Moist. No HCO (from auger cuttings).
3 to 5	- Dark gray, silty to clayey, f. to vf. SAND. Minor interlayered sandy CLAY layering up to 2" in thickness. Moist. No HCO.
8 to 10	- Light gray to tan, f. to vf. SAND. Well sorted. Saturated. No HCO.
11 to 13	- S. A. A. Light gray to tan f. to vf. SAND. Well sorted. Saturated. No HCO.

LOCATION SKETCH

Show direction and distance in miles from at least two State Roads or County Roads. Include road numbers and common road names.

SEE
FIGURE

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

SIGNATURE OF PERSON CONSTRUCTING THE WELL

DATE

Submit original to Division of Water Quality, Groundwater Section, 1636 Mail Service Center - Raleigh, NC 27699-1636 Phone No. (919) 733-3221, within 30 days.

Modified from:
GW-1 REV.07/2001

WELL CONSTRUCTION RECORD

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

WELL CONTRACTOR (INDIVIDUAL) NAME (print) Bobbie Fowler CERTIFICATION # 2869
WELL CONTRACTOR COMPANY NAME CATLIN Engineers & Scientists PHONE # (910) 452-5861
STATE WELL CONSTRUCTION PERMIT # _____ ASSOCIATED WO PERMIT # N/A
(if applicable) (if applicable)

USTAS497 -MW04

1. WELL USE (Check Applicable Box): Residential ☐ Municipal/Public ☐ Industrial ☐ Agricultural ☐
Monitoring ☒ Recovery ☐ Heat Pump Water Injection ☐ Other ☐ If Other, List Use _____

2. WELL LOCATION: (Show sketch of the location below)

Nearest Town: New River Air Station County: Onslow

Marine Corps Air Station, New River

(Road Name and Numbers, Community, Subdivision, Lot No., Zip Code)

3. OWNER: LANTDIV NAVFACENGCOM Commanding General

Address: AC/S EMD/Marine Corps Base/PSC Box 20004
(Street or Route No.)

Camp Lejeune
City or Town

NC
State

28542-0004
Zip Code

Area code - Phone number

4. DATE DRILLED: 6/9/03

5. TOTAL DEPTH: 14

6. DOES WELL REPLACE EXISTING WELL? YES ☐ NO ☒

7. STATIC WATER LEVEL Below Top of Casing 5.56 FT.
(Use "+" if Above Top of Casing)

8. TOP OF CASING IS -0.25 FT. Above Land Surface*

* Top of casing terminated at/or below land surface requires
a variance in accordance with 15A NCAC 2C.0118

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

10. WATER ZONES (depth): Surficial Aquifer

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

13. CASING: Depth Diameter Wall Thickness Material
From 0.25 To 3.5 ft. 2 in. Sch. 40 PVC
From _____ To _____ ft. _____ in. _____
From _____ To _____ ft. _____ in. _____

14. GROUT: Depth Material Method
From 0 To 1 ft. Portland Cement Surface Pour
From 1 To 2 ft. Bent. Pellets Surface Pour

15. SCREEN: Depth Diameter Slot Size Material
From 3.5 To 13.5 ft. 2 in. Slot .010 in. PVC
From _____ To _____ ft. _____ in. _____ in. _____

16. SAND/GRAVEL PACK: Depth Size Material
From 2 To 14 ft. #2 Medium #2 Medium
From _____ To _____ ft. _____ _____

17. REMARKS: _____

Topographic/Land Setting
☐ Ridge ☐ Slope ☐ Valley ☒ Flat
(check appropriate box)

Northing/Easting of well location

3843841.817/276245.849

UTM NAD83 (m)

Latitude/longitude source: ☒ GPS ☐ Topo. map
(check box)

DEPTH DRILLING LOG
From To Formation Description

0 to 0.5	- TOPSOIL
0.5 to 2	- Brown to dark brown, silty CLAY. Moderately well sorted. Moist. No HCO (from auger cuttings)
3 to 4.5	- Top of spoon. Gray, CLAY to silty CLAY. Minor component of silt to vf. sand. Stiff. Moist. No HCO.
4.5 to 5	- Bottom of spoon. Brownish gray, silty, f. to vf. SAND. Moist. No HCO.
6 to 7.5	- Gray, CLAY to silty CLAY (from auger cuttings)
8 to 10	- Gray, silty, f. to vf. SAND. Saturated. No HCO. Minor light greenish gray clay-rich lenses (~2 to 3 mm in thickness).
12 to 14	- S. A. A. Gray, silty, f. to vf. SAND. Saturated. No HCO.

LOCATION SKETCH

Show direction and distance in miles from at least two State Roads or County Roads. Include road numbers and common road names.

SEE
FIGURE

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

SIGNATURE OF PERSON CONSTRUCTING THE WELL

DATE

Submit original to Division of Water Quality, Groundwater Section, 1636 Mail Service Center - Raleigh, NC 27699-1636 Phone No. (919) 733-3221, within 30 days.

Modified from:
GW-1 REV.07/2001

WELL CONSTRUCTION RECORD

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

WELL CONTRACTOR (INDIVIDUAL) NAME (print) Bobbie Fowler CERTIFICATION # 2869
WELL CONTRACTOR COMPANY NAME CATLIN Engineers & Scientists PHONE # (910) 452-5861
STATE WELL CONSTRUCTION PERMIT # _____ ASSOCIATED WO PERMIT # N/A
(if applicable) (if applicable)

USTAS497 -MW05

1. WELL USE (Check Applicable Box): Residential ☐ Municipal/Public ☐ Industrial ☐ Agricultural ☐
Monitoring ☒ Recovery ☐ Heat Pump Water Injection ☐ Other ☐ If Other, List Use _____

2. WELL LOCATION: (Show sketch of the location below)

Nearest Town: New River Air Station County: Onslow

Marine Corps Air Station, New River

(Road Name and Numbers, Community, Subdivision, Lot No., Zip Code)

3. OWNER: LANTDIV NAVFACENGCOM Commanding General

Address: AC/S EMD/Marine Corps Base/PSC Box 20004

(Street or Route No.)

Camp Lejeune

NC

28542-0004

City or Town

State

Zip Code

Area code - Phone number

4. DATE DRILLED: 6/9/03

5. TOTAL DEPTH: 14

6. DOES WELL REPLACE EXISTING WELL? YES ☐ NO ☒

7. STATIC WATER LEVEL Below Top of Casing 5.61 FT.
(Use "+" if Above Top of Casing)

8. TOP OF CASING IS -0.22 FT. Above Land Surface*

* Top of casing terminated at/or below land surface requires
a variance in accordance with 15A NCAC 2C.0118

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

10. WATER ZONES (depth): Surficial Aquifer

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

13. CASING: Depth Diameter Wall Thickness or Weight/Ft. Material
From 0.22 To 4 ft. 2 in. Sch. 40 PVC
From _____ To _____ ft. _____ in. _____
From _____ To _____ ft. _____ in. _____

14. GROUT: Depth Material Method
From 0 To 2 ft. Portland Cement Surface Pour
From 2 To 3 ft. Bent. Pellets Surface Pour

15. SCREEN: Depth Diameter Slot Size Material
From 4 To 14 ft. 2 in. Slot .010 in. PVC
From _____ To _____ ft. _____ in. _____ in. _____

16. SAND/GRAVEL PACK: Depth Size Material
From 3 To 14 ft. #2 Medium #2 Medium
From _____ To _____ ft. _____ _____

17. REMARKS: _____

Topographic/Land Setting
☐ Ridge ☐ Slope ☐ Valley ☒ Flat
(check appropriate box)

Northing/Easting of well location

3843833.411/276284.25

UTM NAD83 (m)

Latitude/longitude source: ☒ GPS ☐ Topo. map
(check box)

DEPTH

From To

DRILLING LOG

Formation Description

0 to 0.2 - TOPSOIL, roots, grass.
0.2 to 2 - Brown, silty CLAY. Minor sand component. Dry.
No HCO. Very difficult drilling (sample from auger
cuttings).
3 to 4 - Top of spoon. Light gray to dark gray, mottled
clay. Stiff. Dry. No HCO.
4 to 5 - Bottom of spoon. Brownish gray, clayey, poorly
sorted, c. to vf. SAND. More friable than clay
above. Moist. Slight HCO?
8 to 10 - Tan to gray, thinly layered vf. SAND. Saturated.
Slight HCO. Layering up to .25" in thickness.
Isolated 2" thick layer of brownish-tan, clayey vf.
SAND.
13 to 15 - S. A. A. Relatively clean, gray to tan, vf. SAND.
Saturated. Slight HCO. Helper changed from 2
wraps to 1 between 3rd and 4th blow count.

LOCATION SKETCH

Show direction and distance in miles from at least
two State Roads or County Roads. Include road
numbers and common road names.

SEE
FIGURE

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

SIGNATURE OF PERSON CONSTRUCTING THE WELL

DATE

Submit original to Division of Water Quality, Groundwater Section, 1636 Mail Service Center - Raleigh, NC
27699-1636 Phone No. (919) 733-3221, within 30 days.

Modified from:
GW-1 REV.07/2001

WELL CONSTRUCTION RECORD

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

WELL CONTRACTOR (INDIVIDUAL) NAME (print) Bobbie Fowler CERTIFICATION # 2869
WELL CONTRACTOR COMPANY NAME CATLIN Engineers & Scientists PHONE # (910) 452-5861
STATE WELL CONSTRUCTION PERMIT # _____ ASSOCIATED WQ PERMIT # N/A
(if applicable) (if applicable)

USTAS497 -MW06

1. WELL USE (Check Applicable Box): Residential ☐ Municipal/Public ☐ Industrial ☐ Agricultural ☐
Monitoring ☒ Recovery ☐ Heat Pump Water Injection ☐ Other ☐ If Other, List Use _____

2. WELL LOCATION: (Show sketch of the location below)

Nearest Town: New River Air Station County: Onslow

Marine Corps Air Station, New River

(Road Name and Numbers, Community, Subdivision, Lot No., Zip Code)

3. OWNER: LANTDIV NAVFACENGCOM Commanding General

Address: AC/S EMD/Marine Corps Base/PSC Box 20004
(Street or Route No.)

Camp Lejeune NC 28542-0004
City or Town State Zip Code

Area code - Phone number

4. DATE DRILLED: 6/13/03

5. TOTAL DEPTH: 50

6. DOES WELL REPLACE EXISTING WELL? YES ☐ NO ☒

7. STATIC WATER LEVEL Below Top of Casing 5.87 FT.
(Use "+" if Above Top of Casing)

8. TOP OF CASING IS -0.05 FT. Above Land Surface*

* Top of casing terminated at/or below land surface requires
a variance in accordance with 15A NCAC 2C.0118

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

10. WATER ZONES (depth): Surficial Aquifer

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

13. CASING:

Depth	Diameter	Wall Thickness or Weight/Ft.	Material
From <u>0.05</u> To <u>44.5</u> ft.	<u>2</u> in.	<u>Sch. 40</u>	<u>PVC</u>
From <u>0.5</u> To <u>39</u> ft.	<u>6</u> in.	<u>Sch. 40</u>	<u>PVC</u>
From _____ To _____ ft.	_____ in.	_____	_____

14. GROUT:

Depth	Material	Method
From <u>1</u> To <u>38</u> ft.	<u>Portland Cement</u>	<u>Tremie</u>
From <u>38</u> To <u>43</u> ft.	<u>Bent. Pellets</u>	<u>Surface Pour</u>

15. SCREEN:

Depth	Diameter	Slot Size	Material
From <u>44.5</u> To <u>49.5</u> ft.	<u>2</u> in.	<u>Slot .010</u> in.	<u>PVC</u>
From _____ To _____ ft.	_____ in.	_____ in.	_____

16. SAND/GRAVEL PACK:

Depth	Size	Material
From <u>43</u> To <u>50</u> ft.	<u>#2 Medium</u>	<u>Torpedo Sand</u>
From _____ To _____ ft.	_____	_____

17. REMARKS: _____

Topographic/Land Setting
☐ Ridge ☐ Slope ☐ Valley ☒ Flat
(check appropriate box)

Northing/Easting of well location

3843817.086/276268.689

UTM NAD83 (m)

Latitude/longitude source: ☒ GPS ☐ Topo. map
(check box)

DEPTH DRILLING LOG
From To Formation Description

3 to 5	- Gray, SILTY, v.f. to f. SANDY CLAY w/high plasticity. Sat. HCO.
8 to 10	- Gray black to brown, well sorted, v.f. to f. SAND. Sat. High HCO.
13 to 15	- Light gray, f. to v.f. SAND w/trace opaque fines. Sat. Very strong HCO.
18 to 20	- S.A.A. w/greenish-gray lenses. Strong HCO.
23 to 24.5	- Greenish gray, SILTY, f. SAND. Mod. sorted and soft. Abundant opaque minerals and minor cemented sand clasts.
24.5 to 25	- Sharp contact. Light gray, poorly sorted, limey med. SAND and weathered FOSS. LS. frags. Sat. Strong HCO.
28 to 30	- Light gray, poorly sorted, limey med. SAND and weathered FOSS. LS. frags. Sat. Strong HCO.
33 to 35	- S.A.A. Sat. Slight HCO.
38 to 40	- S.A.A. Slight HCO.
43 to 45	- Gray green, SILTY, f. to v.f. SAND w/trace v.f. opaque grains. Sat. No HCO.
48 to 50	- S.A.A. Mod. hard but not cemented. Sat. No HCO.

LOCATION SKETCH

Show direction and distance in miles from at least two State Roads or County Roads. Include road numbers and common road names.

SEE
FIGURE

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

SIGNATURE OF PERSON CONSTRUCTING THE WELL

DATE

Submit original to Division of Water Quality, Groundwater Section, 1636 Mail Service Center - Raleigh, NC 27699-1636 Phone No. (919) 733-3221, within 30 days.

Modified from:
GW-1 REV.07/2001

APPENDIX E

MONITORING WELL SAMPLING RECORDS



ENGINEERS and SCIENTISTS
Wilmington, North Carolina

CATLIN #: 203-005

APPENDIX E

MONITORING WELL SAMPLING RECORDS

**Rapid Refueler A-B Tanks
Marine Corps Air Station
New River, NC**

WELL IDENTIFICATION	RR-11	RR-14	USTAS497 -MW01	USTAS497 -MW02	USTAS497 -MW03
DATE SAMPLED	06/10/03	06/10/03	06/10/03	06/10/03	06/10/03
TIME SAMPLED	15:10	15:35	12:10	12:50	13:15
SAMPLED BY	Tom Stetler	Tom Stetler	Tom Stetler	Tom Stetler	Tom Stetler
WELL DIAMETER	2"	2"	2"	2"	2"
WELL DEPTH - (A)	15'	50'	13'	14'	13'
DEPTH TO WATER - (B)	5.91'	4.97'	5.06'	6.21'	5.18'
(A-B) FT. WATER IN WELL - (C)	9.09'	45.03'	7.94'	7.79'	7.82'
GALLONS PER FT. - (D)	0.174 gal.	0.174 gal.	0.174 gal.	0.174 gal.	0.174 gal.
(CxD) ONE WELL VOLUME - (E)	1.58 gal.	7.84 gal.	1.38 gal.	1.36 gal.	1.36 gal.
(3xE) THREE WELL VOLUMES - (F)	4.74 gal.	23.52 gal.	4.14 gal.	4.08 gal.	4.08 gal.
BAILER VOLUME* - (G)	.24 gal.	PUMP	.24 gal.	.24 gal.	.24 gal.
(F/G) BAILS REQUIRED*	19.8	N/A	17.3	17.0	17.0
AMOUNT REMOVED	20 bails	24 gal.	18 bails	17 bails	17 bails
TURBIDITY (clear, slight, moderate, high)	SLIGHT	SLIGHT	SLIGHT	SLIGHT	SLIGHT
ANALYSIS and / or COMMENTS	602	602	602	602	602
	625	625	625	625	625
	EPH/VPH	EPH/VPH	EPH/VPH	EPH/VPH	EPH/VPH

WELL VOLUMES gal/ft

1" WELL = 0.045
2" WELL = 0.174
4" WELL = 0.661
6" WELL = 1.501

BAILER VOLUMES gal/bail

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

* - An entry of "PUMP" indicates that bailers were not used to develop/purge the well and that a pump was used to remove the volume indicated.



ENGINEERS and SCIENTISTS
Wilmington, North Carolina

CATLIN #: 203-005

APPENDIX E

MONITORING WELL SAMPLING RECORDS

**Rapid Refueler A-B Tanks
Marine Corps Air Station
New River, NC**

WELL IDENTIFICATION	USTAS497 -MW04	USTAS497 -MW05	USTAS497 -MW06		
DATE SAMPLED	06/10/03	06/10/03	06/16/03		
TIME SAMPLED	13:45	14:15	14:00		
SAMPLED BY	Tom Stetler	Tom Stetler	Tom Stetler		
WELL DIAMETER	2"	2"	2"		
WELL DEPTH - (A)	14'	14'	50'		
DEPTH TO WATER - (B)	5.56'	5.61'	5.87'		
(A-B) FT. WATER IN WELL - (C)	8.44'	8.39'	44.13'		
GALLONS PER FT. - (D)	0.174 gal.	0.174 gal.	0.174 gal.		
(CxD) ONE WELL VOLUME - (E)	1.47 gal.	1.46 gal.	7.68 gal.		
(3xE) THREE WELL VOLUMES - (F)	4.41 gal.	4.38 gal.	23.04 gal.		
BAILER VOLUME* - (G)	.24 gal.	.24 gal.	PUMP		
(F/G) BAILS REQUIRED*	18.4	18.3	N/A		
AMOUNT REMOVED	19 bails	19 bails	24 gal.		
TURBIDITY (clear, slight, moderate, high)	SLIGHT	SLIGHT	SLIGHT		
ANALYSIS and / or COMMENTS	602	602	602		
	625	625	625		
	EPH/VPH	EPH/VPH	EPH/VPH		

WELL VOLUMES gal/ft

1" WELL = 0.045
2" WELL = 0.174
4" WELL = 0.661
6" WELL = 1.501

BAILER VOLUMES gal/bail

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

* - An entry of "PUMP" indicates that bailers were not used to develop/purge the well and that a pump was used to remove the volume indicated.

APPENDIX F
CATLIN STANDARD PROCEDURES

CATLIN STANDARD METHODS OF INVESTIGATION

(REVISED APRIL 2002)

1.0 DATA COLLECTION

1.1 BACKGROUND DATA

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

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

1.2 SURVEYS AND POTENTIAL RECEPTOR DATA

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

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

1.2.1 Horizontal Survey

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

1.2.2 Vertical Survey

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

1.3 DRILLING AND MONITORING WELL/PIEZOMETER INSTALLATION

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

1.3.1 Drilling Methods and Subsurface Data Collection

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

Auger Drilling

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

Hand Augering

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

Direct Push

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

Other Methods

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

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

1.3.2 Hydropunch Installation

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

1.3.3 Well Installation

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

1.3.4 Well Development

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

1.4 HYDROGEOLOGIC DATA COLLECTION

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

1.4.1 Regional Geology

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

1.4.2 Site Geology

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

1.4.3 Groundwater Occurrence and Characteristics

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

Well Water Levels

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

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

Aquifer Testing

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

Other Methods

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

1.5 PETROLEUM HYDROCARBON DATA COLLECTION

1.5.1 Collection Methods

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

Field Analysis

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

Laboratory Analysis

- Laboratory analysis of phase-separated products.
- Laboratory vapor, soil, and groundwater analysis using appropriate EPA Methods.

1.5.2 Field Sampling

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

Product Samples

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

Vapor Samples

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

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

Soil Samples

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

Groundwater Samples

Groundwater samples are collected in accordance with the following procedures:

- Creeks/Lakes/Etc.

Grab samples are obtained.

- Domestic Wells

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

- Monitoring Wells

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

Three well volumes are removed from each well using a thoroughly cleaned Teflon bailer or appropriate purging pump. If it is not possible to remove three volumes, due to very low yields, a minimum of one volume is removed prior to obtaining a sample.

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

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

Sampling records are field prepared.

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

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

2.0 DATA EVALUATION

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

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

APPENDIX G

LABORATORY ANALYTICAL REPORTS
AND
CHAIN OF CUSTODY RECORDS

FILE COPY**PARADIGM ANALYTICAL LABORATORIES, INC.**

5500 Business Drive
Wilmington, North Carolina 28405
(910) 350-1903
Fax (910) 350-1557

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

June 25, 2003

Report Number: G128-1141

Client Project ID: Rapid Refueler A-B

Dear Mr. Mason,

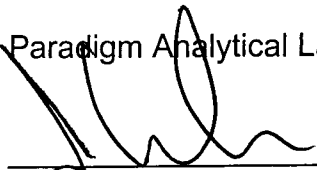
Enclosed are the results of the analytical services performed under the referenced project. Copies of this report and supporting data will be retained in our files for a period of five years in the event they are required for future reference. Any samples submitted to our laboratory will be retained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

If there are any questions about the report or the services performed during this project, please call for assistance. We will be happy to answer any questions or concerns which you may have.

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

Sincerely,

Paradigm Analytical Laboratories, Inc.



Laboratory Director
J. Patrick Weaver

EPH (Aliphatics/Aromatics) Results

by MDEP-EPH

Client Name: Richard Catlin & Associates

Project Name: Rapid Refueler A-B

Sample Information and Analytical Results	
Sample Identification	USTAS497-MW01 (3-5')
Sample Matrix	Soil
Date Collected	06/09/03
Date Received	06/10/03
Date Extracted	06/11/03
Date Analyzed	06/12/03
Dry Weight	84.2
Dilution Factor	1
C ₉ -C ₁₈ Aliphatics*	< 10 (mg/Kg)
C ₁₉ -C ₃₆ Aliphatics*	< 10 (mg/Kg)
C ₁₁ -C ₂₂ Aromatics*	< 10 (mg/Kg)
Aliphatic Surrogate % Recovery	120
Aromatic Surrogate % Recovery	100

Comments:

* = Excludes any surrogates or internal standards.

Sample did not require fractionation.

Lab info: G128-1141-74753

Reviewed By: MHC

EPH (Aliphatics/Aromatics) Results

by MDEP-EPH

Client Name: Richard Catlin & AssociatesProject Name: Rapid Refueler A-B

Sample Information and Analytical Results	
Sample Identification	USTAS497-MW02 (3-5')
Sample Matrix	Soil
Date Collected	06/09/03
Date Received	06/10/03
Date Extracted	06/11/03
Date Analyzed	06/12/03
Dry Weight	81.2
Dilution Factor	1
C ₉ -C ₁₈ Aliphatics*	< 10 (mg/Kg)
C ₁₉ -C ₃₆ Aliphatics*	< 10 (mg/Kg)
C ₁₁ -C ₂₂ Aromatics*	< 10 (mg/Kg)
Aliphatic Surrogate % Recovery	120
Aromatic Surrogate % Recovery	110

Comments:

* = Excludes any surrogates or internal standards.

Sample did not require fractionation.

Lab info: G128-1141-74754

Reviewed By: MLC

EPH (Aliphatics/Aromatics) Results

by MDEP-EPH

Client Name: Richard Catlin & Associates

Project Name: Rapid Refueler A-B

Sample Information and Analytical Results	
Sample Identification	USTAS497-MW03 (3-5')
Sample Matrix	Soil
Date Collected	06/09/03
Date Received	06/10/03
Date Extracted	06/11/03
Date Analyzed	06/12/03
Dry Weight	85.6
Dilution Factor	1
C ₉ -C ₁₈ Aliphatics*	< 10 (mg/Kg)
C ₁₉ -C ₃₆ Aliphatics*	< 10 (mg/Kg)
C ₁₁ -C ₂₂ Aromatics*	< 10 (mg/Kg)
Aliphatic Surrogate % Recovery	110
Aromatic Surrogate % Recovery	100

Comments:

* = Excludes any surrogates or internal standards.

Sample did not require fractionation.

Lab info: G128-1141-74755

Reviewed By: MLC

EPH (Aliphatics/Aromatics) Results

by MDEP-EPH

Client Name: Richard Catlin & Associates

Project Name: Rapid Refueler A-B

Sample Information and Analytical Results	
Sample Identification	USTAS497-MW04 (3-5')
Sample Matrix	Soil
Date Collected	06/09/03
Date Received	06/10/03
Date Extracted	06/11/03
Date Analyzed	06/12/03
Dry Weight	85.8
Dilution Factor	1
C ₉ -C ₁₈ Aliphatics*	< 10 (mg/Kg)
C ₁₉ -C ₃₆ Aliphatics*	< 10 (mg/Kg)
C ₁₁ -C ₂₂ Aromatics*	< 10 (mg/Kg)
Aliphatic Surrogate % Recovery	110
Aromatic Surrogate % Recovery	98

Comments:

* = Excludes any surrogates or internal standards.

Sample did not require fractionation.

Lab info: G128-1141-74756

Reviewed By: mle

EPH (Aliphatics/Aromatics) Results

by MDEP-EPH

Client Name: Richard Catlin & AssociatesProject Name: Rapid Refueler A-B

Sample Information and Analytical Results	
Sample Identification	USTAS497-MW05 (3-5')
Sample Matrix	Soil
Date Collected	06/09/03
Date Received	06/10/03
Date Extracted	06/11/03
Date Analyzed	06/12/03
Dry Weight	90.4
Dilution Factor	1
C ₉ -C ₁₈ Aliphatics*	< 10 (mg/Kg)
C ₁₉ -C ₃₆ Aliphatics*	< 10 (mg/Kg)
C ₁₁ -C ₂₂ Aromatics*	< 10 (mg/Kg)
Aliphatic Surrogate % Recovery	120
Aromatic Surrogate % Recovery	110

Comments:

* = Excludes any surrogates or internal standards.

Sample did not require fractionation.

Lab info: G128-1141-74757

Reviewed By: MAC

PARADIGM ANALYTICAL LABORATORIES, INC.

Attachment 3

EPH Laboratory Reporting Form

Calibration and QA/QC Information

Initial Calibration Date: 06/09/03

Calibration Ranges and Limits

Range	MDL (mg/Kg)	(µg/L)	ML (mg/Kg)	(µg/L)	RL (mg/Kg)	(µg/L)
C ₉ -C ₁₈ Aliphatics	0.1	0.8	0.3	2.6	100	10
C ₁₉ -C ₃₆ Aliphatics	0.1	1.6	0.3	5	100	10
C ₁₁ -C ₂₂ Aromatics	0.2	2.1	0.6	6.7	100	10

Calibration Concentration Levels

Range	Levels (µg/L) (mg/Kg)	%RSD or CCC	Method of Quantitation
C ₉ -C ₁₈ Aliphatics	0.06 1	4.10	Calibration Factor
	0.15 2.5		
	0.3 5		
	0.6 10		
	1.2 20		
C ₁₉ -C ₃₆ Aliphatics	0.08 1.33	2.5	Calibration Factor
	0.2 3.33		
	0.4 6.67		
	0.8 13.3		
	1.6 26.7		
C ₁₁ -C ₂₂ Aromatics	0.17 2.83	4.7	Calibration Factor
	0.425 7.08		
	0.85 14.2		
	1.7 28.3		
	3.4 56.7		

Calibration Check Date: 06/12/03

Calibration Check

Range	Levels (µg/mL) (mg/Kg)	RPD
C ₉ -C ₁₈ Aliphatics	0.6 10	-7.1
C ₁₉ -C ₃₆ Aliphatics	0.8 13.3	-6.1
C ₁₁ -C ₂₂ Aromatics	1.7 28.3	-17.3

MDL = Method Detection Limit

ML = Minimum Limit

RL = Reportable Limit

RPD = Relative Percent Difference

%RSD = Percent Relative Standard Deviation

CCC = Correlation Coefficient of Curve

VPH (Aliphatics/Aromatics) Laboratory Reporting Form

Client Name: Richard Catlin & AssociatesProject Name: Rapid Refueler A-B

Sample Information and Analytical Results	
Sample Identification	USTAS497-MW01 (3-5')
Sample Matrix	Soil
Collection Option (for Soil)*	3
Date Collected	06/09/03
Date Received	06/10/03
Date Extracted	06/09/03
Date Analyzed	06/23/03
Dry Weight	84
Dilution Factor	1
C ₅ -C ₈ Aliphatics**	< 10 (mg/Kg)
C ₉ -C ₁₂ Aliphatics**	< 10 (mg/Kg)
C ₉ -C ₁₀ Aromatics**	< 10 (mg/Kg)
Surrogate % Recovery - PID	78
Surrogate % Recovery - FID	94

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

** = Excludes any surrogates or internal standards.

Lab Info: G128-1141-74753

Reviewed By: MAC

VPH (Aliphatics/Aromatics) Laboratory Reporting Form

Client Name: Richard Catlin & Associates

Project Name: Rapid Refueler A-B

Sample Information and Analytical Results	
Sample Identification	USTAS497-MW02 (3-5')
Sample Matrix	Soil
Collection Option (for Soil)*	3
Date Collected	06/09/03
Date Received	06/10/03
Date Extracted	06/09/03
Date Analyzed	06/23/03
Dry Weight	81
Dilution Factor	1
C ₅ -C ₈ Aliphatics**	< 10 (mg/Kg)
C ₉ -C ₁₂ Aliphatics**	< 10 (mg/Kg)
C ₉ -C ₁₀ Aromatics**	< 10 (mg/Kg)
Surrogate % Recovery - PID	85
Surrogate % Recovery - FID	93

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

** = Excludes any surrogates or internal standards.

Lab Info: G128-1141-74754

Reviewed By: mtc

VPH (Aliphatics/Aromatics) Laboratory Reporting Form

Client Name: Richard Catlin & AssociatesProject Name: Rapid Refueler A-B

Sample Information and Analytical Results	
Sample Identification	USTAS497-MW03 (3-5')
Sample Matrix	Soil
Collection Option (for Soil)*	3
Date Collected	06/09/03
Date Received	06/10/03
Date Extracted	06/09/03
Date Analyzed	06/23/03
Dry Weight	86
Dilution Factor	1
C ₅ -C ₈ Aliphatics**	< 10 (mg/Kg)
C ₉ -C ₁₂ Aliphatics**	< 10 (mg/Kg)
C ₉ -C ₁₀ Aromatics**	< 10 (mg/Kg)
Surrogate % Recovery - PID	82
Surrogate % Recovery - FID	92

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

** = Excludes any surrogates or internal standards.

Lab Info: G128-1141-74755

Reviewed By: me

PARADIGM ANALYTICAL LABORATORIES, INC.

VPH (Aliphatics/Aromatics) Laboratory Reporting Form

Client Name: Richard Catlin & Associates

Project Name: Rapid Refueler A-B

Sample Information and Analytical Results	
Sample Identification	USTAS497-MW04 (3-5')
Sample Matrix	Soil
Collection Option (for Soil)*	3
Date Collected	06/09/03
Date Received	06/10/03
Date Extracted	06/09/03
Date Analyzed	06/23/03
Dry Weight	86
Dilution Factor	1
C ₅ -C ₈ Aliphatics**	< 10 (mg/Kg)
C ₉ -C ₁₂ Aliphatics**	< 10 (mg/Kg)
C ₉ -C ₁₀ Aromatics**	< 10 (mg/Kg)
Surrogate % Recovery - PID	81
Surrogate % Recovery - FID	92

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

** = Excludes any surrogates or internal standards.

Lab Info: G128-1141-74756

Reviewed By: me

VPH (Aliphatics/Aromatics) Laboratory Reporting Form

Client Name: Richard Catlin & AssociatesProject Name: Rapid Refueler A-B

Sample Information and Analytical Results	
Sample Identification	USTAS497-MW05 (3-5')
Sample Matrix	Soil
Collection Option (for Soil)*	3
Date Collected	06/09/03
Date Received	06/10/03
Date Extracted	06/09/03
Date Analyzed	06/24/03
Dry Weight	90
Dilution Factor	1
C ₅ -C ₈ Aliphatics**	< 10 (mg/Kg)
C ₉ -C ₁₂ Aliphatics**	< 10 (mg/Kg)
C ₉ -C ₁₀ Aromatics**	< 10 (mg/Kg)
Surrogate % Recovery - PID	79
Surrogate % Recovery - FID	90

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

** = Excludes any surrogates or internal standards.

Lab Info: G128-1141-74757

Reviewed By: mlc

PARADIGM ANALYTICAL LABORATORIES, INC.

Attachment 2

VPH Laboratory Reporting Form

Calibration and QA/QC Information

FID Initial Calibration Date: 06/23/03

PID Initial Calibration Date: 06/23/03

Calibration Ranges and Limits

Range	MDL		ML		RL	
	(µg/L)	(mg/Kg)	(µg/L)	(mg/Kg)	(µg/L)	(mg/Kg)
C ₅ -C ₈ Aliphatics	9.3	0.41	29.4	1.3	100	10
C ₉ -C ₁₂ Aliphatics	7.9	0.3	25.2	0.97	100	10
C ₉ -C ₁₀ Aromatics	0.5	0.04	1.5	0.14	100	10

Calibration Concentration Levels

Range	Levels		%RSD or CCC	Method of Quantitation
	(µg/L)	(mg/Kg)		
C ₅ -C ₈ Aliphatics	20	2	5.7	Calibration Factor
	80	8		
	200	20		
	800	80		
	2000	200		
C ₉ -C ₁₂ Aliphatics	15	1.5	16.2	Calibration Factor
	60	6		
	150	15		
	600	60		
	1500	150		
C ₉ -C ₁₀ Aromatics	32.5	3.25	20.7	Calibration Factor
	130	13		
	325	32.5		
	1300	130		
	3250	325		

Calibration Check Date: 06/23/03

Calibration Check

Range	Levels		RPD
	(µg/L)	(mg/Kg)	
C ₅ -C ₈ Aliphatics	200	20	-1.2
C ₉ -C ₁₂ Aliphatics	150	15	6.0
C ₉ -C ₁₀ Aromatics	325	32.5	-8.5

MDL = Method Detection Limit

ML = Minimum Limit

RL = Reportable Limit

RPD = Relative Percent Difference

%RSD = Percent Relative Standard Deviation

CCC = Correlation Coefficient of Curve

Reviewed By: MNC

N.C. Certification #481 S.C. Certification #99029

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Volatiles

by GCMS 8260B/5035

Client Sample ID: USTAS497-MW01 (3-5')

Client Project ID: Rapid Refueler A-B

Lab Sample ID: 74753

Lab Project ID: G128-1141

Matrix: Soil

%Solids: 84.2

Date Analyzed: 6/20/03

Analyzed By: EKR

Date Collected: 6/9/03

Date Received: 6/10/03

Dilution: 1

Compound	Quantitation Limit (mg/KG)	Result (mg/KG)
Acetone	0.051	BQL
Acrolein	0.1	BQL
Acrylonitrile	0.1	BQL
Benzene	0.0051	BQL
Bromobenzene	0.0051	BQL
Bromochloromethane	0.0051	BQL
Bromodichloromethane	0.0051	BQL
Bromoform	0.0051	BQL
Bromomethane	0.0051	BQL
2-Butanone	0.025	BQL
n-Butylbenzene	0.0051	BQL
sec-Butylbenzene	0.0051	BQL
tert-Butylbenzene	0.0051	BQL
Carbon disulfide	0.0051	BQL
Carbon tetrachloride	0.0051	BQL
Chlorobenzene	0.0051	BQL
Chloroethane	0.0051	BQL
2-Chloroethyl vinyl ether	0.0051	BQL
Chloroform	0.0051	BQL
Chloromethane	0.0051	BQL
2-Chlorotoluene	0.0051	BQL
4-Chlorotoluene	0.0051	BQL
Dibromochloromethane	0.0051	BQL
1,2-Dibromo-3-chloropropane	0.0051	BQL
Dibromomethane	0.0051	BQL
1,2-Dibromoethane (EDB)	0.0051	BQL
1,2-Dichlorobenzene	0.0051	BQL
1,3-Dichlorobenzene	0.0051	BQL
1,4-Dichlorobenzene	0.0051	BQL
trans-1,4-Dichloro-2-butene	0.0051	BQL
1,1-Dichloroethane	0.0051	BQL
1,1-Dichloroethene	0.0051	BQL
1,2-Dichloroethane	0.0051	BQL
cis-1,2-Dichloroethene	0.0051	BQL
trans-1,2-dichloroethene	0.0051	BQL
1,2-Dichloropropane	0.0051	BQL
1,3-Dichloropropane	0.0051	BQL
2,2-Dichloropropane	0.0051	BQL
1,1-Dichloropropene	0.0051	BQL
cis-1,3-Dichloropropene	0.0051	BQL
trans-1,3-Dichloropropene	0.0051	BQL
Dichlorodifluoromethane	0.0051	BQL
Diisopropyl ether (DIPE)	0.0051	BQL
Ethylbenzene	0.0051	BQL
Hexachlorobutadiene	0.0051	BQL

Reviewed by: MLC

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Volatiles

by GCMS 8260B/5035

Client Sample ID: USTAS497-MW01 (3-5')

Date Analyzed: 6/20/03

Client Project ID: Rapid Refueler A-B

Analyzed By: EKR

Lab Sample ID: 74753

Date Collected: 6/9/03

Lab Project ID: G128-1141

Date Received: 6/10/03

Matrix: Soil

%Solids: 84.2

Dilution: 1

Compound	Quantitation Limit (mg/KG)	Result (mg/KG)
2-Hexanone	0.0051	BQL
Iodomethane	0.0051	BQL
Isopropylbenzene	0.0051	BQL
4-Isopropyltoluene	0.0051	BQL
Methylene chloride	0.02	BQL
4-Methyl-2-pentanone	0.0051	BQL
Methyl-tert-butyl ether (MTBE)	0.0051	BQL
Naphthalene	0.0051	BQL
n-Propyl benzene	0.0051	BQL
Styrene	0.0051	BQL
1,1,1,2-Tetrachloroethane	0.0051	BQL
1,1,2,2-Tetrachloroethane	0.0051	BQL
Tetrachloroethene	0.0051	BQL
Toluene	0.0051	BQL
1,2,3-Trichlorobenzene	0.0051	BQL
1,2,4-Trichlorobenzene	0.0051	BQL
Trichloroethene	0.0051	BQL
1,1,1-Trichloroethane	0.0051	BQL
1,1,2-Trichloroethane	0.0051	BQL
Trichlorofluoromethane	0.0051	BQL
1,2,3-Trichloropropane	0.0051	BQL
1,2,4-Trimethylbenzene	0.0051	BQL
1,3,5-Trimethylbenzene	0.0051	BQL
Vinyl chloride	0.0051	BQL
m-,p-Xylene	0.01	BQL
o-Xylene	0.0051	BQL

Surrogate Spike Recoveries	Spike Added	Surrogate Result	%Rec
Compound	(mg/KG)	(mg/KG)	
Bromofluorobenzene	0.0500	0.0477	95
1,2-Dichloroethane-d4	0.0500	0.0550	110
Toluene-d8	0.0500	0.0498	100

Comments:

All results are corrected for dilution.

Reviewed by: mmc

Flags: BQL = Below Quantitation Limit

N.C. Certification #481 S.C. Certification #99029

Page 2 of 2

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Volatiles

by GCMS 8260B/5035

Client Sample ID: USTAS497-MW02 (3-5')

Client Project ID: Rapid Refueler A-B

Lab Sample ID: 74754

Lab Project ID: G128-1141

Matrix: Soil

%Solids: 81.2

Date Analyzed: 6/20/03

Analyzed By: EKR

Date Collected: 6/9/03

Date Received: 6/10/03

Dilution: 1

Compound	Quantitation	Result
	Limit (mg/KG)	(mg/KG)
Acetone	0.055	BQL
Acrolein	0.11	BQL
Acrylonitrile	0.11	BQL
Benzene	0.0055	BQL
Bromobenzene	0.0055	BQL
Bromochloromethane	0.0055	BQL
Bromodichloromethane	0.0055	BQL
Bromoform	0.0055	BQL
Bromomethane	0.0055	BQL
2-Butanone	0.027	BQL
n-Butylbenzene	0.0055	BQL
sec-Butylbenzene	0.0055	BQL
tert-Butylbenzene	0.0055	BQL
Carbon disulfide	0.0055	BQL
Carbon tetrachloride	0.0055	BQL
Chlorobenzene	0.0055	BQL
Chloroethane	0.0055	BQL
2-Chloroethyl vinyl ether	0.0055	BQL
Chloroform	0.0055	BQL
Chloromethane	0.0055	BQL
2-Chlorotoluene	0.0055	BQL
4-Chlorotoluene	0.0055	BQL
Dibromochloromethane	0.0055	BQL
1,2-Dibromo-3-chloropropane	0.0055	BQL
Dibromomethane	0.0055	BQL
1,2-Dibromoethane (EDB)	0.0055	BQL
1,2-Dichlorobenzene	0.0055	BQL
1,3-Dichlorobenzene	0.0055	BQL
1,4-Dichlorobenzene	0.0055	BQL
trans-1,4-Dichloro-2-butene	0.0055	BQL
1,1-Dichloroethane	0.0055	BQL
1,1-Dichloroethene	0.0055	BQL
1,2-Dichloroethane	0.0055	BQL
cis-1,2-Dichloroethene	0.0055	BQL
trans-1,2-dichloroethene	0.0055	BQL
1,2-Dichloropropane	0.0055	BQL
1,3-Dichloropropane	0.0055	BQL
2,2-Dichloropropane	0.0055	BQL
1,1-Dichloropropene	0.0055	BQL
cis-1,3-Dichloropropene	0.0055	BQL
trans-1,3-Dichloropropene	0.0055	BQL
Dichlorodifluoromethane	0.0055	BQL
Diisopropyl ether (DIPE)	0.0055	BQL
Ethylbenzene	0.0055	BQL
Hexachlorobutadiene	0.0055	BQL

Reviewed by: WMC

Flags: BQL = Below Quantitation Limit

N.C. Certification #481 S.C. Certification #99029

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Volatiles

by GCMS 8260B/5035

Client Sample ID: USTAS497-MW02 (3-5')

Client Project ID: Rapid Refueler A-B

Lab Sample ID: 74754

Lab Project ID: G128-1141

Matrix: Soil

%Solids: 81.2

Date Analyzed: 6/20/03

Analyzed By: EKR

Date Collected: 6/9/03

Date Received: 6/10/03

Dilution: 1

Compound	Quantitation Limit (mg/KG)	Result (mg/KG)
2-Hexanone	0.0055	BQL
Iodomethane	0.0055	BQL
Isopropylbenzene	0.0055	BQL
4-Isopropyltoluene	0.0055	BQL
Methylene chloride	0.022	BQL
4-Methyl-2-pentanone	0.0055	BQL
Methyl-tert-butyl ether (MTBE)	0.0055	BQL
Naphthalene	0.0055	BQL
n-Propyl benzene	0.0055	BQL
Styrene	0.0055	BQL
1,1,1,2-Tetrachloroethane	0.0055	BQL
1,1,2,2-Tetrachloroethane	0.0055	BQL
Tetrachloroethene	0.0055	BQL
Toluene	0.0055	BQL
1,2,3-Trichlorobenzene	0.0055	BQL
1,2,4-Trichlorobenzene	0.0055	BQL
Trichloroethene	0.0055	BQL
1,1,1-Trichloroethane	0.0055	BQL
1,1,2-Trichloroethane	0.0055	BQL
Trichlorofluoromethane	0.0055	BQL
1,2,3-Trichloropropane	0.0055	BQL
1,2,4-Trimethylbenzene	0.0055	BQL
1,3,5-Trimethylbenzene	0.0055	BQL
Vinyl chloride	0.0055	BQL
m-,p-Xylene	0.011	BQL
o-Xylene	0.0055	BQL

Surrogate Spike Recoveries	Spike Added	Surrogate Result	%Rec
Compound	(mg/KG)	(mg/KG)	
Bromofluorobenzene	0.0500	0.0490	98
1,2-Dichloroethane-d4	0.0500	0.0550	110
Toluene-d8	0.0500	0.0502	100

Comments:

All results are corrected for dilution.

Reviewed by: mlc

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Volatiles

by GCMS 8260B/5035

Client Sample ID: USTAS497-MW03 (3-5')

Client Project ID: Rapid Refueler A-B

Lab Sample ID: 74755

Lab Project ID: G128-1141

Matrix: Soil

%Solids: 85.6

Date Analyzed: 6/20/03

Analyzed By: EKR

Date Collected: 6/9/03

Date Received: 6/10/03

Dilution: 1

Compound	Quantitation Limit (mg/KG)	Result (mg/KG)
Acetone	0.047	BQL
Acrolein	0.095	BQL
Acrylonitrile	0.095	BQL
Benzene	0.0047	BQL
Bromobenzene	0.0047	BQL
Bromochloromethane	0.0047	BQL
Bromodichloromethane	0.0047	BQL
Bromoform	0.0047	BQL
Bromomethane	0.0047	BQL
2-Butanone	0.024	BQL
n-Butylbenzene	0.0047	BQL
sec-Butylbenzene	0.0047	BQL
tert-Butylbenzene	0.0047	BQL
Carbon disulfide	0.0047	BQL
Carbon tetrachloride	0.0047	BQL
Chlorobenzene	0.0047	BQL
Chloroethane	0.0047	BQL
2-Chloroethyl vinyl ether	0.0047	BQL
Chloroform	0.0047	BQL
Chloromethane	0.0047	BQL
2-Chlorotoluene	0.0047	BQL
4-Chlorotoluene	0.0047	BQL
Dibromochloromethane	0.0047	BQL
1,2-Dibromo-3-chloropropane	0.0047	BQL
Dibromomethane	0.0047	BQL
1,2-Dibromoethane (EDB)	0.0047	BQL
1,2-Dichlorobenzene	0.0047	BQL
1,3-Dichlorobenzene	0.0047	BQL
1,4-Dichlorobenzene	0.0047	BQL
trans-1,4-Dichloro-2-butene	0.0047	BQL
1,1-Dichloroethane	0.0047	BQL
1,1-Dichloroethene	0.0047	BQL
1,2-Dichloroethane	0.0047	BQL
cis-1,2-Dichloroethene	0.0047	BQL
trans-1,2-dichloroethene	0.0047	BQL
1,2-Dichloropropane	0.0047	BQL
1,3-Dichloropropane	0.0047	BQL
2,2-Dichloropropane	0.0047	BQL
1,1-Dichloropropene	0.0047	BQL
cis-1,3-Dichloropropene	0.0047	BQL
trans-1,3-Dichloropropene	0.0047	BQL
Dichlorodifluoromethane	0.0047	BQL
Diisopropyl ether (DIPE)	0.0047	BQL
Ethylbenzene	0.0047	BQL
Hexachlorobutadiene	0.0047	BQL

Reviewed by: MAC

Flags: BQL = Below Quantitation Limit

N.C. Certification #481 S.C. Certification #99029

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Volatiles

by GCMS 8260B/5035

Client Sample ID: USTAS497-MW03 (3-5')

Client Project ID: Rapid Refueler A-B

Lab Sample ID: 74755

Lab Project ID: G128-1141

Matrix: Soil

%Solids: 85.6

Date Analyzed: 6/20/03

Analyzed By: EKR

Date Collected: 6/9/03

Date Received: 6/10/03

Dilution: 1

Compound	Quantitation Limit (mg/KG)	Result (mg/KG)
2-Hexanone	0.0047	BQL
Iodomethane	0.0047	BQL
Isopropylbenzene	0.0047	BQL
4-Isopropyltoluene	0.0047	BQL
Methylene chloride	0.019	BQL
4-Methyl-2-pentanone	0.0047	BQL
Methyl-tert-butyl ether (MTBE)	0.0047	BQL
Naphthalene	0.0047	BQL
n-Propyl benzene	0.0047	BQL
Styrene	0.0047	BQL
1,1,1,2-Tetrachloroethane	0.0047	BQL
1,1,2,2-Tetrachloroethane	0.0047	BQL
Tetrachloroethene	0.0047	BQL
Toluene	0.0047	BQL
1,2,3-Trichlorobenzene	0.0047	BQL
1,2,4-Trichlorobenzene	0.0047	BQL
Trichloroethene	0.0047	BQL
1,1,1-Trichloroethane	0.0047	BQL
1,1,2-Trichloroethane	0.0047	BQL
Trichlorofluoromethane	0.0047	BQL
1,2,3-Trichloropropane	0.0047	BQL
1,2,4-Trimethylbenzene	0.0047	BQL
1,3,5-Trimethylbenzene	0.0047	BQL
Vinyl chloride	0.0047	BQL
m-,p-Xylene	0.0095	BQL
o-Xylene	0.0047	BQL

Surrogate Spike Recoveries

Compound	Spike Added (mg/KG)	Surrogate Result (mg/KG)	%Rec
Bromofluorobenzene	0.0500	0.0473	95
1,2-Dichloroethane-d4	0.0500	0.0557	111
Toluene-d8	0.0500	0.0492	98

Comments:

All results are corrected for dilution.

Reviewed by: MAC

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Volatiles

by GCMS 8260B/5035

Client Sample ID: USTAS497-MW04 (3-5')

Date Analyzed: 6/20/03

Client Project ID: Rapid Refueler A-B

Analyzed By: EKR

Lab Sample ID: 74756

Date Collected: 6/9/03

Lab Project ID: G128-1141

Date Received: 6/10/03

Matrix: Soil

%Solids: 85.8

Dilution: 1

Compound	Quantitation Limit (mg/KG)	Result (mg/KG)
Acetone	0.048	BQL
Acrolein	0.095	BQL
Acrylonitrile	0.095	BQL
Benzene	0.0048	BQL
Bromobenzene	0.0048	BQL
Bromochloromethane	0.0048	BQL
Bromodichloromethane	0.0048	BQL
Bromoform	0.0048	BQL
Bromomethane	0.0048	BQL
2-Butanone	0.024	BQL
n-Butylbenzene	0.0048	BQL
sec-Butylbenzene	0.0048	BQL
tert-Butylbenzene	0.0048	BQL
Carbon disulfide	0.0048	BQL
Carbon tetrachloride	0.0048	BQL
Chlorobenzene	0.0048	BQL
Chloroethane	0.0048	BQL
2-Chloroethyl vinyl ether	0.0048	BQL
Chloroform	0.0048	BQL
Chloromethane	0.0048	BQL
2-Chlorotoluene	0.0048	BQL
4-Chlorotoluene	0.0048	BQL
Dibromochloromethane	0.0048	BQL
1,2-Dibromo-3-chloropropane	0.0048	BQL
Dibromomethane	0.0048	BQL
1,2-Dibromoethane (EDB)	0.0048	BQL
1,2-Dichlorobenzene	0.0048	BQL
1,3-Dichlorobenzene	0.0048	BQL
1,4-Dichlorobenzene	0.0048	BQL
trans-1,4-Dichloro-2-butene	0.0048	BQL
1,1-Dichloroethane	0.0048	BQL
1,1-Dichloroethene	0.0048	BQL
1,2-Dichloroethane	0.0048	BQL
cis-1,2-Dichloroethene	0.0048	BQL
trans-1,2-dichloroethene	0.0048	BQL
1,2-Dichloropropane	0.0048	BQL
1,3-Dichloropropane	0.0048	BQL
2,2-Dichloropropane	0.0048	BQL
1,1-Dichloropropene	0.0048	BQL
cis-1,3-Dichloropropene	0.0048	BQL
trans-1,3-Dichloropropene	0.0048	BQL
Dichlorodifluoromethane	0.0048	BQL
Diisopropyl ether (DIPE)	0.0048	BQL
Ethylbenzene	0.0048	BQL
Hexachlorobutadiene	0.0048	BQL

Reviewed by: mdc

Flags: BQL = Below Quantitation Limit

N.C. Certification #481 S.C. Certification #99029

Page 1 of 2

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Volatiles

by GCMS 8260B/5035

Client Sample ID: USTAS497-MW04 (3-5')

Client Project ID: Rapid Refueler A-B

Lab Sample ID: 74756

Lab Project ID: G128-1141

Matrix: Soil

%Solids: 85.8

Date Analyzed: 6/20/03

Analyzed By: EKR

Date Collected: 6/9/03

Date Received: 6/10/03

Dilution: 1

Compound	Quantitation Limit (mg/KG)	Result (mg/KG)
2-Hexanone	0.0048	BQL
Iodomethane	0.0048	BQL
Isopropylbenzene	0.0048	BQL
4-Isopropyltoluene	0.0048	BQL
Methylene chloride	0.019	BQL
4-Methyl-2-pentanone	0.0048	BQL
Methyl-tert-butyl ether (MTBE)	0.0048	BQL
Naphthalene	0.0048	BQL
n-Propyl benzene	0.0048	BQL
Styrene	0.0048	BQL
1,1,1,2-Tetrachloroethane	0.0048	BQL
1,1,2,2-Tetrachloroethane	0.0048	BQL
Tetrachloroethene	0.0048	BQL
Toluene	0.0048	BQL
1,2,3-Trichlorobenzene	0.0048	BQL
1,2,4-Trichlorobenzene	0.0048	BQL
Trichloroethene	0.0048	BQL
1,1,1-Trichloroethane	0.0048	BQL
1,1,2-Trichloroethane	0.0048	BQL
Trichlorofluoromethane	0.0048	BQL
1,2,3-Trichloropropane	0.0048	BQL
1,2,4-Trimethylbenzene	0.0048	BQL
1,3,5-Trimethylbenzene	0.0048	BQL
Vinyl chloride	0.0048	BQL
m,p-Xylene	0.0095	BQL
o-Xylene	0.0048	BQL

Surrogate Spike Recoveries	Spike Added (mg/KG)	Surrogate Result (mg/KG)	%Rec
Compound			
Bromofluorobenzene	0.0500	0.0476	95
1,2-Dichloroethane-d4	0.0500	0.0581	116
Toluene-d8	0.0500	0.0499	100

Comments:

All results are corrected for dilution.

Reviewed by: MLC

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Volatiles

by GCMS 8260B/5035

Client Sample ID: USTAS497-MW05 (3-5')

Date Analyzed: 6/20/03

Client Project ID: Rapid Refueler A-B

Analyzed By: EKR

Lab Sample ID: 74757

Date Collected: 6/9/03

Lab Project ID: G128-1141

Date Received: 6/10/03

Matrix: Soil

%Solids: 90.4

Dilution: 1

Compound	Quantitation Limit (mg/KG)	Result (mg/KG)
Acetone	0.048	BQL
Acrolein	0.097	BQL
Acrylonitrile	0.097	BQL
Benzene	0.0048	BQL
Bromobenzene	0.0048	BQL
Bromochloromethane	0.0048	BQL
Bromodichloromethane	0.0048	BQL
Bromoform	0.0048	BQL
Bromomethane	0.0048	BQL
2-Butanone	0.024	BQL
n-Butylbenzene	0.0048	BQL
sec-Butylbenzene	0.0048	BQL
tert-Butylbenzene	0.0048	BQL
Carbon disulfide	0.0048	BQL
Carbon tetrachloride	0.0048	BQL
Chlorobenzene	0.0048	BQL
Chloroethane	0.0048	BQL
2-Chloroethyl vinyl ether	0.0048	BQL
Chloroform	0.0048	BQL
Chloromethane	0.0048	BQL
2-Chlorotoluene	0.0048	BQL
4-Chlorotoluene	0.0048	BQL
Dibromochloromethane	0.0048	BQL
1,2-Dibromo-3-chloropropane	0.0048	BQL
Dibromomethane	0.0048	BQL
1,2-Dibromoethane (EDB)	0.0048	BQL
1,2-Dichlorobenzene	0.0048	BQL
1,3-Dichlorobenzene	0.0048	BQL
1,4-Dichlorobenzene	0.0048	BQL
trans-1,4-Dichloro-2-butene	0.0048	BQL
1,1-Dichloroethane	0.0048	BQL
1,1-Dichloroethene	0.0048	BQL
1,2-Dichloroethane	0.0048	BQL
cis-1,2-Dichloroethene	0.0048	BQL
trans-1,2-dichloroethene	0.0048	BQL
1,2-Dichloropropane	0.0048	BQL
1,3-Dichloropropane	0.0048	BQL
2,2-Dichloropropane	0.0048	BQL
1,1-Dichloropropene	0.0048	BQL
cis-1,3-Dichloropropene	0.0048	BQL
trans-1,3-Dichloropropene	0.0048	BQL
Dichlorodifluoromethane	0.0048	BQL
Diisopropyl ether (DIPE)	0.0048	BQL
Ethylbenzene	0.0048	BQL
Hexachlorobutadiene	0.0048	BQL

Reviewed by: MLC

Flags: BQL = Below Quantitation Limit

N.C. Certification #481 S.C. Certification #99029

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Volatiles

by GCMS 8260B/5035

Client Sample ID: USTAS497-MW05 (3-5')

Client Project ID: Rapid Refueler A-B

Lab Sample ID: 74757

Lab Project ID: G128-1141

Matrix: Soil

%Solids: 90.4

Date Analyzed: 6/20/03

Analyzed By: EKR

Date Collected: 6/9/03

Date Received: 6/10/03

Dilution: 1

Compound	Quantitation Limit (mg/KG)	Result (mg/KG)
2-Hexanone	0.0048	BQL
Iodomethane	0.0048	BQL
Isopropylbenzene	0.0048	BQL
4-Isopropyltoluene	0.0048	BQL
Methylene chloride	0.019	BQL
4-Methyl-2-pentanone	0.0048	BQL
Methyl-tert-butyl ether (MTBE)	0.0048	BQL
Naphthalene	0.0048	BQL
n-Propyl benzene	0.0048	BQL
Styrene	0.0048	BQL
1,1,1,2-Tetrachloroethane	0.0048	BQL
1,1,2,2-Tetrachloroethane	0.0048	BQL
Tetrachloroethene	0.0048	BQL
Toluene	0.0048	BQL
1,2,3-Trichlorobenzene	0.0048	BQL
1,2,4-Trichlorobenzene	0.0048	BQL
Trichloroethene	0.0048	BQL
1,1,1-Trichloroethane	0.0048	BQL
1,1,2-Trichloroethane	0.0048	BQL
Trichlorofluoromethane	0.0048	BQL
1,2,3-Trichloropropane	0.0048	BQL
1,2,4-Trimethylbenzene	0.0048	BQL
1,3,5-Trimethylbenzene	0.0048	BQL
Vinyl chloride	0.0048	BQL
m,p-Xylene	0.0097	BQL
o-Xylene	0.0048	BQL

Surrogate Spike Recoveries	Spike Added (mg/KG)	Surrogate Result (mg/KG)	%Rec
Compound			
Bromofluorobenzene	0.0500	0.0484	97
1,2-Dichloroethane-d4	0.0500	0.0560	112
Toluene-d8	0.0500	0.0501	100

Comments:

All results are corrected for dilution.

Reviewed by: mlc

Flags: BQL = Below Quantitation Limit

N.C. Certification #481 S.C. Certification #99029

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Semivolatiles

by GCMS 8270

Client Sample ID: USTAS497-MW01 (3-5')

Client Project ID: Rapid Refueler A-B

Lab Sample ID: 74753

Lab Project ID: G128-1141

Matrix: Soil

%Solids: 84.2

Date Collected: 6/9/2003

Date Received: 6/10/2003

Date Analyzed: 6/13/2003

Analyzed By: MRC

Dilution: 1

Compound	Quantitation Limit (mg/KG)	Result (mg/KG)
Acenaphthene	0.37	BQL
Acenaphthylene	0.37	BQL
Anthracene	0.37	BQL
Benzo[a]anthracene	0.37	BQL
Benzo[a]pyrene	0.37	BQL
Benzo[b]fluoranthene	0.37	BQL
Benzo[g,h,i]perylene	0.37	BQL
Benzo[k]fluoranthene	0.37	BQL
Benzoic Acid	0.74	BQL
Bis(2-chloroethoxy)methane	0.37	BQL
Bis(2-chloroethyl)ether	0.37	BQL
Bis(2-chloroisopropyl)ether	0.37	BQL
Bis(2-ethylhexyl)phthalate	0.37	BQL
4-bromophenyl phenyl ether	0.37	BQL
Butylbenzylphthalate	0.37	BQL
4-Chloroaniline	1.9	BQL
4-Chloro-3-methylphenol	0.37	BQL
2-Chloronaphthalene	0.37	BQL
2-Chlorophenol	0.37	BQL
4-Chlorophenyl phenyl ether	0.37	BQL
Chrysene	0.37	BQL
Di-n-Butylphthalate	0.37	BQL
Di-n-octylphthalate	0.37	BQL
Dibenzo[a,h]anthracene	0.37	BQL
Dibenzofuran	0.37	BQL
1,2-Dichlorobenzene	0.37	BQL
1,3-Dichlorobenzene	0.37	BQL
1,4-Dichlorobenzene	0.37	BQL
3,3'-Dichlorobenzidine	0.74	BQL
2,4-Dichlorophenol	0.37	BQL
Diethylphthalate	0.37	BQL
2,4-Dimethylphenol	0.37	BQL
Dimethylphthalate	0.37	BQL
4,6-Dinitro-2-methylphenol	1.9	BQL
2,4-Dinitrophenol	1.9	BQL
2,4-Dinitrotoluene	0.37	BQL
2,6-Dinitrotoluene	0.37	BQL
Fluoranthene	0.37	BQL
Fluorene	0.37	BQL
Hexachlorobenzene	0.37	BQL

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Semivolatiles

by GCMS 8270

Client Sample ID: USTAS497-MW01 (3-5')

Client Project ID: Rapid Refueler A-B

Lab Sample ID: 74753

Lab Project ID: G128-1141

Matrix: Soil

%Solids: 84.2

Date Collected: 6/9/2003

Date Received: 6/10/2003

Date Analyzed: 6/13/2003

Analyzed By: MRC

Dilution: 1

Compound	Quantitation Limit (mg/KG)	Result (mg/KG)
Hexachlorobutadiene	0.37	BQL
Hexachlorocyclopentadiene	0.74	BQL
Hexachloroethane	0.37	BQL
Indeno(1,2,3-c,d)pyrene	0.37	BQL
Isophorone	0.37	BQL
2-Methylnaphthalene	0.37	BQL
2-Methylphenol	0.37	BQL
3- & 4-Methylphenol	0.37	BQL
N-Nitrosodi-n-propylamine	0.37	BQL
N-Nitrosodiphenylamine	0.37	BQL
Naphthalene	0.37	BQL
2-Nitroaniline	0.37	BQL
3-Nitroaniline	1.9	BQL
4-Nitroaniline	1.9	BQL
Nitrobenzene	0.37	BQL
2-Nitrophenol	0.37	BQL
4-Nitrophenol	1.9	BQL
Pentachlorophenol	1.9	BQL
Phenanthrene	0.37	BQL
Phenol	0.37	BQL
Pyrene	0.37	BQL
1,2,4-Trichlorobenzene	0.37	BQL
2,4,5-Trichlorophenol	0.37	BQL
2,4,6-Trichlorophenol	0.37	BQL

Surrogate Spike Recoveries	Spike Added	Spike Result	Percent Recovered
2-Fluorobiphenyl	10	6.9	69
2-Fluorophenol	10	6.9	69
Nitrobenzene-d5	10	7.1	71
Phenol-d6	10	6.4	64
2,4,6-Tribromophenol	10	6.2	62
4-Terphenyl-d14	10	8.0	80

Comments:

Results are corrected for %solids and dilution where applicable.

Flags:

BQL = Below Quantitation Limit.

Reviewed By: MRC

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Semivolatiles

by GCMS 8270

Client Sample ID: USTAS497-MW02 (3-5')

Client Project ID: Rapid Refueler A-B

Lab Sample ID: 74754

Lab Project ID: G128-1141

Matrix: Soil

%Solids: 81.2

Date Collected: 6/9/2003

Date Received: 6/10/2003

Date Analyzed: 6/13/2003

Analyzed By: MRC

Dilution: 1

Compound	Quantitation Limit (mg/KG)	Result (mg/KG)
Acenaphthene	0.4	BQL
Acenaphthylene	0.4	BQL
Anthracene	0.4	BQL
Benzo[a]anthracene	0.4	BQL
Benzo[a]pyrene	0.4	BQL
Benzo[b]fluoranthene	0.4	BQL
Benzo[g,h,i]perylene	0.4	BQL
Benzo[k]fluoranthene	0.4	BQL
Benzoic Acid	0.79	BQL
Bis(2-chloroethoxy)methane	0.4	BQL
Bis(2-chloroethyl)ether	0.4	BQL
Bis(2-chloroisopropyl)ether	0.4	BQL
Bis(2-ethylhexyl)phthalate	0.4	BQL
4-bromophenyl phenyl ether	0.4	BQL
Butylbenzylphthalate	0.4	BQL
4-Chloroaniline	2	BQL
4-Chloro-3-methylphenol	0.4	BQL
2-Chloronaphthalene	0.4	BQL
2-Chlorophenol	0.4	BQL
4-Chlorophenyl phenyl ether	0.4	BQL
Chrysene	0.4	BQL
Di-n-Butylphthalate	0.4	BQL
Di-n-octylphthalate	0.4	BQL
Dibenzo[a,h]anthracene	0.4	BQL
Dibenzofuran	0.4	BQL
1,2-Dichlorobenzene	0.4	BQL
1,3-Dichlorobenzene	0.4	BQL
1,4-Dichlorobenzene	0.4	BQL
3,3'-Dichlorobenzidine	0.79	BQL
2,4-Dichlorophenol	0.4	BQL
Diethylphthalate	0.4	BQL
2,4-Dimethylphenol	0.4	BQL
Dimethylphthalate	0.4	BQL
4,6-Dinitro-2-methylphenol	2	BQL
2,4-Dinitrophenol	2	BQL
2,4-Dinitrotoluene	0.4	BQL
2,6-Dinitrotoluene	0.4	BQL
Fluoranthene	0.4	BQL
Fluorene	0.4	BQL
Hexachlorobenzene	0.4	BQL

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Semivolatiles

by GCMS 8270

Client Sample ID: USTAS497-MW02 (3-5')

Client Project ID: Rapid Refueler A-B

Lab Sample ID: 74754

Lab Project ID: G128-1141

Matrix: Soil

%Solids: 81.2

Date Collected: 6/9/2003

Date Received: 6/10/2003

Date Analyzed: 6/13/2003

Analyzed By: MRC

Dilution: 1

Compound	Quantitation Limit (mg/KG)	Result (mg/KG)
Hexachlorobutadiene	0.4	BQL
Hexachlorocyclopentadiene	0.79	BQL
Hexachloroethane	0.4	BQL
Indeno(1,2,3-c,d)pyrene	0.4	BQL
Isophorone	0.4	BQL
2-Methylnaphthalene	0.4	BQL
2-Methylphenol	0.4	BQL
3- & 4-Methylphenol	0.4	BQL
N-Nitrosodi-n-propylamine	0.4	BQL
N-Nitrosodiphenylamine	0.4	BQL
Naphthalene	0.4	BQL
2-Nitroaniline	0.4	BQL
3-Nitroaniline	2	BQL
4-Nitroaniline	2	BQL
Nitrobenzene	0.4	BQL
2-Nitrophenol	0.4	BQL
4-Nitrophenol	2	BQL
Pentachlorophenol	2	BQL
Phenanthrene	0.4	BQL
Phenol	0.4	BQL
Pyrene	0.4	BQL
1,2,4-Trichlorobenzene	0.4	BQL
2,4,5-Trichlorophenol	0.4	BQL
2,4,6-Trichlorophenol	0.4	BQL

Surrogate Spike Recoveries	Spike Added	Spike Result	Percent Recovered
2-Fluorobiphenyl	10	9.1	91
2-Fluorophenol	10	7.7	77
Nitrobenzene-d5	10	8.3	83
Phenol-d6	10	7.6	76
2,4,6-Tribromophenol	10	9.2	92
4-Terphenyl-d14	10	8.5	85

Comments:

Results are corrected for %solids and dilution where applicable.

Flags:

BQL = Below Quantitation Limit.

Reviewed By: MRC

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Semivolatiles

by GCMS 8270

Client Sample ID: USTAS497-MW03 (3-5')

Client Project ID: Rapid Refueler A-B

Lab Sample ID: 74755

Lab Project ID: G128-1141

Matrix: Soil

%Solids: 85.6

Date Collected: 6/9/2003

Date Received: 6/10/2003

Date Analyzed: 6/13/2003

Analyzed By: MRC

Dilution: 1

Compound	Quantitation Limit (mg/KG)	Result (mg/KG)
Acenaphthene	0.34	BQL
Acenaphthylene	0.34	BQL
Anthracene	0.34	BQL
Benzo[a]anthracene	0.34	BQL
Benzo[a]pyrene	0.34	BQL
Benzo[b]fluoranthene	0.34	BQL
Benzo[g,h,i]perylene	0.34	BQL
Benzo[k]fluoranthene	0.34	BQL
Benzoic Acid	0.69	BQL
Bis(2-chloroethoxy)methane	0.34	BQL
Bis(2-chloroethyl)ether	0.34	BQL
Bis(2-chloroisopropyl)ether	0.34	BQL
Bis(2-ethylhexyl)phthalate	0.34	BQL
4-bromophenyl phenyl ether	0.34	BQL
Butylbenzylphthalate	0.34	BQL
4-Chloroaniline	1.7	BQL
4-Chloro-3-methylphenol	0.34	BQL
2-Chloronaphthalene	0.34	BQL
2-Chlorophenol	0.34	BQL
4-Chlorophenyl phenyl ether	0.34	BQL
Chrysene	0.34	BQL
Di-n-Butylphthalate	0.34	BQL
Di-n-octylphthalate	0.34	BQL
Dibenzo[a,h]anthracene	0.34	BQL
Dibenzofuran	0.34	BQL
1,2-Dichlorobenzene	0.34	BQL
1,3-Dichlorobenzene	0.34	BQL
1,4-Dichlorobenzene	0.34	BQL
3,3'-Dichlorobenzidine	0.69	BQL
2,4-Dichlorophenol	0.34	BQL
Diethylphthalate	0.34	BQL
2,4-Dimethylphenol	0.34	BQL
Dimethylphthalate	0.34	BQL
4,6-Dinitro-2-methylphenol	1.7	BQL
2,4-Dinitrophenol	1.7	BQL
2,4-Dinitrotoluene	0.34	BQL
2,6-Dinitrotoluene	0.34	BQL
Fluoranthene	0.34	BQL
Fluorene	0.34	BQL
Hexachlorobenzene	0.34	BQL

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Semivolatiles

by GCMS 8270

Client Sample ID: USTAS497-MW03 (3-5')

Client Project ID: Rapid Refueler A-B

Lab Sample ID: 74755

Lab Project ID: G128-1141

Matrix: Soil

%Solids: 85.6

Date Collected: 6/9/2003

Date Received: 6/10/2003

Date Analyzed: 6/13/2003

Analyzed By: MRC

Dilution: 1

Compound	Quantitation Limit (mg/KG)	Result (mg/KG)
Hexachlorobutadiene	0.34	BQL
Hexachlorocyclopentadiene	0.69	BQL
Hexachloroethane	0.34	BQL
Indeno(1,2,3-c,d)pyrene	0.34	BQL
Isophorone	0.34	BQL
2-Methylnaphthalene	0.34	BQL
2-Methylphenol	0.34	BQL
3- & 4-Methylphenol	0.34	BQL
N-Nitrosodi-n-propylamine	0.34	BQL
N-Nitrosodiphenylamine	0.34	BQL
Naphthalene	0.34	BQL
2-Nitroaniline	0.34	BQL
3-Nitroaniline	1.7	BQL
4-Nitroaniline	1.7	BQL
Nitrobenzene	0.34	BQL
2-Nitrophenol	0.34	BQL
4-Nitrophenol	1.7	BQL
Pentachlorophenol	1.7	BQL
Phenanthrene	0.34	BQL
Phenol	0.34	BQL
Pyrene	0.34	BQL
1,2,4-Trichlorobenzene	0.34	BQL
2,4,5-Trichlorophenol	0.34	BQL
2,4,6-Trichlorophenol	0.34	BQL

Surrogate Spike Recoveries	Spike Added	Spike Result	Percent Recovered
2-Fluorobiphenyl	10	9.4	94
2-Fluorophenol	10	8.0	80
Nitrobenzene-d5	10	8.2	82
Phenol-d6	10	8.0	80
2,4,6-Tribromophenol	10	9.7	97
4-Terphenyl-d14	10	9.5	95

Comments:

Results are corrected for %solids and dilution where applicable.

Flags:

BQL = Below Quantitation Limit.

Reviewed By: MRC

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Semivolatiles

by GCMS 8270

Client Sample ID: USTAS497-MW04 (3-5')

Client Project ID: Rapid Refueler A-B

Lab Sample ID: 74756

Lab Project ID: G128-1141

Matrix: Soil

%Solids: 85.8

Date Collected: 6/9/2003

Date Received: 6/10/2003

Date Analyzed: 6/17/2003

Analyzed By: MRC

Dilution: 1

Compound	Quantitation Limit (mg/KG)	Result (mg/KG)
Acenaphthene	0.37	BQL
Acenaphthylene	0.37	BQL
Anthracene	0.37	BQL
Benzo[a]anthracene	0.37	BQL
Benzo[a]pyrene	0.37	BQL
Benzo[b]fluoranthene	0.37	BQL
Benzo[g,h,i]perylene	0.37	BQL
Benzo[k]fluoranthene	0.37	BQL
Benzoic Acid	0.74	BQL
Bis(2-chloroethoxy)methane	0.37	BQL
Bis(2-chloroethyl)ether	0.37	BQL
Bis(2-chloroisopropyl)ether	0.37	BQL
Bis(2-ethylhexyl)phthalate	0.37	BQL
4-bromophenyl phenyl ether	0.37	BQL
Butylbenzylphthalate	0.37	BQL
4-Chloroaniline	1.9	BQL
4-Chloro-3-methylphenol	0.37	BQL
2-Chloronaphthalene	0.37	BQL
2-Chlorophenol	0.37	BQL
4-Chlorophenyl phenyl ether	0.37	BQL
Chrysene	0.37	BQL
Di-n-Butylphthalate	0.37	BQL
Di-n-octylphthalate	0.37	BQL
Dibenzo[a,h]anthracene	0.37	BQL
Dibenzofuran	0.37	BQL
1,2-Dichlorobenzene	0.37	BQL
1,3-Dichlorobenzene	0.37	BQL
1,4-Dichlorobenzene	0.37	BQL
3,3'-Dichlorobenzidine	0.74	BQL
2,4-Dichlorophenol	0.37	BQL
Diethylphthalate	0.37	BQL
2,4-Dimethylphenol	0.37	BQL
Dimethylphthalate	0.37	BQL
4,6-Dinitro-2-methylphenol	1.9	BQL
2,4-Dinitrophenol	1.9	BQL
2,4-Dinitrotoluene	0.37	BQL
2,6-Dinitrotoluene	0.37	BQL
Fluoranthene	0.37	BQL
Fluorene	0.37	BQL
Hexachlorobenzene	0.37	BQL

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Semivolatiles

by GCMS 8270

Client Sample ID: USTAS497-MW04 (3-5')

Client Project ID: Rapid Refueler A-B

Lab Sample ID: 74756

Lab Project ID: G128-1141

Matrix: Soil

%Solids: 85.8

Date Collected: 6/9/2003

Date Received: 6/10/2003

Date Analyzed: 6/17/2003

Analyzed By: MRC

Dilution: 1

Compound	Quantitation Limit (mg/KG)	Result (mg/KG)
Hexachlorobutadiene	0.37	BQL
Hexachlorocyclopentadiene	0.74	BQL
Hexachloroethane	0.37	BQL
Indeno(1,2,3-c,d)pyrene	0.37	BQL
Isophorone	0.37	BQL
2-Methylnaphthalene	0.37	BQL
2-Methylphenol	0.37	BQL
3- & 4-Methylphenol	0.37	BQL
N-Nitrosodi-n-propylamine	0.37	BQL
N-Nitrosodiphenylamine	0.37	BQL
Naphthalene	0.37	BQL
2-Nitroaniline	0.37	BQL
3-Nitroaniline	1.9	BQL
4-Nitroaniline	1.9	BQL
Nitrobenzene	0.37	BQL
2-Nitrophenol	0.37	BQL
4-Nitrophenol	1.9	BQL
Pentachlorophenol	1.9	BQL
Phenanthrene	0.37	BQL
Phenol	0.37	BQL
Pyrene	0.37	BQL
1,2,4-Trichlorobenzene	0.37	BQL
2,4,5-Trichlorophenol	0.37	BQL
2,4,6-Trichlorophenol	0.37	BQL

Surrogate Spike Recoveries	Spike Added	Spike Result	Percent Recovered
2-Fluorobiphenyl	10	9.1	91
2-Fluorophenol	10	8.8	88
Nitrobenzene-d5	10	9.2	92
Phenol-d6	10	8.6	86
2,4,6-Tribromophenol	10	8.3	83
4-Terphenyl-d14	10	8.8	88

Comments:

Results are corrected for %solids and dilution where applicable.

Flags:

BQL = Below Quantitation Limit.

Reviewed By: MLC

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Semivolatiles

by GCMS 8270

Client Sample ID: USTAS497-MW05 (3-5')

Client Project ID: Rapid Refueler A-B

Lab Sample ID: 74757

Lab Project ID: G128-1141

Matrix: Soil

%Solids: 90.4

Date Collected: 6/9/2003

Date Received: 6/10/2003

Date Analyzed: 6/17/2003

Analyzed By: MRC

Dilution: 1

Compound	Quantitation Limit (mg/KG)	Result (mg/KG)
Acenaphthene	0.34	BQL
Acenaphthylene	0.34	BQL
Anthracene	0.34	BQL
Benzo[a]anthracene	0.34	BQL
Benzo[a]pyrene	0.34	BQL
Benzo[b]fluoranthene	0.34	BQL
Benzo[g,h,i]perylene	0.34	BQL
Benzo[k]fluoranthene	0.34	BQL
Benzoic Acid	0.69	BQL
Bis(2-chloroethoxy)methane	0.34	BQL
Bis(2-chloroethyl)ether	0.34	BQL
Bis(2-chloroisopropyl)ether	0.34	BQL
Bis(2-ethylhexyl)phthalate	0.34	BQL
4-bromophenyl phenyl ether	0.34	BQL
Butylbenzylphthalate	0.34	BQL
4-Chloroaniline	1.7	BQL
4-Chloro-3-methylphenol	0.34	BQL
2-Chloronaphthalene	0.34	BQL
2-Chlorophenol	0.34	BQL
4-Chlorophenyl phenyl ether	0.34	BQL
Chrysene	0.34	BQL
Di-n-Butylphthalate	0.34	BQL
Di-n-octylphthalate	0.34	BQL
Dibenzo[a,h]anthracene	0.34	BQL
Dibenzofuran	0.34	BQL
1,2-Dichlorobenzene	0.34	BQL
1,3-Dichlorobenzene	0.34	BQL
1,4-Dichlorobenzene	0.34	BQL
3,3'-Dichlorobenzidine	0.69	BQL
2,4-Dichlorophenol	0.34	BQL
Diethylphthalate	0.34	BQL
2,4-Dimethylphenol	0.34	BQL
Dimethylphthalate	0.34	BQL
4,6-Dinitro-2-methylphenol	1.7	BQL
2,4-Dinitrophenol	1.7	BQL
2,4-Dinitrotoluene	0.34	BQL
2,6-Dinitrotoluene	0.34	BQL
Fluoranthene	0.34	BQL
Fluorene	0.34	BQL
Hexachlorobenzene	0.34	BQL

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Semivolatiles

by GCMS 8270

Client Sample ID: USTAS497-MW05 (3-5')

Client Project ID: Rapid Refueler A-B

Lab Sample ID: 74757

Lab Project ID: G128-1141

Matrix: Soil

%Solids: 90.4

Date Collected: 6/9/2003

Date Received: 6/10/2003

Date Analyzed: 6/17/2003

Analyzed By: MRC

Dilution: 1

Compound	Quantitation Limit (mg/KG)	Result (mg/KG)
Hexachlorobutadiene	0.34	BQL
Hexachlorocyclopentadiene	0.69	BQL
Hexachloroethane	0.34	BQL
Indeno(1,2,3-c,d)pyrene	0.34	BQL
Isophorone	0.34	BQL
2-Methylnaphthalene	0.34	BQL
2-Methylphenol	0.34	BQL
3- & 4-Methylphenol	0.34	BQL
N-Nitrosodi-n-propylamine	0.34	BQL
N-Nitrosodiphenylamine	0.34	BQL
Naphthalene	0.34	BQL
2-Nitroaniline	0.34	BQL
3-Nitroaniline	1.7	BQL
4-Nitroaniline	1.7	BQL
Nitrobenzene	0.34	BQL
2-Nitrophenol	0.34	BQL
4-Nitrophenol	1.7	BQL
Pentachlorophenol	1.7	BQL
Phenanthrene	0.34	BQL
Phenol	0.34	BQL
Pyrene	0.34	BQL
1,2,4-Trichlorobenzene	0.34	BQL
2,4,5-Trichlorophenol	0.34	BQL
2,4,6-Trichlorophenol	0.34	BQL

Surrogate Spike Recoveries	Spike Added	Spike Result	Percent Recovered
2-Fluorobiphenyl	10	8.7	87
2-Fluorophenol	10	8.8	88
Nitrobenzene-d5	10	9.1	91
Phenol-d6	10	8.7	87
2,4,6-Tribromophenol	10	8.4	84
4-Terphenyl-d14	10	8.1	81

Comments:

Results are corrected for %solids and dilution where applicable.

Flags:

BQL = Below Quantitation Limit.

Reviewed By: MAC

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

Chain-of Custody Record & Analytical Request

coc# 19449

Page 1 of 15

Client: <u>Catlin</u>	Project ID: <u>Rapid Refueeler A-B</u>	Date: <u>6-10-03</u>	Report To: <u>Mike E. Mason @</u>
Address: <u>220 Old Dairy Rd.</u>	Contact: <u>Miller E. Mason</u>	Turnaround: <u>Standard</u>	<u>Catlin</u>
Address: <u>Wilmington NC 28409</u>	Phone: <u>910-452-5961</u>	Job Number: <u>203-005</u>	
Quote #: <u>DOD 101</u>	Fax: <u>910-452-7563</u>	P.O. Number: <u>230411-9</u>	Invoice To: <u>Sheila @ catlin</u>

Sample ID	Date	Time	Matrix	Preservatives				Analyses								Comments: Please specify any special reporting requirements		
				Ice	Methanol	Sodium Bio		MADEP EPH	MADEP VPH	EPA 8260/5035 prep.	EPA 8270							
USTAS497-MW01 (3-5')	6-9	4:00p	Soil	✓	✓	✓		✓	✓	✓	✓							La Jeune and Summary EDD
USTAS497-MW02 (3-5')	6-9	3:00p	Soil	✓	✓	✓		✓	✓	✓	✓							Report low runs
USTAS497-MW03 (3-5')	6-9	2:00p	Soil	✓	✓	✓		✓	✓	✓	✓							
USTAS497-MW04 (3-5')	6-9	1:20p	Soil	✓	✓	✓		✓	✓	✓	✓							
USTAS497-MW05 (3-5')	6-9	11:35a	Soil	✓	✓	✓		✓	✓	✓	✓							

CLIENT COPY

Client:	<u>Catlin</u>	Project ID:	<u>Rapid Refueler A-B</u>	Date:	<u>6-10-03</u>	Report To:	<u>Mike E. Mason @ Catlin</u>
Address:	<u>220 Old Dairy Rd.</u>	Contact:	<u>Mike E. Mason</u>	Turnaround:	<u>Standard</u>		
Address:	<u>Wilmington NC 28409</u>	Phone:	<u>910-452-5961</u>	Job Number:	<u>203-005</u>		
Quote #:	<u>DOD 101</u>	Fax:	<u>910-452-7563</u>	P.O. Number:	<u>230411-9</u>	Invoice To:	<u>Sheila @ Catlin</u>

Sample ID	Date	Time	Matrix	Preservatives				Analyses								Comments: Please specify any special reporting requirements				
				Ice	Methanol	Sodium Bio		MADEP EPH	MADEP VPH	EPA 8260/5035 Pres.	EPA 8270									
STAS497-MW01 (3-5')	6-9	4:00p	Soil	✓	✓	✓		✓	✓	✓	✓									6128-1141
STAS497-MW02 (3-5')	6-9	3:00p	Soil	✓	✓	✓		✓	✓	✓	✓									Le Jeune and Summary EDO
STAS497-MW03 (3-5')	6-9	2:00p	Soil	✓	✓	✓		✓	✓	✓	✓									Report low runs
STAS497-MW04 (3-5')	6-9	1:20p	Soil	✓	✓	✓		✓	✓	✓	✓									
STAS497-MW05 (3-5')	6-9	11:35a	Soil	✓	✓	✓		✓	✓	✓	✓									

FILE COPY**PARADIGM ANALYTICAL LABORATORIES, INC.**

5500 Business Drive
Wilmington, North Carolina 28405
(910) 350-1903
Fax (910) 350-1557

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

June 27, 2003

Report Number: G128-1142

Client Project ID: Rapid Refueler A-B

Dear Mr. Mason,

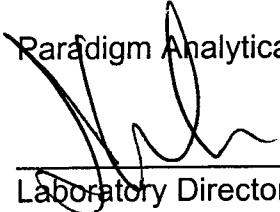
Enclosed are the results of the analytical services performed under the referenced project. Copies of this report and supporting data will be retained in our files for a period of five years in the event they are required for future reference. Any samples submitted to our laboratory will be retained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

If there are any questions about the report or the services performed during this project, please call for assistance. We will be happy to answer any questions or concerns which you may have.

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

Sincerely,

Paradigm Analytical Laboratories, Inc.



Laboratory Director
J. Patrick Weaver

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Volatiles

by GC 602

Client Sample ID: USTAS497-MW01
Client Project ID: Rapid Refueler A-B
Lab Sample ID: 74895
Lab Project ID: G128-1142

Analyzed By: JTF
Date Collected: 6/10/03
Date Received: 6/11/03
Matrix: Water

Analyte	Result ug/L	Report Limit ug/L	Dilution Factor	Date Analyzed
Benzene	BQL	1.0	1	6/19/03
Diisopropyl ether (DIPE)	BQL	1.0	1	6/19/03
Ethylbenzene	BQL	1.0	1	6/19/03
Methyl-tert butyl ether (MTBE)	BQL	2.0	1	6/19/03
Toluene	BQL	1.0	1	6/19/03
m/p-Xylene	BQL	2.0	1	6/19/03
o-Xylene	BQL	2.0	1	6/19/03
Surrogate Spike Recoveries		Spike Added	Spike Result	Percent Recovery
Trifluorotoluene		40	38.5	96.4

Comments:

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

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Volatiles

by GC 602

Client Sample ID: USTAS497-MW02
Client Project ID: Rapid Refueler A-B
Lab Sample ID: 74896
Lab Project ID: G128-1142

Analyzed By: JTF
Date Collected: 6/10/03
Date Received: 6/11/03
Matrix: Water

Analyte	Result ug/L	Report Limit ug/L	Dilution Factor	Date Analyzed
Benzene	BQL	1.0	1	6/19/03
Diisopropyl ether (DIPE)	BQL	1.0	1	6/19/03
Ethylbenzene	BQL	1.0	1	6/19/03
Methyl-tert butyl ether (MTBE)	BQL	2.0	1	6/19/03
Toluene	BQL	1.0	1	6/19/03
m/p-Xylene	BQL	2.0	1	6/19/03
o-Xylene	BQL	2.0	1	6/19/03

Surrogate Spike Recoveries	Spike Added	Spike Result	Percent Recovery
Trifluorotoluene	40	38.5	96.2

Comments:

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

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Volatiles

by GC 602

Client Sample ID: USTAS497-MW03
 Client Project ID: Rapid Refueler A-B
 Lab Sample ID: 74897
 Lab Project ID: G128-1142

Analyzed By: JTF
 Date Collected: 6/10/03
 Date Received: 6/11/03
 Matrix: Water

Analyte	Result ug/L	Report Limit ug/L	Dilution Factor	Date Analyzed
Benzene	BQL	1.0	1	6/19/03
Diisopropyl ether (DIPE)	BQL	1.0	1	6/19/03
Ethylbenzene	BQL	1.0	1	6/19/03
Methyl-tert butyl ether (MTBE)	BQL	2.0	1	6/19/03
Toluene	BQL	1.0	1	6/19/03
m/p-Xylene	BQL	2.0	1	6/19/03
o-Xylene	BQL	2.0	1	6/19/03
Surrogate Spike Recoveries		Spike Added	Spike Result	Percent Recovery
Trifluorotoluene		40	38.6	96.4

Comments:

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

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Volatiles

by GC 602

Client Sample ID: USTAS497-MW04
Client Project ID: Rapid Refueler A-B
Lab Sample ID: 74898
Lab Project ID: G128-1142

Analyzed By: JTF
Date Collected: 6/10/03
Date Received: 6/11/03
Matrix: Water

Analyte	Result ug/L	Report Limit ug/L	Dilution Factor	Date Analyzed
Benzene	BQL	1.0	1	6/19/03
Diisopropyl ether (DIPE)	BQL	1.0	1	6/19/03
Ethylbenzene	BQL	1.0	1	6/19/03
Methyl-tert butyl ether (MTBE)	BQL	2.0	1	6/19/03
Toluene	BQL	1.0	1	6/19/03
m/p-Xylene	BQL	2.0	1	6/19/03
o-Xylene	BQL	2.0	1	6/19/03

Surrogate Spike Recoveries

	Spike Added	Spike Result	Percent Recovery
Trifluorotoluene	40	38.7	96.7

Comments:

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

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Volatiles

by GC 602

Client Sample ID: USTAS497-MW05
 Client Project ID: Rapid Refueler A-B
 Lab Sample ID: 74899
 Lab Project ID: G128-1142

Analyzed By: JTF
 Date Collected: 6/10/03
 Date Received: 6/11/03
 Matrix: Water

Analyte	Result ug/L	Report Limit ug/L	Dilution Factor	Date Analyzed
Benzene	BQL	1.0	1	6/19/03
Diisopropyl ether (DIPE)	BQL	1.0	1	6/19/03
Ethylbenzene	8.6	1.0	1	6/19/03
Methyl-tert butyl ether (MTBE)	4.5	2.0	1	6/19/03
Toluene	BQL	1.0	1	6/19/03
m/p-Xylene	26	2.0	1	6/19/03
o-Xylene	BQL	2.0	1	6/19/03

Surrogate Spike Recoveries

	Spike Added	Spike Result	Percent Recovery
Trifluorotoluene	40	38.7	96.8

Comments:

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

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Volatiles

by GC 602

Client Sample ID: RR-11

Client Project ID: Rapid Refueler A-B

Lab Sample ID: 74900

Lab Project ID: G128-1142

Analyzed By: JTF

Date Collected: 6/10/03

Date Received: 6/11/03

Matrix: Water

Analyte	Result ug/L	Report Limit ug/L	Dilution Factor	Date Analyzed
Benzene	BQL	1.0	1	6/19/03
Diisopropyl ether (DIPE)	BQL	1.0	1	6/19/03
Ethylbenzene	BQL	1.0	1	6/19/03
Methyl-tert butyl ether (MTBE)	BQL	2.0	1	6/19/03
Toluene	BQL	1.0	1	6/19/03
m/p-Xylene	BQL	2.0	1	6/19/03
o-Xylene	BQL	2.0	1	6/19/03

Surrogate Spike Recoveries

	Spike Added	Spike Result	Percent Recovery
Trifluorotoluene	40	38.4	96.1

Comments:

All values corrected for dilution.

BQL = Below quantitation limit.

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Volatiles

by GC 602

Client Sample ID: RR-14

Client Project ID: Rapid Refueler A-B

Lab Sample ID: 74901

Lab Project ID: G128-1142

Analyzed By: JTF

Date Collected: 6/10/03

Date Received: 6/11/03

Matrix: Water

Analyte	Result ug/L	Report Limit ug/L	Dilution Factor	Date Analyzed
Benzene	BQL	1.0	1	6/19/03
Diisopropyl ether (DIPE)	BQL	1.0	1	6/19/03
Ethylbenzene	BQL	1.0	1	6/19/03
Methyl-tert butyl ether (MTBE)	BQL	2.0	1	6/19/03
Toluene	BQL	1.0	1	6/19/03
m/p-Xylene	BQL	2.0	1	6/19/03
o-Xylene	BQL	2.0	1	6/19/03

Surrogate Spike Recoveries

	Spike Added	Spike Result	Percent Recovery
Trifluorotoluene	40	38.5	96.4

Comments:

All values corrected for dilution.

BQL = Below quantitation limit.

Results for Semivolatiles
by GCMS 625

Client Sample ID: USTAS497-MW01
Client Project ID: Rapid Refueler A-B
Lab Sample ID: 74895
Lab Project ID: G128-1142
Matrix: Water

Date Collected: 6/10/2003
Date Received: 6/11/2003
Date Analyzed: 6/16/2003
Analyzed By: MRC
Dilution: 1

Compound	Quantitation Limit (ug/L)	Result (ug/L)
Acenaphthene	10	BQL
Acenaphthylene	10	BQL
Anthracene	10	BQL
Benzo[a]anthracene	10	BQL
Benzo[a]pyrene	10	BQL
Benzo[b]fluoranthene	10	BQL
Benzo[g,h,i]perylene	10	BQL
Benzo[k]fluoranthene	10	BQL
Bis(2-chloroethoxy)methane	10	BQL
Bis(2-chloroethyl)ether	10	BQL
Bis(2-chloroisopropyl)ether	10	BQL
Bis(2-ethylhexyl)phthalate	10	BQL
4-bromophenyl phenyl ether	10	BQL
Butylbenzylphthalate	10	BQL
4-Chloro-3-methylphenol	10	BQL
2-Chloronaphthalene	10	BQL
2-Chlorophenol	10	BQL
4-Chlorophenyl phenyl ether	10	BQL
Chrysene	10	BQL
Di-n-Butylphthalate	10	BQL
Di-n-octylphthalate	10	BQL
Dibenzo[a,h]anthracene	10	BQL
1,2-Dichlorobenzene	10	BQL
1,3-Dichlorobenzene	10	BQL
1,4-Dichlorobenzene	10	BQL
3,3'-Dichlorobenzidine	20	BQL
2,4-Dichlorophenol	10	BQL
Diethylphthalate	10	BQL
2,4-Dimethylphenol	10	BQL
Dimethylphthalate	10	BQL
4,6-Dinitro-2-methylphenol	50	BQL
2,4-Dinitrophenol	50	BQL
2,4-Dinitrotoluene	10	BQL
2,6-Dinitrotoluene	10	BQL
Fluoranthene	10	BQL
Fluorene	10	BQL
Hexachlorobenzene	10	BQL
Hexachlorobutadiene	10	BQL
Hexachlorocyclopentadiene	20	BQL
Hexachloroethane	10	BQL

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Semivolatiles

by GCMS 625

Client Sample ID: USTAS497-MW01
 Client Project ID: Rapid Refueler A-B
 Lab Sample ID: 74895
 Lab Project ID: G128-1142
 Matrix: Water

Date Collected: 6/10/2003
 Date Received: 6/11/2003
 Date Analyzed: 6/16/2003
 Analyzed By: MRC
 Dilution: 1

Compound	Quantitation Limit (ug/L)	Result (ug/L)
Indeno(1,2,3-c,d)pyrene	10	BQL
Isophorone	10	BQL
N-Nitrosodi-n-propylamine	10	BQL
N-Nitrosodiphenylamine	10	BQL
Naphthalene	10	BQL
Nitrobenzene	10	BQL
2-Nitrophenol	10	BQL
4-Nitrophenol	50	BQL
Pentachlorophenol	50	BQL
Phenanthrene	10	BQL
Phenol	10	BQL
Pyrene	10	BQL
1,2,4-Trichlorobenzene	10	BQL
2,4,6-Trichlorophenol	10	BQL

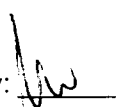
Surrogate Spike Recoveries	Spike Added	Spike Result	Percent Recovered
2-Fluorobiphenyl	10	8.4	84
2-Fluorophenol	10	8.1	81
Nitrobenzene-d5	10	9.0	90
Phenol-d6	10	8.6	86
2,4,6-Tribromophenol	10	8.4	84
4-Terphenyl-d14	10	9.2	92

Comments:

Results are corrected for %solids and dilution where applicable.

Flags:

BQL = Below Quantitation Limit.

Reviewed By: 

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Semivolatiles

by GCMS 625

Client Sample ID: USTAS497-MW02

Client Project ID: Rapid Refueler A-B

Lab Sample ID: 74896

Lab Project ID: G128-1142

Matrix: Water

Date Collected: 6/10/2003

Date Received: 6/11/2003

Date Analyzed: 6/16/2003

Analyzed By: MRC

Dilution: 1

Compound	Quantitation Limit (ug/L)	Result (ug/L)
Acenaphthene	10	BQL
Acenaphthylene	10	BQL
Anthracene	10	BQL
Benzo[a]anthracene	10	BQL
Benzo[a]pyrene	10	BQL
Benzo[b]fluoranthene	10	BQL
Benzo[g,h,i]perylene	10	BQL
Benzo[k]fluoranthene	10	BQL
Bis(2-chloroethoxy)methane	10	BQL
Bis(2-chloroethyl)ether	10	BQL
Bis(2-chloroisopropyl)ether	10	BQL
Bis(2-ethylhexyl)phthalate	10	BQL
4-bromophenyl phenyl ether	10	BQL
Butylbenzylphthalate	10	BQL
4-Chloro-3-methylphenol	10	BQL
2-Chloronaphthalene	10	BQL
2-Chlorophenol	10	BQL
4-Chlorophenyl phenyl ether	10	BQL
Chrysene	10	BQL
Di-n-Butylphthalate	10	BQL
Di-n-octylphthalate	10	BQL
Dibenzo[a,h]anthracene	10	BQL
1,2-Dichlorobenzene	10	BQL
1,3-Dichlorobenzene	10	BQL
1,4-Dichlorobenzene	10	BQL
3,3'-Dichlorobenzidine	20	BQL
2,4-Dichlorophenol	10	BQL
Diethylphthalate	10	BQL
2,4-Dimethylphenol	10	BQL
Dimethylphthalate	10	BQL
4,6-Dinitro-2-methylphenol	50	BQL
2,4-Dinitrophenol	50	BQL
2,4-Dinitrotoluene	10	BQL
2,6-Dinitrotoluene	10	BQL
Fluoranthene	10	BQL
Fluorene	10	BQL
Hexachlorobenzene	10	BQL
Hexachlorobutadiene	10	BQL
Hexachlorocyclopentadiene	20	BQL
Hexachloroethane	10	BQL

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Semivolatiles

by GCMS 625

Client Sample ID: USTAS497-MW02

Client Project ID: Rapid Refueler A-B

Lab Sample ID: 74896

Lab Project ID: G128-1142

Matrix: Water

Date Collected: 6/10/2003

Date Received: 6/11/2003

Date Analyzed: 6/16/2003

Analyzed By: MRC

Dilution: 1

Compound	Quantitation Limit (ug/L)	Result (ug/L)
Indeno(1,2,3-c,d)pyrene	10	BQL
Isophorone	10	BQL
N-Nitrosodi-n-propylamine	10	BQL
N-Nitrosodiphenylamine	10	BQL
Naphthalene	10	BQL
Nitrobenzene	10	BQL
2-Nitrophenol	10	BQL
4-Nitrophenol	50	BQL
Pentachlorophenol	50	BQL
Phenanthrene	10	BQL
Phenol	10	BQL
Pyrene	10	BQL
1,2,4-Trichlorobenzene	10	BQL
2,4,6-Trichlorophenol	10	BQL

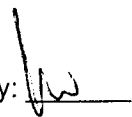
Surrogate Spike Recoveries	Spike Added	Spike Result	Percent Recovered
2-Fluorobiphenyl	10	9.1	91
2-Fluorophenol	10	9.0	90
Nitrobenzene-d5	10	9.6	96
Phenol-d6	10	9.5	95
2,4,6-Tribromophenol	10	8.8	88
4-Terphenyl-d14	10	9.5	95

Comments:

Results are corrected for %solids and dilution where applicable.

Flags:

BQL = Below Quantitation Limit.

Reviewed By: 

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Semivolatiles by GCMS 625

Client Sample ID: USTAS497-MW03
Client Project ID: Rapid Refueler A-B
Lab Sample ID: 74897
Lab Project ID: G128-1142
Matrix: Water

Date Collected: 6/10/2003
Date Received: 6/11/2003
Date Analyzed: 6/16/2003
Analyzed By: MRC
Dilution: 1

Compound	Quantitation Limit (ug/L)	Result (ug/L)
Acenaphthene	10	BQL
Acenaphthylene	10	BQL
Anthracene	10	BQL
Benzo[a]anthracene	10	BQL
Benzo[a]pyrene	10	BQL
Benzo[b]fluoranthene	10	BQL
Benzo[g,h,i]perylene	10	BQL
Benzo[k]fluoranthene	10	BQL
Bis(2-chloroethoxy)methane	10	BQL
Bis(2-chloroethyl)ether	10	BQL
Bis(2-chloroisopropyl)ether	10	BQL
Bis(2-ethylhexyl)phthalate	10	BQL
4-bromophenyl phenyl ether	10	BQL
Butylbenzylphthalate	10	BQL
4-Chloro-3-methylphenol	10	BQL
2-Chloronaphthalene	10	BQL
2-Chlorophenol	10	BQL
4-Chlorophenyl phenyl ether	10	BQL
Chrysene	10	BQL
Di-n-Butylphthalate	10	BQL
Di-n-octylphthalate	10	BQL
Dibenzo[a,h]anthracene	10	BQL
1,2-Dichlorobenzene	10	BQL
1,3-Dichlorobenzene	10	BQL
1,4-Dichlorobenzene	10	BQL
3,3'-Dichlorobenzidine	20	BQL
2,4-Dichlorophenol	10	BQL
Diethylphthalate	10	BQL
2,4-Dimethylphenol	10	BQL
Dimethylphthalate	10	BQL
4,6-Dinitro-2-methylphenol	50	BQL
2,4-Dinitrophenol	50	BQL
2,4-Dinitrotoluene	10	BQL
2,6-Dinitrotoluene	10	BQL
Fluoranthene	10	BQL
Fluorene	10	BQL
Hexachlorobenzene	10	BQL
Hexachlorobutadiene	10	BQL
Hexachlorocyclopentadiene	20	BQL
Hexachloroethane	10	BQL

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Semivolatiles

by GCMS 625

Client Sample ID: USTAS497-MW03
 Client Project ID: Rapid Refueler A-B
 Lab Sample ID: 74897
 Lab Project ID: G128-1142
 Matrix: Water

Date Collected: 6/10/2003
 Date Received: 6/11/2003
 Date Analyzed: 6/16/2003
 Analyzed By: MRC
 Dilution: 1

Compound	Quantitation Limit (ug/L)	Result (ug/L)
Indeno(1,2,3-c,d)pyrene	10	BQL
Isophorone	10	BQL
N-Nitrosodi-n-propylamine	10	BQL
N-Nitrosodiphenylamine	10	BQL
Naphthalene	10	BQL
Nitrobenzene	10	BQL
2-Nitrophenol	10	BQL
4-Nitrophenol	50	BQL
Pentachlorophenol	50	BQL
Phenanthrene	10	BQL
Phenol	10	BQL
Pyrene	10	BQL
1,2,4-Trichlorobenzene	10	BQL
2,4,6-Trichlorophenol	10	BQL

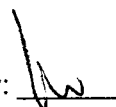
Surrogate Spike Recoveries	Spike Added	Spike Result	Percent Recovered
2-Fluorobiphenyl	10	9.5	95
2-Fluorophenol	10	9.4	94
Nitrobenzene-d5	10	10.1	101
Phenol-d6	10	9.8	98
2,4,6-Tribromophenol	10	9.2	92
4-Terphenyl-d14	10	7.8	78

Comments:

Results are corrected for %solids and dilution where applicable.

Flags:

BQL = Below Quantitation Limit.

Reviewed By: 

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Semivolatiles by GCMS 625

Client Sample ID: USTAS497-MW04
 Client Project ID: Rapid Refueler A-B
 Lab Sample ID: 74898
 Lab Project ID: G128-1142
 Matrix: Water

Date Collected: 6/10/2003
 Date Received: 6/11/2003
 Date Analyzed: 6/16/2003
 Analyzed By: MRC
 Dilution: 1

Compound	Quantitation Limit (ug/L)	Result (ug/L)
Acenaphthene	10	BQL
Acenaphthylene	10	BQL
Anthracene	10	BQL
Benzo[a]anthracene	10	BQL
Benzo[a]pyrene	10	BQL
Benzo[b]fluoranthene	10	BQL
Benzo[g,h,i]perylene	10	BQL
Benzo[k]fluoranthene	10	BQL
Bis(2-chloroethoxy)methane	10	BQL
Bis(2-chloroethyl)ether	10	BQL
Bis(2-chloroisopropyl)ether	10	BQL
Bis(2-ethylhexyl)phthalate	10	BQL
4-bromophenyl phenyl ether	10	BQL
Butylbenzylphthalate	10	BQL
4-Chloro-3-methylphenol	10	BQL
2-Chloronaphthalene	10	BQL
2-Chlorophenol	10	BQL
4-Chlorophenyl phenyl ether	10	BQL
Chrysene	10	BQL
Di-n-Butylphthalate	10	BQL
Di-n-octylphthalate	10	BQL
Dibenzo[a,h]anthracene	10	BQL
1,2-Dichlorobenzene	10	BQL
1,3-Dichlorobenzene	10	BQL
1,4-Dichlorobenzene	10	BQL
3,3'-Dichlorobenzidine	20	BQL
2,4-Dichlorophenol	10	BQL
Diethylphthalate	10	BQL
2,4-Dimethylphenol	10	BQL
Dimethylphthalate	10	BQL
4,6-Dinitro-2-methylphenol	50	BQL
2,4-Dinitrophenol	50	BQL
2,4-Dinitrotoluene	10	BQL
2,6-Dinitrotoluene	10	BQL
Fluoranthene	10	BQL
Fluorene	10	BQL
Hexachlorobenzene	10	BQL
Hexachlorobutadiene	10	BQL
Hexachlorocyclopentadiene	20	BQL
Hexachloroethane	10	BQL

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Semivolatiles by GCMS 625

Client Sample ID: USTAS497-MW04
 Client Project ID: Rapid Refueler A-B
 Lab Sample ID: 74898
 Lab Project ID: G128-1142
 Matrix: Water

Date Collected: 6/10/2003
 Date Received: 6/11/2003
 Date Analyzed: 6/16/2003
 Analyzed By: MRC
 Dilution: 1

Compound	Quantitation Limit (ug/L)	Result (ug/L)
Indeno(1,2,3-c,d)pyrene	10	BQL
Isophorone	10	BQL
N-Nitrosodi-n-propylamine	10	BQL
N-Nitrosodiphenylamine	10	BQL
Naphthalene	10	BQL
Nitrobenzene	10	BQL
2-Nitrophenol	10	BQL
4-Nitrophenol	50	BQL
Pentachlorophenol	50	BQL
Phenanthrene	10	BQL
Phenol	10	BQL
Pyrene	10	BQL
1,2,4-Trichlorobenzene	10	BQL
2,4,6-Trichlorophenol	10	BQL

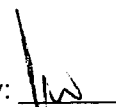
Surrogate Spike Recoveries	Spike Added	Spike Result	Percent Recovered
2-Fluorobiphenyl	10	8.4	84
2-Fluorophenol	10	8.2	82
Nitrobenzene-d5	10	8.7	87
Phenol-d6	10	8.4	84
2,4,6-Tribromophenol	10	8.3	83
4-Terphenyl-d14	10	5.1	51

Comments:

Results are corrected for %solids and dilution where applicable.

Flags:

BQL = Below Quantitation Limit.

Reviewed By: 

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Semivolatiles by GCMS 625

Client Sample ID: USTAS497-MW05
 Client Project ID: Rapid Refueler A-B
 Lab Sample ID: 74899
 Lab Project ID: G128-1142
 Matrix: Water

Date Collected: 6/10/2003
 Date Received: 6/11/2003
 Date Analyzed: 6/16/2003
 Analyzed By: MRC
 Dilution: 1

Compound	Quantitation Limit (ug/L)	Result (ug/L)
Acenaphthene	10	BQL
Acenaphthylene	10	BQL
Anthracene	10	BQL
Benzo[a]anthracene	10	BQL
Benzo[a]pyrene	10	BQL
Benzo[b]fluoranthene	10	BQL
Benzo[g,h,i]perylene	10	BQL
Benzo[k]fluoranthene	10	BQL
Bis(2-chloroethoxy)methane	10	BQL
Bis(2-chloroethyl)ether	10	BQL
Bis(2-chloroisopropyl)ether	10	BQL
Bis(2-ethylhexyl)phthalate	10	BQL
4-bromophenyl phenyl ether	10	BQL
Butylbenzylphthalate	10	BQL
4-Chloro-3-methylphenol	10	BQL
2-Chloronaphthalene	10	BQL
2-Chlorophenol	10	BQL
4-Chlorophenyl phenyl ether	10	BQL
Chrysene	10	BQL
Di-n-Butylphthalate	10	BQL
Di-n-octylphthalate	10	BQL
Dibenzo[a,h]anthracene	10	BQL
1,2-Dichlorobenzene	10	BQL
1,3-Dichlorobenzene	10	BQL
1,4-Dichlorobenzene	10	BQL
3,3'-Dichlorobenzidine	20	BQL
2,4-Dichlorophenol	10	BQL
Diethylphthalate	10	BQL
2,4-Dimethylphenol	10	BQL
Dimethylphthalate	10	BQL
4,6-Dinitro-2-methylphenol	50	BQL
2,4-Dinitrophenol	50	BQL
2,4-Dinitrotoluene	10	BQL
2,6-Dinitrotoluene	10	BQL
Fluoranthene	10	BQL
Fluorene	10	BQL
Hexachlorobenzene	10	BQL
Hexachlorobutadiene	10	BQL
Hexachlorocyclopentadiene	20	BQL
Hexachloroethane	10	BQL

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Semivolatiles

by GCMS 625

Client Sample ID: USTAS497-MW05

Client Project ID: Rapid Refueler A-B

Lab Sample ID: 74899

Lab Project ID: G128-1142

Matrix: Water

Date Collected: 6/10/2003

Date Received: 6/11/2003

Date Analyzed: 6/16/2003

Analyzed By: MRC

Dilution: 1

Compound	Quantitation Limit (ug/L)	Result (ug/L)
Indeno(1,2,3-c,d)pyrene	10	BQL
Isophorone	10	BQL
N-Nitrosodi-n-propylamine	10	BQL
N-Nitrosodiphenylamine	10	BQL
Naphthalene	10	31
Nitrobenzene	10	BQL
2-Nitrophenol	10	BQL
4-Nitrophenol	50	BQL
Pentachlorophenol	50	BQL
Phenanthrene	10	BQL
Phenol	10	BQL
Pyrene	10	BQL
1,2,4-Trichlorobenzene	10	BQL
2,4,6-Trichlorophenol	10	BQL

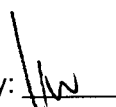
Surrogate Spike Recoveries	Spike Added	Spike Result	Percent Recovered
2-Fluorobiphenyl	10	8.8	88
2-Fluorophenol	10	8.5	85
Nitrobenzene-d5	10	9.6	96
Phenol-d6	10	9.0	90
2,4,6-Tribromophenol	10	9.1	91
4-Terphenyl-d14	10	9.8	98

Comments:

Results are corrected for %solids and dilution where applicable.

Flags:

BQL = Below Quantitation Limit.

Reviewed By: 

PARADIGM ANALYTICAL LABORATORIES, INC.

**Results for Semivolatiles
by GCMS 625**

Client Sample ID: RR-11
Client Project ID: Rapid Refueler A-B
Lab Sample ID: 74900
Lab Project ID: G128-1142
Matrix: Water

Date Collected: 6/10/2003
Date Received: 6/11/2003
Date Analyzed: 6/16/2003
Analyzed By: MRC
Dilution: 1

Compound	Quantitation Limit (ug/L)	Result (ug/L)
Acenaphthene	10	BQL
Acenaphthylene	10	BQL
Anthracene	10	BQL
Benzo[a]anthracene	10	BQL
Benzo[a]pyrene	10	BQL
Benzo[b]fluoranthene	10	BQL
Benzo[g,h,i]perylene	10	BQL
Benzo[k]fluoranthene	10	BQL
Bis(2-chloroethoxy)methane	10	BQL
Bis(2-chloroethyl)ether	10	BQL
Bis(2-chloroisopropyl)ether	10	BQL
Bis(2-ethylhexyl)phthalate	10	BQL
4-bromophenyl phenyl ether	10	BQL
Butylbenzylphthalate	10	BQL
4-Chloro-3-methylphenol	10	BQL
2-Chloronaphthalene	10	BQL
2-Chlorophenol	10	BQL
4-Chlorophenyl phenyl ether	10	BQL
Chrysene	10	BQL
Di-n-Butylphthalate	10	BQL
Di-n-octylphthalate	10	BQL
Dibenzo[a,h]anthracene	10	BQL
1,2-Dichlorobenzene	10	BQL
1,3-Dichlorobenzene	10	BQL
1,4-Dichlorobenzene	10	BQL
3,3'-Dichlorobenzidine	20	BQL
2,4-Dichlorophenol	10	BQL
Diethylphthalate	10	BQL
2,4-Dimethylphenol	10	BQL
Dimethylphthalate	10	BQL
4,6-Dinitro-2-methylphenol	50	BQL
2,4-Dinitrophenol	50	BQL
2,4-Dinitrotoluene	10	BQL
2,6-Dinitrotoluene	10	BQL
Fluoranthene	10	BQL
Fluorene	10	BQL
Hexachlorobenzene	10	BQL
Hexachlorobutadiene	10	BQL
Hexachlorocyclopentadiene	20	BQL
Hexachloroethane	10	BQL

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Semivolatiles by GCMS 625

Client Sample ID: RR-11
 Client Project ID: Rapid Refueler A-B
 Lab Sample ID: 74900
 Lab Project ID: G128-1142
 Matrix: Water

Date Collected: 6/10/2003
 Date Received: 6/11/2003
 Date Analyzed: 6/16/2003
 Analyzed By: MRC
 Dilution: 1

Compound	Quantitation Limit (ug/L)	Result (ug/L)
Indeno(1,2,3-c,d)pyrene	10	BQL
Isophorone	10	BQL
N-Nitrosodi-n-propylamine	10	BQL
N-Nitrosodiphenylamine	10	BQL
Naphthalene	10	BQL
Nitrobenzene	10	BQL
2-Nitrophenol	10	BQL
4-Nitrophenol	50	BQL
Pentachlorophenol	50	BQL
Phenanthrene	10	BQL
Phenol	10	BQL
Pyrene	10	BQL
1,2,4-Trichlorobenzene	10	BQL
2,4,6-Trichlorophenol	10	BQL

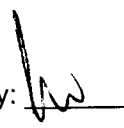
Surrogate Spike Recoveries	Spike Added	Spike Result	Percent Recovered
2-Fluorobiphenyl	10	8.3	83
2-Fluorophenol	10	7.8	78
Nitrobenzene-d5	10	8.7	87
Phenol-d6	10	8.5	85
2,4,6-Tribromophenol	10	8.4	84
4-Terphenyl-d14	10	7.8	78

Comments:

Results are corrected for %solids and dilution where applicable.

Flags:

BQL = Below Quantitation Limit.

Reviewed By: 

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Semivolatiles by GCMS 625

Client Sample ID: RR-14
Client Project ID: Rapid Refueler A-B
Lab Sample ID: 74901
Lab Project ID: G128-1142
Matrix: Water

Date Collected: 6/10/2003
Date Received: 6/11/2003
Date Analyzed: 6/16/2003
Analyzed By: MRC
Dilution: 1

Compound	Quantitation Limit (ug/L)	Result (ug/L)
Acenaphthene	10	BQL
Acenaphthylene	10	BQL
Anthracene	10	BQL
Benzo[a]anthracene	10	BQL
Benzo[a]pyrene	10	BQL
Benzo[b]fluoranthene	10	BQL
Benzo[g,h,i]perylene	10	BQL
Benzo[k]fluoranthene	10	BQL
Bis(2-chloroethoxy)methane	10	BQL
Bis(2-chloroethyl)ether	10	BQL
Bis(2-chloroisopropyl)ether	10	BQL
Bis(2-ethylhexyl)phthalate	10	BQL
4-bromophenyl phenyl ether	10	BQL
Butylbenzylphthalate	10	BQL
4-Chloro-3-methylphenol	10	BQL
2-Chloronaphthalene	10	BQL
2-Chlorophenol	10	BQL
4-Chlorophenyl phenyl ether	10	BQL
Chrysene	10	BQL
Di-n-Butylphthalate	10	BQL
Di-n-octylphthalate	10	BQL
Dibenzo[a,h]anthracene	10	BQL
1,2-Dichlorobenzene	10	BQL
1,3-Dichlorobenzene	10	BQL
1,4-Dichlorobenzene	10	BQL
3,3'-Dichlorobenzidine	20	BQL
2,4-Dichlorophenol	10	BQL
Diethylphthalate	10	BQL
2,4-Dimethylphenol	10	BQL
Dimethylphthalate	10	BQL
4,6-Dinitro-2-methylphenol	50	BQL
2,4-Dinitrophenol	50	BQL
2,4-Dinitrotoluene	10	BQL
2,6-Dinitrotoluene	10	BQL
Fluoranthene	10	BQL
Fluorene	10	BQL
Hexachlorobenzene	10	BQL
Hexachlorobutadiene	10	BQL
Hexachlorocyclopentadiene	20	BQL
Hexachloroethane	10	BQL

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Semivolatiles

by GCMS 625

Client Sample ID: RR-14
 Client Project ID: Rapid Refueler A-B
 Lab Sample ID: 74901
 Lab Project ID: G128-1142
 Matrix: Water

Date Collected: 6/10/2003
 Date Received: 6/11/2003
 Date Analyzed: 6/16/2003
 Analyzed By: MRC
 Dilution: 1

Compound	Quantitation Limit (ug/L)	Result (ug/L)
Indeno(1,2,3-c,d)pyrene	10	BQL
Isophorone	10	BQL
N-Nitrosodi-n-propylamine	10	BQL
N-Nitrosodiphenylamine	10	BQL
Naphthalene	10	BQL
Nitrobenzene	10	BQL
2-Nitrophenol	10	BQL
4-Nitrophenol	50	BQL
Pentachlorophenol	50	BQL
Phenanthrene	10	BQL
Phenol	10	BQL
Pyrene	10	BQL
1,2,4-Trichlorobenzene	10	BQL
2,4,6-Trichlorophenol	10	BQL

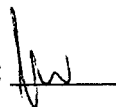
Surrogate Spike Recoveries	Spike Added	Spike Result	Percent Recovered
2-Fluorobiphenyl	10	9.5	95
2-Fluorophenol	10	8.3	83
Nitrobenzene-d5	10	10.0	100
Phenol-d6	10	9.5	95
2,4,6-Tribromophenol	10	9.5	95
4-Terphenyl-d14	10	9.6	96

Comments:

Results are corrected for %solids and dilution where applicable.

Flags:

BQL = Below Quantitation Limit.

Reviewed By: 

EPH (Aliphatics/Aromatics) Results

by MDEP-EPH

Client Name: Richard Callin & Associates

Project Name: Rapid Refueler A-B

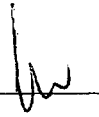
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Sample Identification	USTAS497-MW01
Sample Matrix	Water
Date Collected	06/10/03
Date Received	06/11/03
Date Extracted	06/17/03
Date Analyzed	06/17/03
Dry Weight	
Dilution Factor	1
C ₉ -C ₁₈ Aliphatics*	< 100 (µg/L)
C ₁₉ -C ₃₆ Aliphatics*	< 100 (µg/L)
C ₁₁ -C ₂₂ Aromatics*	< 100 (µg/L)
Aliphatic Surrogate % Recovery	91
Aromatic Surrogate % Recovery	90

Comments:

* = Excludes any surrogates or internal standards.

Sample did not require fractionation.

Lab info: G128-1142-74895

Reviewed By: 

EPH (Aliphatics/Aromatics) Results

by MDEP-EPH

Client Name: Richard Catlin & Associates

Project Name: Rapid Refueler A-B

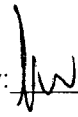
Sample Information and Analytical Results	
Sample Identification	USTAS497-MW02
Sample Matrix	Water
Date Collected	06/10/03
Date Received	06/11/03
Date Extracted	06/17/03
Date Analyzed	06/17/03
Dry Weight	
Dilution Factor	1
C ₉ -C ₁₈ Aliphatics*	< 100 (µg/L)
C ₁₉ -C ₃₆ Aliphatics*	< 100 (µg/L)
C ₁₁ -C ₂₂ Aromatics*	< 100 (µg/L)
Aliphatic Surrogate % Recovery	73
Aromatic Surrogate % Recovery	79

Comments:

* = Excludes any surrogates or internal standards.

Sample did not require fractionation.

Lab info: G128-1142-74896

Reviewed By: 

EPH (Aliphatics/Aromatics) Results

by MDEP-EPH

Client Name: Richard Catlin & AssociatesProject Name: Rapid Refueler A-B

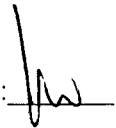
Sample Information and Analytical Results	
Sample Identification	USTAS497-MW03
Sample Matrix	Water
Date Collected	06/10/03
Date Received	06/11/03
Date Extracted	06/17/03
Date Analyzed	06/17/03
Dry Weight	
Dilution Factor	1
C ₉ -C ₁₈ Aliphatics*	< 100 (µg/L)
C ₁₉ -C ₃₆ Aliphatics*	< 100 (µg/L)
C ₁₁ -C ₂₂ Aromatics*	< 100 (µg/L)
Aliphatic Surrogate % Recovery	60
Aromatic Surrogate % Recovery	67

Comments:

* = Excludes any surrogates or internal standards.

Sample did not require fractionation.

Lab info: G128-1142-74897

Reviewed By: 

EPH (Aliphatics/Aromatics) Results

by MDEP-EPH

Client Name: Richard Catlin & AssociatesProject Name: Rapid Refueler A-B

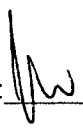
Sample Information and Analytical Results	
Sample Identification	USTAS497-MW04
Sample Matrix	Water
Date Collected	06/10/03
Date Received	06/11/03
Date Extracted	06/17/03
Date Analyzed	06/17/03
Dry Weight	
Dilution Factor	1
C ₉ -C ₁₈ Aliphatics*	< 100 (µg/L)
C ₁₉ -C ₃₆ Aliphatics*	< 100 (µg/L)
C ₁₁ -C ₂₂ Aromatics*	< 100 (µg/L)
Aliphatic Surrogate % Recovery	64
Aromatic Surrogate % Recovery	68

Comments:

* = Excludes any surrogates or internal standards.

Sample did not require fractionation.

Lab info: G128-1142-74898

Reviewed By: 

EPH (Aliphatics/Aromatics) Results

by MDEP-EPH

Client Name: Richard Catlin & Associates

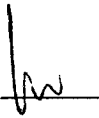
Project Name: Rapid Refueler A-B

Sample Information and Analytical Results	
Sample Identification	USTAS497-MW05
Sample Matrix	Water
Date Collected	06/10/03
Date Received	06/11/03
Date Extracted	06/17/03
Date Analyzed	06/25/03
Dry Weight	
Dilution Factor	1
C ₉ -C ₁₈ Aliphatics*	< 100 (µg/L)
C ₁₉ -C ₃₆ Aliphatics*	< 100 (µg/L)
C ₁₁ -C ₂₂ Aromatics*	< 100 (µg/L)
Aliphatic Surrogate % Recovery	100
Aromatic Surrogate % Recovery	97
Fractionation Surrogate 1 % Recovery	100

Comments:

* = Excludes any surrogates or internal standards.

Lab info: G128-1142-74899

Reviewed By: 

EPH (Aliphatics/Aromatics) Results

by MDEP-EPH

Client Name: Richard Catlin & Associates

Project Name: Rapid Refueler A-B

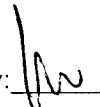
Sample Information and Analytical Results	
Sample Identification	RR-11
Sample Matrix	Water
Date Collected	06/10/03
Date Received	06/11/03
Date Extracted	06/17/03
Date Analyzed	06/17/03
Dry Weight	
Dilution Factor	1
C ₉ -C ₁₈ Aliphatics*	< 100 (µg/L)
C ₁₉ -C ₃₆ Aliphatics*	< 100 (µg/L)
C ₁₁ -C ₂₂ Aromatics*	< 100 (µg/L)
Aliphatic Surrogate % Recovery	82
Aromatic Surrogate % Recovery	79

Comments:

* = Excludes any surrogates or internal standards.

Sample did not require fractionation.

Lab info: G128-1142-74900

Reviewed By: 

EPH (Aliphatics/Aromatics) Results

by MDEP-EPH

Client Name: Richard Catlin & Associates

Project Name: Rapid Refueler A-B

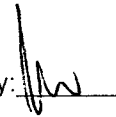
Sample Information and Analytical Results	
Sample Identification	RR-14
Sample Matrix	Water
Date Collected	06/10/03
Date Received	06/11/03
Date Extracted	06/17/03
Date Analyzed	06/17/03
Dry Weight	
Dilution Factor	1
C ₉ -C ₁₈ Aliphatics*	< 100 (µg/L)
C ₁₉ -C ₃₆ Aliphatics*	< 100 (µg/L)
C ₁₁ -C ₂₂ Aromatics*	< 100 (µg/L)
Aliphatic Surrogate % Recovery	86
Aromatic Surrogate % Recovery	83

Comments:

* = Excludes any surrogates or internal standards.

Sample did not require fractionation.

Lab info: G128-1142-74901

Reviewed By: 

PARADIGM ANALYTICAL LABORATORIES, INC.

Attachment 3

EPH Laboratory Reporting Form

Calibration and QA/QC Information

Initial Calibration Date: 06/09/03

Calibration Ranges and Limits

Range	MDL (mg/Kg)	(µg/L)	ML (mg/Kg)	(µg/L)	RL (mg/Kg)	(µg/L)
C ₉ -C ₁₈ Aliphatics	0.1	0.8	0.3	2.6	100	10
C ₁₉ -C ₃₆ Aliphatics	0.1	1.6	0.3	5	100	10
C ₁₁ -C ₂₂ Aromatics	0.2	2.1	0.6	6.7	100	10

Calibration Concentration Levels

Range	Levels (µg/L) (mg/Kg)	%RSD or CCC	Method of Quantitation
C ₉ -C ₁₈ Aliphatics	0.06 1	4.10	Calibration Factor
	0.15 2.5		
	0.3 5		
	0.6 10		
	1.2 20		
C ₁₉ -C ₃₆ Aliphatics	0.08 1.33	2.5	Calibration Factor
	0.2 3.33		
	0.4 6.67		
	0.8 13.3		
	1.6 26.7		
C ₁₁ -C ₂₂ Aromatics	0.17 2.83	4.7	Calibration Factor
	0.425 7.08		
	0.85 14.2		
	1.7 28.3		
	3.4 56.7		

Calibration Check Date: 06/17/03

Calibration Check

Range	Levels (µg/mL) (mg/Kg)	RPD
C ₉ -C ₁₈ Aliphatics	0.6 10	-6.6
C ₁₉ -C ₃₆ Aliphatics	0.8 13.3	-8.3
C ₁₁ -C ₂₂ Aromatics	1.7 28.3	-12.9

MDL = Method Detection Limit

ML = Minimum Limit

RL = Reportable Limit

RPD = Relative Percent Difference

%RSD = Percent Relative Standard Deviation

CCC = Correlation Coefficient of Curve

PARADIGM ANALYTICAL LABORATORIES, INC.

Attachment 3

EPH Laboratory Reporting Form

Calibration and QA/QC Information

Initial Calibration Date: 06/09/03

Calibration Ranges and Limits

Range	MDL (mg/Kg)	(µg/L)	ML (mg/Kg)	(µg/L)	RL (mg/Kg)	(µg/L)
C ₉ -C ₁₈ Aliphatics	0.1	0.8	0.3	2.6	100	10
C ₁₉ -C ₃₆ Aliphatics	0.1	1.6	0.3	5	100	10
C ₁₁ -C ₂₂ Aromatics	0.2	2.1	0.6	6.7	100	10

Calibration Concentration Levels

Range	Levels (µg/L) (mg/Kg)	%RSD or CCC	Method of Quantitation
C ₉ -C ₁₈ Aliphatics	0.06 1	4.10	Calibration Factor
	0.15 2.5		
	0.3 5		
	0.6 10		
	1.2 20		
C ₁₉ -C ₃₆ Aliphatics	0.08 1.33	2.5	Calibration Factor
	0.2 3.33		
	0.4 6.67		
	0.8 13.3		
	1.6 26.7		
C ₁₁ -C ₂₂ Aromatics	0.17 2.83	4.7	Calibration Factor
	0.425 7.08		
	0.85 14.2		
	1.7 28.3		
	3.4 56.7		

Calibration Check Date: 06/25/03

Calibration Check

Range	Levels (µg/mL) (mg/Kg)	RPD
C ₉ -C ₁₈ Aliphatics	0.6 10	2.6
C ₁₉ -C ₃₆ Aliphatics	0.8 13.3	7.7
C ₁₁ -C ₂₂ Aromatics	1.7 28.3	1.1

MDL = Method Detection Limit

ML = Minimum Limit

RL = Reportable Limit

RPD = Relative Percent Difference

%RSD = Percent Relative Standard Deviation

CCC = Correlation Coefficient of Curve

VPH (Aliphatics/Aromatics) Laboratory Reporting Form

Client Name: Richard Catlin & AssociatesProject Name: Rapid Refueler A-B

Sample Information and Analytical Results	
Sample Identification	USTAS497-MW01
Sample Matrix	Water
Collection Option (for Soil)*	
Date Collected	06/10/03
Date Received	06/11/03
Date Extracted	06/18/03
Date Analyzed	06/18/03
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	69
Surrogate % Recovery - FID	85

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

** = Excludes any surrogates or internal standards.

Lab Info: G128-1142-74895

Reviewed By: 

VPH (Aliphatics/Aromatics) Laboratory Reporting Form

Client Name: Richard Catlin & AssociatesProject Name: Rapid Refueler A-B

Sample Information and Analytical Results	
Sample Identification	USTAS497-MW02
Sample Matrix	Water
Collection Option (for Soil)*	
Date Collected	06/10/03
Date Received	06/11/03
Date Extracted	06/18/03
Date Analyzed	06/18/03
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	72
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: G128-1142-74896

Reviewed By: 

VPH (Aliphatics/Aromatics) Laboratory Reporting Form

Client Name: Richard Catlin & AssociatesProject Name: Rapid Refueler A-B

Sample Information and Analytical Results	
Sample Identification	USTAS497-MW03
Sample Matrix	Water
Collection Option (for Soil)*	
Date Collected	06/10/03
Date Received	06/11/03
Date Extracted	06/18/03
Date Analyzed	06/18/03
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	58
Surrogate % Recovery - FID	74

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

** = Excludes any surrogates or internal standards.

Lab Info: G128-1142-74897

Reviewed By: 

VPH (Aliphatics/Aromatics) Laboratory Reporting Form

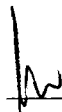
Client Name: Richard Catlin & AssociatesProject Name: Rapid Refueler A-B

Sample Information and Analytical Results	
Sample Identification	USTAS497-MW04
Sample Matrix	Water
Collection Option (for Soil)*	
Date Collected	06/10/03
Date Received	06/11/03
Date Extracted	06/18/03
Date Analyzed	06/18/03
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	78
Surrogate % Recovery - FID	95

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

** = Excludes any surrogates or internal standards.

Lab Info: G128-1142-74898

Reviewed By: 

VPH (Aliphatics/Aromatics) Laboratory Reporting Form

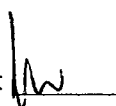
Client Name: Richard Catlin & AssociatesProject Name: Rapid Refueler A-B

Sample Information and Analytical Results	
Sample Identification	USTAS497-MW05
Sample Matrix	Water
Collection Option (for Soil)*	
Date Collected	06/10/03
Date Received	06/11/03
Date Extracted	06/18/03
Date Analyzed	06/18/03
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**	< 100 (µg/L)
Surrogate % Recovery - PID	59
Surrogate % Recovery - FID	100

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

** = Excludes any surrogates or internal standards.

Lab Info: G128-1142-74899

Reviewed By: 

VPH (Aliphatics/Aromatics) Laboratory Reporting Form

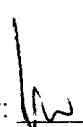
Client Name: Richard Catlin & AssociatesProject Name: Rapid Refueler A-B

Sample Information and Analytical Results	
Sample Identification	RR-11
Sample Matrix	Water
Collection Option (for Soil)*	
Date Collected	06/10/03
Date Received	06/11/03
Date Extracted	06/18/03
Date Analyzed	06/18/03
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	53
Surrogate % Recovery - FID	66

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

** = Excludes any surrogates or internal standards.

Lab Info: G128-1142-74900

Reviewed By: 

VPH (Aliphatics/Aromatics) Laboratory Reporting Form

Client Name: Richard Catlin & AssociatesProject Name: Rapid Refueler A-B

Sample Information and Analytical Results	
Sample Identification	RR-14
Sample Matrix	Water
Collection Option (for Soil)*	
Date Collected	06/10/03
Date Received	06/11/03
Date Extracted	06/18/03
Date Analyzed	06/18/03
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	68
Surrogate % Recovery - FID	87

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

** = Excludes any surrogates or internal standards.

Lab Info: G128-1142-74901

Reviewed By: 

PARADIGM ANALYTICAL LABORATORIES, INC.

Attachment 2

VPH Laboratory Reporting Form

Calibration and QA/QC Information

FID Initial Calibration Date:

06/10/03

PID Initial Calibration Date:

06/10/03

Calibration Ranges and Limits

Range	MDL		ML		RL	
	(µg/L)	(mg/Kg)	(µg/L)	(mg/Kg)	(µg/L)	(mg/Kg)
C ₅ -C ₈ Aliphatics	9.3	0.41	29.4	1.3	100	10
C ₉ -C ₁₂ Aliphatics	7.9	0.3	25.2	0.97	100	10
C ₉ -C ₁₀ Aromatics	0.5	0.04	1.5	0.14	100	10

Calibration Concentration Levels

Range	Levels		%RSD or CCC	Method of Quantitation
	(µg/L)	(mg/Kg)		
C ₅ -C ₈ Aliphatics	20	2	6.4	Calibration Factor
	80	8		
	200	20		
	800	80		
	2000	200		
C ₉ -C ₁₂ Aliphatics	15	1.5	18	Calibration Factor
	60	6		
	150	15		
	600	60		
	1500	150		
C ₉ -C ₁₀ Aromatics	32.5	3.25	19.2	Calibration Factor
	130	13		
	325	32.5		
	1300	130		
	3250	325		

Calibration Check Date:

06/18/03

Calibration Check

Range	Levels		RPD
	(µg/L)	(mg/Kg)	
C ₅ -C ₈ Aliphatics	200	20	-0.2
C ₉ -C ₁₂ Aliphatics	150	15	-4.9
C ₉ -C ₁₀ Aromatics	325	32.5	-3.9

MDL = Method Detection Limit

ML = Minimum Limit

RL = Reportable Limit

RPD = Relative Percent Difference

%RSD = Percent Relative Standard Deviation

CCC = Correlation Coefficient of Curve

Reviewed By: 

N.C. Certification #481 S.C. Certification #99029

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

COC# 350415

Page 1 of 1

Report To: Mike E. Mason E

Catlin

Invoice To: Shaila @ Catlin

Quote #: DOD 101 Fax: 910-452-7563 P.O. Number: 230411-9

Sample ID	Date	Time	Matrix	Preservatives				Analyses								Comments: Please specify any special reporting requirements		
				Ice	HCl			EPA 602 + MyleneS + MTBE	EPA 625	MADEP EPH	MADEP VPH							
	TLS																	G128-1142
USTAS 497-MW01	6-10	1210	GW	✓	✓			✓	✓	✓	✓							La Jume and Summary GDD Report low runs
USTAS 497-MW02	6-10	1250	GW	✓	✓			✓	✓	✓	✓							
USTAS 497-MW03	6-10	1:15p	GW	✓	✓			✓	✓	✓	✓							
USTAS 497-MW04	6-10	1:45p	GW	✓	✓			✓	✓	✓	✓							
USTAS 497-MW05	6-10	2:15p	GW	✓	✓			✓	✓	✓	✓							
RR-11	6-10	3:10p	GW	✓	✓			✓	✓	✓	✓							
RR-14	6-10	3:35p	GW	✓	✓			✓	✓	✓	✓							
Relinquished By		Date	Time	Received By				Date	Time	Temperature		State Certification Requested						
Tom Stet		6-11-03	1030	[Signature]				6/11/03	1030	wice 1-2°c, 0.8%		NC ☒ SC ☐ Other ☐						
SEE REVERSE FOR TERMS AND CONDITIONS																		

ARADIGM ANALYTICAL LABORATORIES, INC.

500 Business Drive, Wilmington, NC 28405

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

Chain-of Custody Record & Analytical Request

COC# 35774

Page 1 of 1

Client: Catlin Project ID: Rapid Refueler A-B Date: 6-11-03 Report To: Mike E. Mason @ Catlin
Address: 220 Old Dairy Rd. Contact: Mike E. Mason Turnaround: standard
Address: Wilmington NC 28405 Phone: 910-452-5861 Job Number: 203-005
Quote #: DOD 101 Fax: 910-452-7563 P.O. Number: 230411-9 Invoice To: Sheila @ Catlin

Sample ID	Date	Time	Matrix	Preservatives				Analyses								Comments: Please specify any special reporting requirements
				Ice	HCl			EPA 602 + xylenes + MTBE	EPA 625	MADEP EPH	MADEP VPH					
USTAS497-MW01	6-10	1210	GW	✓	✓			✓	✓	✓	✓					Le Jeune and Summary EDD Report low runs
USTAS497-MW02	6-10	1250	GW	✓	✓			✓	✓	✓	✓					
USTAS497-MW03	6-10	1:15p	GW	✓	✓			✓	✓	✓	✓					
USTAS497-MW04	6-10	1:45p	GW	✓	✓			✓	✓	✓	✓					
USTAS497-MW05	6-10	2:15p	GW	✓	✓			✓	✓	✓	✓					
RR-11	6-10	3:10p	GW	✓	✓			✓	✓	✓	✓					
RR-14	6-10	3:35p	GW	✓	✓			✓	✓	✓	✓					
Relinquished By		Date	Time	Received By		Date	Time	Temperature		State Certification Requested						
Tom Stel		6-11-03	1030	[Signature]		6/11/03	1030	wies		NC ☒ SC ☐ Other ☐						
										SEE REVERSE FOR TERMS AND CONDITIONS						

203-005

RECEIVED
BY *a* | DATE 7-7-03

PARADIGM ANALYTICAL LABORATORIES, INC.
5500 Business Drive
Wilmington, North Carolina 28405
(910) 350-1903
Fax (910) 350-1557

FILE COPY

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

July 3, 2003

Report Number: G128-1147

Client Project ID: Rapid Refueler

Dear Mr. Mason,

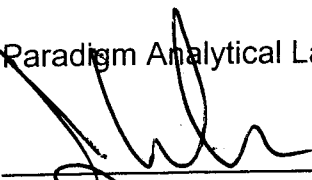
Enclosed are the results of the analytical services performed under the referenced project. Copies of this report and supporting data will be retained in our files for a period of five years in the event they are required for future reference. Any samples submitted to our laboratory will be retained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

If there are any questions about the report or the services performed during this project, please call for assistance. We will be happy to answer any questions or concerns which you may have.

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

Sincerely,

Paradigm Analytical Laboratories, Inc.



Laboratory Director
J. Patrick Weaver

EPH (Aliphatics/Aromatics) Results

by MDEP-EPH

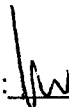
Client Name: Richard Catlin & AssociatesProject Name: Rapid Refueler

Sample Information and Analytical Results	
Sample Identification	USTAS497-MW06 (0-2')
Sample Matrix	Soil
Date Collected	06/16/03
Date Received	06/17/03
Date Extracted	06/11/03
Date Analyzed	06/20/03
Dry Weight	87.1
Dilution Factor	1
C ₉ -C ₁₈ Aliphatics*	< 10 (mg/Kg)
C ₁₉ -C ₃₆ Aliphatics*	< 10 (mg/Kg)
C ₁₁ -C ₂₂ Aromatics*	< 10 (mg/Kg)
Aliphatic Surrogate % Recovery	120
Aromatic Surrogate % Recovery	110

Comments:

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

Lab info: G128-1147-75300

Reviewed By: 

EPH (Aliphatics/Aromatics) Results

by MDEP-EPH

Client Name: Richard Catlin & AssociatesProject Name: Rapid Refueler

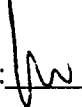
Sample Information and Analytical Results	
Sample Identification	USTAS497-MW06
Sample Matrix	Water
Date Collected	06/16/03
Date Received	06/17/03
Date Extracted	06/18/03
Date Analyzed	06/18/03
Dry Weight	
Dilution Factor	1
C ₉ -C ₁₈ Aliphatics*	< 100 (µg/L)
C ₁₉ -C ₃₆ Aliphatics*	< 100 (µg/L)
C ₁₁ -C ₂₂ Aromatics*	< 100 (µg/L)
Aliphatic Surrogate % Recovery	60
Aromatic Surrogate % Recovery	59

Comments:

* = Excludes any surrogates or internal standards.

Sample did not require fractionation.

Lab info: G128-1147-75302

Reviewed By: 

EPH (Aliphatics/Aromatics) Results

by MDEP-EPH

Client Name: Richard Catlin & Associates

Project Name: Rapid Refueler

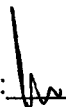
Sample Information and Analytical Results	
Sample Identification	"Pond"
Sample Matrix	Water
Date Collected	06/16/03
Date Received	06/17/03
Date Extracted	06/18/03
Date Analyzed	06/18/03
Dry Weight	
Dilution Factor	1
C ₉ -C ₁₈ Aliphatics*	< 100 (µg/L)
C ₁₉ -C ₃₆ Aliphatics*	< 100 (µg/L)
C ₁₁ -C ₂₂ Aromatics*	< 100 (µg/L)
Aliphatic Surrogate % Recovery	87
Aromatic Surrogate % Recovery	82

Comments:

* = Excludes any surrogates or internal standards.

Sample did not require fractionation.

Lab info: G128-1147-75304

Reviewed By: 

PARADIGM ANALYTICAL LABORATORIES, INC.

Attachment 3

EPH Laboratory Reporting Form

Calibration and QA/QC Information

Initial Calibration Date: 06/09/03

Calibration Ranges and Limits

Range	MDL (µg/L) (mg/Kg)		ML (µg/L) (mg/Kg)		RL (µg/L) (mg/Kg)	
C ₉ -C ₁₈ Aliphatics	0.1	0.8	0.3	2.6	100	10
C ₁₉ -C ₃₆ Aliphatics	0.1	1.6	0.3	5	100	10
C ₁₁ -C ₂₂ Aromatics	0.2	2.1	0.6	6.7	100	10

Calibration Concentration Levels

Range	Levels (µg/L) (mg/Kg)		%RSD or CCC	Method of Quantitation
C ₉ -C ₁₈ Aliphatics	0.06	1	4.10	Calibration Factor
	0.15	2.5		
	0.3	5		
	0.6	10		
	1.2	20		
C ₁₉ -C ₃₆ Aliphatics	0.08	1.33	2.5	Calibration Factor
	0.2	3.33		
	0.4	6.67		
	0.8	13.3		
	1.6	26.7		
C ₁₁ -C ₂₂ Aromatics	0.17	2.83	4.7	Calibration Factor
	0.425	7.08		
	0.85	14.2		
	1.7	28.3		
	3.4	56.7		

Calibration Check Date: 06/18/03

Calibration Check

Range	Levels (µg/mL) (mg/Kg)		RPD
C ₉ -C ₁₈ Aliphatics	0.6	10	-18.6
C ₁₉ -C ₃₆ Aliphatics	0.8	13.3	-20.9
C ₁₁ -C ₂₂ Aromatics	1.7	28.3	-20.8

MDL = Method Detection Limit

ML = Minimum Limit

RL = Reportable Limit

RPD = Relative Percent Difference

%RSD = Percent Relative Standard Deviation

CCC = Correlation Coefficient of Curve

PARADIGM ANALYTICAL LABORATORIES, INC.

Attachment 3

EPH Laboratory Reporting Form

Calibration and QA/QC Information

Initial Calibration Date: 06/09/03

Calibration Ranges and Limits

Range	MDL (mg/Kg)	(µg/L)	ML (mg/Kg)	(µg/L)	RL (mg/Kg)	(µg/L)
C ₉ -C ₁₈ Aliphatics	0.1	0.8	0.3	2.6	100	10
C ₁₉ -C ₃₆ Aliphatics	0.1	1.6	0.3	5	100	10
C ₁₁ -C ₂₂ Aromatics	0.2	2.1	0.6	6.7	100	10

Calibration Concentration Levels

Range	Levels (µg/L) (mg/Kg)	%RSD or CCC	Method of Quantitation
C ₉ -C ₁₈ Aliphatics	0.06 1	4.10	Calibration Factor
	0.15 2.5		
	0.3 5		
	0.6 10		
	1.2 20		
C ₁₉ -C ₃₆ Aliphatics	0.08 1.33	2.5	Calibration Factor
	0.2 3.33		
	0.4 6.67		
	0.8 13.3		
	1.6 26.7		
C ₁₁ -C ₂₂ Aromatics	0.17 2.83	4.7	Calibration Factor
	0.425 7.08		
	0.85 14.2		
	1.7 28.3		
	3.4 56.7		

Calibration Check Date: 06/20/03

Calibration Check

Range	Levels (µg/mL) (mg/Kg)	RPD
C ₉ -C ₁₈ Aliphatics	0.6 10	3.5
C ₁₉ -C ₃₆ Aliphatics	0.8 13.3	7.6
C ₁₁ -C ₂₂ Aromatics	1.7 28.3	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

PARADIGM ANALYTICAL LABORATORIES, INC.

VPH (Aliphatics/Aromatics) Laboratory Reporting Form

Client Name: Richard Catlin & Associates

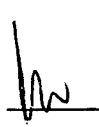
Project Name: Rapid Refueler

Sample Information and Analytical Results	
Sample Identification	USTAS497-MW06 (0-2')
Sample Matrix	Soil
Collection Option (for Soil)*	3
Date Collected	06/16/03
Date Received	06/17/03
Date Extracted	06/16/03
Date Analyzed	06/28/03
Dry Weight	87
Dilution Factor	1
C ₅ -C ₈ Aliphatics**	< 10 (mg/Kg)
C ₉ -C ₁₂ Aliphatics**	< 10 (mg/Kg)
C ₉ -C ₁₀ Aromatics**	< 10 (mg/Kg)
Surrogate % Recovery - PID	80
Surrogate % Recovery - FID	96

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

** = Excludes any surrogates or internal standards.

Lab Info: G128-1147-75300

Reviewed By: 

VPH (Aliphatics/Aromatics) Laboratory Reporting Form

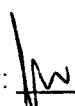
Client Name: Richard Catlin & AssociatesProject Name: Rapid Refueler

Sample Information and Analytical Results	
Sample Identification	USTAS497-MW06
Sample Matrix	Water
Collection Option (for Soil)*	
Date Collected	06/16/03
Date Received	06/17/03
Date Extracted	06/25/03
Date Analyzed	06/25/03
Dry Weight	
Dilution Factor	1
C ₅ -C ₈ Aliphatics**	< 100 (µg/L)
C ₉ -C ₁₂ Aliphatics**	230 (µg/L)
C ₉ -C ₁₀ Aromatics**	< 100 (µg/L)
Surrogate % Recovery - PID	58
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: G128-1147-75302

Reviewed By: 

VPH (Aliphatics/Aromatics) Laboratory Reporting Form

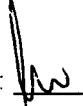
Client Name: Richard Catlin & AssociatesProject Name: Rapid Refueler

Sample Information and Analytical Results	
Sample Identification	"Pond"
Sample Matrix	Water
Collection Option (for Soil)*	
Date Collected	06/16/03
Date Received	06/17/03
Date Extracted	06/25/03
Date Analyzed	06/25/03
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	64
Surrogate % Recovery - FID	78

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

** = Excludes any surrogates or internal standards.

Lab Info: G128-1147-75304

Reviewed By: 

Attachment 2

VPH Laboratory Reporting Form

Calibration and QA/QC Information

FID Initial Calibration Date: 06/23/03PID Initial Calibration Date: 06/23/03

Calibration Ranges and Limits

Range	MDL		ML		RL	
	(µg/L)	(mg/Kg)	(µg/L)	(mg/Kg)	(µg/L)	(mg/Kg)
C ₅ -C ₈ Aliphatics	9.3	0.41	29.4	1.3	100	10
C ₉ -C ₁₂ Aliphatics	7.9	0.3	25.2	0.97	100	10
C ₉ -C ₁₀ Aromatics	0.5	0.04	1.5	0.14	100	10

Calibration Concentration Levels

Range	Levels		%RSD or CCC	Method of Quantitation
	(µg/L)	(mg/Kg)		
C ₅ -C ₈ Aliphatics	20	2	5.7	Calibration Factor
	80	8		
	200	20		
	800	80		
	2000	200		
C ₉ -C ₁₂ Aliphatics	15	1.5	16.2	Calibration Factor
	60	6		
	150	15		
	600	60		
	1500	150		
C ₉ -C ₁₀ Aromatics	32.5	3.25	20.7	Calibration Factor
	130	13		
	325	32.5		
	1300	130		
	3250	325		

Calibration Check Date: 06/24/03

Calibration Check

Range	Levels		RPD
	(µg/L)	(mg/Kg)	
C ₅ -C ₈ Aliphatics	200	20	3.0
C ₉ -C ₁₂ Aliphatics	150	15	9.5
C ₉ -C ₁₀ Aromatics	325	32.5	-4.0

MDL = Method Detection Limit

ML = Minimum Limit

RL = Reportable Limit

RPD = Relative Percent Difference

%RSD = Percent Relative Standard Deviation

CCC = Correlation Coefficient of Curve

Reviewed By: 

PARADIGM ANALYTICAL LABORATORIES, INC.

Attachment 2

VPH Laboratory Reporting Form

Calibration and QA/QC Information

FID Initial Calibration Date: 06/23/03

PID Initial Calibration Date: 06/23/03

Calibration Ranges and Limits

Range	MDL		ML		RL	
	(µg/L)	(mg/Kg)	(µg/L)	(mg/Kg)	(µg/L)	(mg/Kg)
C ₅ -C ₈ Aliphatics	9.3	0.41	29.4	1.3	100	10
C ₉ -C ₁₂ Aliphatics	7.9	0.3	25.2	0.97	100	10
C ₉ -C ₁₀ Aromatics	0.5	0.04	1.5	0.14	100	10

Calibration Concentration Levels

Range	Levels		%RSD or CCC	Method of Quantitation
	(µg/L)	(mg/Kg)		
C ₅ -C ₈ Aliphatics	20	2	5.7	Calibration Factor
	80	8		
	200	20		
	800	80		
	2000	200		
C ₉ -C ₁₂ Aliphatics	15	1.5	16.2	Calibration Factor
	60	6		
	150	15		
	600	60		
	1500	150		
C ₉ -C ₁₀ Aromatics	32.5	3.25	20.7	Calibration Factor
	130	13		
	325	32.5		
	1300	130		
	3250	325		

Calibration Check Date: 06/28/03

Calibration Check

Range	Levels		RPD
	(µg/L)	(mg/Kg)	
C ₅ -C ₈ Aliphatics	200	20	4.5
C ₉ -C ₁₂ Aliphatics	150	15	11.9
C ₉ -C ₁₀ Aromatics	325	32.5	0.4

MDL = Method Detection Limit

ML = Minimum Limit

RL = Reportable Limit

RPD = Relative Percent Difference

%RSD = Percent Relative Standard Deviation

CCC = Correlation Coefficient of Curve

Reviewed By: 

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Volatiles

by GCMS 8260B/5035

Client Sample ID: USTAS497-MW06 (0-2')

Date Analyzed: 6/27/03

Client Project ID: Rapid Refueler

Analyzed By: EKR

Lab Sample ID: 75300

Date Collected: 6/16/03

Lab Project ID: G128-1147

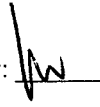
Date Received: 6/17/03

Matrix: Soil

%Solids: 87.1

Dilution: 1

Compound	Quantitation Limit (mg/KG)	Result (mg/KG)
Acetone	0.05	BQL
Acrolein	0.1	BQL
Acrylonitrile	0.1	BQL
Benzene	0.005	BQL
Bromobenzene	0.005	BQL
Bromochloromethane	0.005	BQL
Bromodichloromethane	0.005	BQL
Bromoform	0.005	BQL
Bromomethane	0.005	BQL
2-Butanone	0.025	BQL
n-Butylbenzene	0.005	BQL
sec-Butylbenzene	0.005	0.013
tert-Butylbenzene	0.005	BQL
Carbon disulfide	0.005	BQL
Carbon tetrachloride	0.005	BQL
Chlorobenzene	0.005	BQL
Chloroethane	0.005	BQL
2-Chloroethyl vinyl ether	0.005	BQL
Chloroform	0.005	BQL
Chloromethane	0.005	BQL
2-Chlorotoluene	0.005	BQL
4-Chlorotoluene	0.005	BQL
Dibromochloromethane	0.005	BQL
1,2-Dibromo-3-chloropropane	0.005	BQL
Dibromomethane	0.005	BQL
1,2-Dibromoethane (EDB)	0.005	BQL
1,2-Dichlorobenzene	0.005	BQL
1,3-Dichlorobenzene	0.005	BQL
1,4-Dichlorobenzene	0.005	BQL
trans-1,4-Dichloro-2-butene	0.005	BQL
1,1-Dichloroethane	0.005	BQL
1,1-Dichloroethene	0.005	BQL
1,2-Dichloroethane	0.005	BQL
cis-1,2-Dichloroethene	0.005	BQL
trans-1,2-dichloroethene	0.005	BQL
1,2-Dichloropropane	0.005	BQL
1,3-Dichloropropane	0.005	BQL
2,2-Dichloropropane	0.005	BQL
1,1-Dichloropropene	0.005	BQL
cis-1,3-Dichloropropene	0.005	BQL
trans-1,3-Dichloropropene	0.005	BQL
Dichlorodifluoromethane	0.005	BQL
Diisopropyl ether (DIPE)	0.005	BQL
Ethylbenzene	0.005	BQL
Hexachlorobutadiene	0.005	BQL

Reviewed by: 

Flags: BQL = Below Quantitation Limit

N.C. Certification #481 S.C. Certification #99029

Page 1 of 2

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Volatiles

by GCMS 8260B/5035

Client Sample ID: USTAS497-MW06 (0-2")

Client Project ID: Rapid Refueler

Lab Sample ID: 75300

Lab Project ID: G128-1147

Matrix: Soil

%Solids: 87.1

Date Analyzed: 6/27/03

Analyzed By: EKR

Date Collected: 6/16/03

Date Received: 6/17/03

Dilution: 1

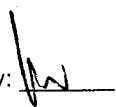
Compound	Quantitation Limit (mg/KG)	Result (mg/KG)
2-Hexanone	0.005	BQL
Iodomethane	0.005	BQL
Isopropylbenzene	0.005	0.015
4-Isopropyltoluene	0.005	BQL
Methylene chloride	0.02	BQL
4-Methyl-2-pentanone	0.005	BQL
Methyl-tert-butyl ether (MTBE)	0.005	BQL
Naphthalene	0.005	BQL
n-Propyl benzene	0.005	0.021
Styrene	0.005	BQL
1,1,1,2-Tetrachloroethane	0.005	BQL
1,1,2,2-Tetrachloroethane	0.005	BQL
Tetrachloroethene	0.005	BQL
Toluene	0.005	BQL
1,2,3-Trichlorobenzene	0.005	BQL
1,2,4-Trichlorobenzene	0.005	BQL
Trichloroethene	0.005	BQL
1,1,1-Trichloroethane	0.005	BQL
1,1,2-Trichloroethane	0.005	BQL
Trichlorofluoromethane	0.005	BQL
1,2,3-Trichloropropane	0.005	BQL
1,2,4-Trimethylbenzene	0.005	0.085
1,3,5-Trimethylbenzene	0.005	0.024
Vinyl chloride	0.005	BQL
m-,p-Xylene	0.01	BQL
o-Xylene	0.005	BQL

Surrogate Spike Recoveries

Compound	Spike Added (mg/KG)	Surrogate Result (mg/KG)	%Rec
Bromofluorobenzene	0.0500	0.0468	94
1,2-Dichloroethane-d4	0.0500	0.0506	101
Toluene-d8	0.0500	0.0498	100

Comments:

All results are corrected for dilution.

Reviewed by: 

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Volatiles by GCMS 8260B/5035

Client Sample ID: USTAS497-MW06 (0-2') Dup.

Date Analyzed: 6/26/03

Client Project ID: Rapid Refueler

Analyzed By: JTF

Lab Sample ID: 75301

Date Collected: 6/16/03

Lab Project ID: G128-1147

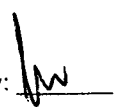
Date Received: 6/17/03

Matrix: Soil

%Solids: 86.4

Dilution: 1

Compound	Quantitation Limit (mg/KG)	Result (mg/KG)
Acetone	0.049	0.066
Acrolein	0.1	BQL
Acrylonitrile	0.098	BQL
Benzene	0.0049	BQL
Bromobenzene	0.0049	BQL
Bromochloromethane	0.0049	BQL
Bromodichloromethane	0.0049	BQL
Bromoform	0.0049	BQL
Bromomethane	0.0049	BQL
2-Butanone	0.025	BQL
n-Butylbenzene	0.0049	0.0053
sec-Butylbenzene	0.0049	0.013
tert-Butylbenzene	0.0049	BQL
Carbon disulfide	0.0049	BQL
Carbon tetrachloride	0.0049	BQL
Chlorobenzene	0.0049	BQL
Chloroethane	0.0049	BQL
2-Chloroethyl vinyl ether	0.0049	BQL
Chloroform	0.0049	BQL
Chloromethane	0.0049	BQL
2-Chlorotoluene	0.0049	BQL
4-Chlorotoluene	0.0049	BQL
Dibromochloromethane	0.0049	BQL
1,2-Dibromo-3-chloropropane	0.0049	BQL
Dibromomethane	0.0049	BQL
1,2-Dibromoethane (EDB)	0.0049	BQL
1,2-Dichlorobenzene	0.0049	BQL
1,3-Dichlorobenzene	0.0049	BQL
1,4-Dichlorobenzene	0.0049	BQL
trans-1,4-Dichloro-2-butene	0.0049	BQL
1,1-Dichloroethane	0.0049	BQL
1,1-Dichloroethene	0.0049	BQL
1,2-Dichloroethane	0.0049	BQL
cis-1,2-Dichloroethene	0.0049	BQL
trans-1,2-dichloroethene	0.0049	BQL
1,2-Dichloropropane	0.0049	BQL
1,3-Dichloropropane	0.0049	BQL
2,2-Dichloropropane	0.0049	BQL
1,1-Dichloropropene	0.0049	BQL
cis-1,3-Dichloropropene	0.0049	BQL
trans-1,3-Dichloropropene	0.0049	BQL
Dichlorodifluoromethane	0.0049	BQL
Diisopropyl ether (DIPE)	0.0049	BQL
Ethylbenzene	0.0049	BQL
Hexachlorobutadiene	0.0049	BQL

Reviewed by: 

Flags: BQL = Below Quantitation Limit

N.C. Certification #481 S.C. Certification #99029

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Volatiles

by GCMS 8260B/5035

Client Sample ID: USTAS497-MW06 (0-2') Dup.

Date Analyzed: 6/26/03

Client Project ID: Rapid Refueler

Analyzed By: JTF

Lab Sample ID: 75301

Date Collected: 6/16/03

Lab Project ID: G128-1147

Date Received: 6/17/03

Matrix: Soil

%Solids: 86.4

Dilution: 1

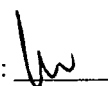
Compound	Quantitation Limit (mg/KG)	Result (mg/KG)
2-Hexanone	0.0049	BQL
Iodomethane	0.0049	BQL
Isopropylbenzene	0.0049	0.013
4-Isopropyltoluene	0.0049	BQL
Methylene chloride	0.02	BQL
4-Methyl-2-pentanone	0.0049	BQL
Methyl-tert-butyl ether (MTBE)	0.0049	BQL
Naphthalene	0.0049	BQL
n-Propyl benzene	0.0049	0.021
Styrene	0.0049	BQL
1,1,1,2-Tetrachloroethane	0.0049	BQL
1,1,2,2-Tetrachloroethane	0.0049	BQL
Tetrachloroethene	0.0049	BQL
Toluene	0.0049	BQL
1,2,3-Trichlorobenzene	0.0049	BQL
1,2,4-Trichlorobenzene	0.0049	BQL
Trichloroethene	0.0049	BQL
1,1,1-Trichloroethane	0.0049	BQL
1,1,2-Trichloroethane	0.0049	BQL
Trichlorofluoromethane	0.0049	BQL
1,2,3-Trichloropropane	0.0049	BQL
1,2,4-Trimethylbenzene	0.0049	0.094
1,3,5-Trimethylbenzene	0.0049	0.025
Vinyl chloride	0.0049	BQL
m-,p-Xylene	0.0098	BQL
o-Xylene	0.0049	BQL

Surrogate Spike Recoveries

Compound	Spike Added (mg/KG)	Surrogate Result (mg/KG)	%Rec
Bromofluorobenzene	0.0500	0.0451	90
1,2-Dichloroethane-d4	0.0500	0.0605	121
Toluene-d8	0.0500	0.0499	100

Comments:

All results are corrected for dilution.

Reviewed by: 

Flags: BQL = Below Quantitation Limit

N.C. Certification #481 S.C. Certification #99029

Results for Semivolatiles
by GCMS 8270

Client Sample ID: USTAS497-MW06 (0-2')

Client Project ID: Rapid Refueler

Lab Sample ID: 75300

Lab Project ID: G128-1147

Matrix: Soil

%Solids: 87.1

Date Collected: 6/16/2003

Date Received: 6/17/2003

Date Analyzed: 6/24/2003

Analyzed By: MRC

Dilution: 1

Compound	Quantitation Limit (mg/KG)	Result (mg/KG)
Acenaphthene	0.36	BQL
Acenaphthylene	0.36	BQL
Anthracene	0.36	BQL
Benzo[a]anthracene	0.36	BQL
Benzo[a]pyrene	0.36	BQL
Benzo[b]fluoranthene	0.36	BQL
Benzo[g,h,i]perylene	0.36	BQL
Benzo[k]fluoranthene	0.36	BQL
Benzoic Acid	0.72	BQL
Bis(2-chloroethoxy)methane	0.36	BQL
Bis(2-chloroethyl)ether	0.36	BQL
Bis(2-chloroisopropyl)ether	0.36	BQL
Bis(2-ethylhexyl)phthalate	0.36	BQL
4-bromophenyl phenyl ether	0.36	BQL
Butylbenzylphthalate	0.36	BQL
4-Chloroaniline	1.8	BQL
4-Chloro-3-methylphenol	0.36	BQL
2-Chloronaphthalene	0.36	BQL
2-Chlorophenol	0.36	BQL
4-Chlorophenyl phenyl ether	0.36	BQL
Chrysene	0.36	BQL
Di-n-Butylphthalate	0.36	BQL
Di-n-octylphthalate	0.36	BQL
Dibenzo[a,h]anthracene	0.36	BQL
Dibenzofuran	0.36	BQL
1,2-Dichlorobenzene	0.36	BQL
1,3-Dichlorobenzene	0.36	BQL
1,4-Dichlorobenzene	0.36	BQL
3,3'-Dichlorobenzidine	0.72	BQL
2,4-Dichlorophenol	0.36	BQL
Diethylphthalate	0.36	BQL
2,4-Dimethylphenol	0.36	BQL
Dimethylphthalate	0.36	BQL
4,6-Dinitro-2-methylphenol	1.8	BQL
2,4-Dinitrophenol	1.8	BQL
2,4-Dinitrotoluene	0.36	BQL
2,6-Dinitrotoluene	0.36	BQL
Fluoranthene	0.36	BQL
Fluorene	0.36	BQL
Hexachlorobenzene	0.36	BQL

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Semivolatiles

by GCMS 8270

Client Sample ID: USTAS497-MW06 (0-2')

Client Project ID: Rapid Refueler

Lab Sample ID: 75300

Lab Project ID: G128-1147

Matrix: Soil

%Solids: 87.1

Date Collected: 6/16/2003

Date Received: 6/17/2003

Date Analyzed: 6/24/2003

Analyzed By: MRC

Dilution: 1

Compound	Quantitation Limit (mg/KG)	Result (mg/KG)
Hexachlorobutadiene	0.36	BQL
Hexachlorocyclopentadiene	0.72	BQL
Hexachloroethane	0.36	BQL
Indeno(1,2,3-c,d)pyrene	0.36	BQL
Isophorone	0.36	BQL
2-Methylnaphthalene	0.36	BQL
2-Methylphenol	0.36	BQL
3- & 4-Methylphenol	0.36	BQL
N-Nitrosodi-n-propylamine	0.36	BQL
N-Nitrosodiphenylamine	0.36	BQL
Naphthalene	0.36	BQL
2-Nitroaniline	0.36	BQL
3-Nitroaniline	1.8	BQL
4-Nitroaniline	1.8	BQL
Nitrobenzene	0.36	BQL
2-Nitrophenol	0.36	BQL
4-Nitrophenol	1.8	BQL
Pentachlorophenol	1.8	BQL
Phenanthrene	0.36	BQL
Phenol	0.36	BQL
Pyrene	0.36	BQL
1,2,4-Trichlorobenzene	0.36	BQL
2,4,5-Trichlorophenol	0.36	BQL
2,4,6-Trichlorophenol	0.36	BQL

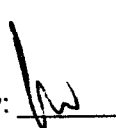
Surrogate Spike Recoveries	Spike Added	Spike Result	Percent Recovered
2-Fluorobiphenyl	10	9.5	95
2-Fluorophenol	10	8.7	87
Nitrobenzene-d5	10	9.5	95
Phenol-d6	10	8.6	86
2,4,6-Tribromophenol	10	8.8	88
4-Terphenyl-d14	10	9.7	97

Comments:

Results are corrected for %solids and dilution where applicable.

Flags:

BQL = Below Quantitation Limit.

Reviewed By: 

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Volatiles

by GC 602

Client Sample ID: USTAS497-MW06

Client Project ID: Rapid Refueler

Lab Sample ID: 75302

Lab Project ID: G128-1147

Analyzed By: JTF

Date Collected: 6/16/03

Date Received: 6/17/03

Matrix: Water

Analyte	Result ug/L	Report Limit ug/L	Dilution Factor	Date Analyzed
Benzene	BQL	1.0	1	6/23/03
Diisopropyl ether (DIPE)	BQL	1.0	1	6/23/03
Ethylbenzene	2.9	1.0	1	6/23/03
Methyl-tert butyl ether (MTBE)	BQL	2.0	1	6/26/03
Toluene	BQL	1.0	1	6/23/03
m/p-Xylene	7.3	2.0	1	6/23/03
o-Xylene	BQL	2.0	1	6/23/03

Surrogate Spike Recoveries

	Spike Added	Spike Result	Percent Recovery
Trifluorotoluene	40	39.1	97.8

Comments:

All values corrected for dilution.

BQL = Below quantitation limit.

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Volatiles

by GC 602

Client Sample ID: USTAS497-MW06 Dup.

Client Project ID: Rapid Refueler

Lab Sample ID: 75303

Lab Project ID: G128-1147

Analyzed By: JTF

Date Collected: 6/16/03

Date Received: 6/17/03

Matrix: Water

Analyte	Result ug/L	Report Limit ug/L	Dilution Factor	Date Analyzed
Benzene	BQL	1.0	1	6/23/03
Diisopropyl ether (DIPE)	BQL	1.0	1	6/23/03
Ethylbenzene	2.7	1.0	1	6/23/03
Methyl-tert butyl ether (MTBE)	BQL	2.0	1	6/26/03
Toluene	BQL	1.0	1	6/23/03
m/p-Xylene	7.0	2.0	1	6/23/03
o-Xylene	BQL	2.0	1	6/23/03
Surrogate Spike Recoveries		Spike Added	Spike Result	Percent Recovery
Trifluorotoluene		40	38.9	97.2

Comments:

All values corrected for dilution.

BQL = Below quantitation limit.

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Volatiles

by GC 602

Client Sample ID: Pond
 Client Project ID: Rapid Refueler
 Lab Sample ID: 75304
 Lab Project ID: G128-1147

Analyzed By: JTF
 Date Collected: 6/16/03
 Date Received: 6/17/03
 Matrix: Water

Analyte	Result ug/L	Report Limit ug/L	Dilution Factor	Date Analyzed
Benzene	BQL	1.0	1	6/23/03
Diisopropyl ether (DIPE)	BQL	1.0	1	6/23/03
Ethylbenzene	BQL	1.0	1	6/23/03
Methyl-tert butyl ether (MTBE)	BQL	2.0	1	6/26/03
Toluene	BQL	1.0	1	6/23/03
m/p-Xylene	BQL	2.0	1	6/23/03
o-Xylene	BQL	2.0	1	6/23/03
Surrogate Spike Recoveries		Spike Added	Spike Result	Percent Recovery
Trifluorotoluene		40	39.2	98.0

Comments:

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

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Semivolatiles by GCMS 625

Client Sample ID: USTAS497-MW06
 Client Project ID: Rapid Refueler
 Lab Sample ID: 75302
 Lab Project ID: G128-1147
 Matrix: Water

Date Collected: 6/16/2003
 Date Received: 6/17/2003
 Date Analyzed: 6/23/2003
 Analyzed By: MRC
 Dilution: 1

Compound	Quantitation Limit (ug/L)	Result (ug/L)
Acenaphthene	10	BQL
Acenaphthylene	10	BQL
Anthracene	10	BQL
Benzo[a]anthracene	10	BQL
Benzo[a]pyrene	10	BQL
Benzo[b]fluoranthene	10	BQL
Benzo[g,h,i]perylene	10	BQL
Benzo[k]fluoranthene	10	BQL
Bis(2-chloroethoxy)methane	10	BQL
Bis(2-chloroethyl)ether	10	BQL
Bis(2-chloroisopropyl)ether	10	BQL
Bis(2-ethylhexyl)phthalate	10	BQL
4-bromophenyl phenyl ether	10	BQL
Butylbenzylphthalate	10	BQL
4-Chloro-3-methylphenol	10	BQL
2-Chloronaphthalene	10	BQL
2-Chlorophenol	10	BQL
4-Chlorophenyl phenyl ether	10	BQL
Chrysene	10	BQL
Di-n-Butylphthalate	10	BQL
Di-n-octylphthalate	10	BQL
Dibenzo[a,h]anthracene	10	BQL
1,2-Dichlorobenzene	10	BQL
1,3-Dichlorobenzene	10	BQL
1,4-Dichlorobenzene	10	BQL
3,3'-Dichlorobenzidine	20	BQL
2,4-Dichlorophenol	10	BQL
Diethylphthalate	10	BQL
2,4-Dimethylphenol	10	BQL
Dimethylphthalate	10	BQL
4,6-Dinitro-2-methylphenol	50	BQL
2,4-Dinitrophenol	50	BQL
2,4-Dinitrotoluene	10	BQL
2,6-Dinitrotoluene	10	BQL
Fluoranthene	10	BQL
Fluorene	10	BQL
Hexachlorobenzene	10	BQL
Hexachlorobutadiene	10	BQL
Hexachlorocyclopentadiene	20	BQL
Hexachloroethane	10	BQL

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Semivolatiles

by GCMS 625

Client Sample ID: USTAS497-MW06

Client Project ID: Rapid Refueler

Lab Sample ID: 75302

Lab Project ID: G128-1147

Matrix: Water

Date Collected: 6/16/2003

Date Received: 6/17/2003

Date Analyzed: 6/23/2003

Analyzed By: MRC

Dilution: 1

Compound	Quantitation Limit (ug/L)	Result (ug/L)
Indeno(1,2,3-c,d)pyrene	10	BQL
Isophorone	10	BQL
N-Nitrosodi-n-propylamine	10	BQL
N-Nitrosodiphenylamine	10	BQL
Naphthalene	10	12
Nitrobenzene	10	BQL
2-Nitrophenol	10	BQL
4-Nitrophenol	50	BQL
Pentachlorophenol	50	BQL
Phenanthrene	10	BQL
Phenol	10	BQL
Pyrene	10	BQL
1,2,4-Trichlorobenzene	10	BQL
2,4,6-Trichlorophenol	10	BQL

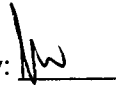
Surrogate Spike Recoveries	Spike Added	Spike Result	Percent Recovered
2-Fluorobiphenyl	10	9.3	93
2-Fluorophenol	10	9.7	97
Nitrobenzene-d5	10	10.0	100
Phenol-d6	10	9.5	95
2,4,6-Tribromophenol	10	9.9	99
4-Terphenyl-d14	10	11.1	111

Comments:

Results are corrected for %solids and dilution where applicable.

Flags:

BQL = Below Quantitation Limit.

Reviewed By: 

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Semivolatiles by GCMS 625

Client Sample ID: "Pond"
Client Project ID: Rapid Refueler
Lab Sample ID: 75304
Lab Project ID: G128-1147
Matrix: Water

Date Collected: 6/16/2003
Date Received: 6/17/2003
Date Analyzed: 6/23/2003
Analyzed By: MRC
Dilution: 1

Compound	Quantitation Limit (ug/L)	Result (ug/L)
Acenaphthene	10	BQL
Acenaphthylene	10	BQL
Anthracene	10	BQL
Benzo[a]anthracene	10	BQL
Benzo[a]pyrene	10	BQL
Benzo[b]fluoranthene	10	BQL
Benzo[g,h,i]perylene	10	BQL
Benzo[k]fluoranthene	10	BQL
Bis(2-chloroethoxy)methane	10	BQL
Bis(2-chloroethyl)ether	10	BQL
Bis(2-chloroisopropyl)ether	10	BQL
Bis(2-ethylhexyl)phthalate	10	BQL
4-bromophenyl phenyl ether	10	BQL
Butylbenzylphthalate	10	BQL
4-Chloro-3-methylphenol	10	BQL
2-Chloronaphthalene	10	BQL
2-Chlorophenol	10	BQL
4-Chlorophenyl phenyl ether	10	BQL
Chrysene	10	BQL
Di-n-Butylphthalate	10	BQL
Di-n-octylphthalate	10	BQL
Dibenzo[a,h]anthracene	10	BQL
1,2-Dichlorobenzene	10	BQL
1,3-Dichlorobenzene	10	BQL
1,4-Dichlorobenzene	10	BQL
3,3'-Dichlorobenzidine	20	BQL
2,4-Dichlorophenol	10	BQL
Diethylphthalate	10	BQL
2,4-Dimethylphenol	10	BQL
Dimethylphthalate	10	BQL
4,6-Dinitro-2-methylphenol	50	BQL
2,4-Dinitrophenol	50	BQL
2,4-Dinitrotoluene	10	BQL
2,6-Dinitrotoluene	10	BQL
Fluoranthene	10	BQL
Fluorene	10	BQL
Hexachlorobenzene	10	BQL
Hexachlorobutadiene	10	BQL
Hexachlorocyclopentadiene	20	BQL
Hexachloroethane	10	BQL

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Semivolatiles by GCMS 625

Client Sample ID: "Pond"
Client Project ID: Rapid Refueler
Lab Sample ID: 75304
Lab Project ID: G128-1147
Matrix: Water

Date Collected: 6/16/2003
Date Received: 6/17/2003
Date Analyzed: 6/23/2003
Analyzed By: MRC
Dilution: 1

Compound	Quantitation Limit (ug/L)	Result (ug/L)
Indeno(1,2,3-c,d)pyrene	10	BQL
Isophorone	10	BQL
N-Nitrosodi-n-propylamine	10	BQL
N-Nitrosodiphenylamine	10	BQL
Naphthalene	10	BQL
Nitrobenzene	10	BQL
2-Nitrophenol	10	BQL
4-Nitrophenol	50	BQL
Pentachlorophenol	50	BQL
Phenanthrene	10	BQL
Phenol	10	BQL
Pyrene	10	BQL
1,2,4-Trichlorobenzene	10	BQL
2,4,6-Trichlorophenol	10	BQL

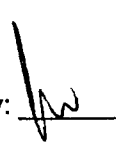
Surrogate Spike Recoveries	Spike Added	Spike Result	Percent Recovered
2-Fluorobiphenyl	10	9.6	96
2-Fluorophenol	10	9.6	96
Nitrobenzene-d5	10	10.0	100
Phenol-d6	10	9.3	93
2,4,6-Tribromophenol	10	10.2	102
4-Terphenyl-d14	10	12.3	123

Comments:

Results are corrected for %solids and dilution where applicable.

Flags:

BQL = Below Quantitation Limit.

Reviewed By: 

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# 35776

Page ____ of ____

 Client: Catlin

 Project ID: Rapid Re Greler

 Date: 6-17-03

 Report To: Mike E. Mason @

 Address: 220 Old Dairy Rd.

 Contact: Mike E. Mason

 Turnaround: Standard
Catlin

 Address: Wilmington NC 28405

 Phone: 910-452-5861

 Job Number: 203-005

 Quote #: DOD 101

 Fax: 910-452-7563

 P.O. Number: 230411-9

 Invoice To: Shiela @ Catlin

Sample ID	Date	Time	Matrix	Preservatives				Analyses								Comments: Please specify any special reporting requirements		
				Ice	HCl	Sodium Bic	Methanol	MADEP EPH	MADEP VPH	EPA 8260/5035 Prep	EPA 8270	EPA 608 + xylenes + MTBE	EPA 625	MADEP EPH	MADEP VPH			
USTAS497-MW06 (0-2')	6-16	1:10p	Soil	✓	✓	✓	✓	✓	✓	✓	✓							
USTAS497-MW06 (0-2') Dup.	6-16	1:10p	Soil	✓		✓	✓			✓								Le. Leuna and Summary E.D.D. format
USTAS497-MW06	6-16	2:00p	GW	✓	✓							✓	✓	✓	✓			
USTAS497-MW06 Dup.	6-16	2:00p	GW	✓	✓							✓						
"Pond"	6-16	1:40p	GW	✓	✓							✓	✓	✓	✓			
Relinquished By	Date	Time	Received By		Date	Time	Temperature	State Certification Requested										
<u>Tam Stitt</u>	<u>6-17</u>		<u>A. McJannet</u>		<u>6/17/03</u>	<u>2:50</u>	<u>On Ice</u>	NC ☒ SC _____ Other _____										
							<u>WALKER</u>	SEE REVERSE FOR TERMS AND CONDITIONS										
							<u>4:52</u>											