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NAB LITTLE CREEK  
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FINAL RIFLE RANGE LEAD STUDY REPORT NAB LITTLE CREEK VA  
7/1/1989  
CH2MHILL

RIFLE RANGE LEAD STUDY  
NAVAL AMPHIBIOUS BASE, LITTLE CREEK  
NORFOLK, VIRGINIA

FINAL REPORT

Prepared for:

ATLANTIC DIVISION NAVAL FACILITIES  
ENGINEERING COMMAND  
Norfolk, Virginia

Contract N62470-85-C-7975

Prepared by:

CH2M HILL, INC.

July 1989

## INTRODUCTION

The rifle range at the Little Creek Naval Amphibious Base is located in the northeastern corner of the base, adjacent to the Chesapeake Bay (Figure 1). Heavy use of the range over a period of several years has resulted in the accumulation of lead in the soil, particularly in the vicinity of the target area. Past management of the lead-contaminated soil has involved excavation, with subsequent disposal of the material in a pit adjacent to the range. The pit has been lined on top and bottom with polyethylene sheeting to minimize the amount of precipitation infiltrating the waste soil, and to reduce the potential for human and/or environmental exposure to the material.

The purpose of this study is to determine whether the onsite lead disposal practices have resulted in contamination of the local groundwater underlying the site. The conclusions and recommendations presented in this report are based on the results of the activities specified in the Scope of Work as developed by the Navy.

## SITE INVESTIGATION

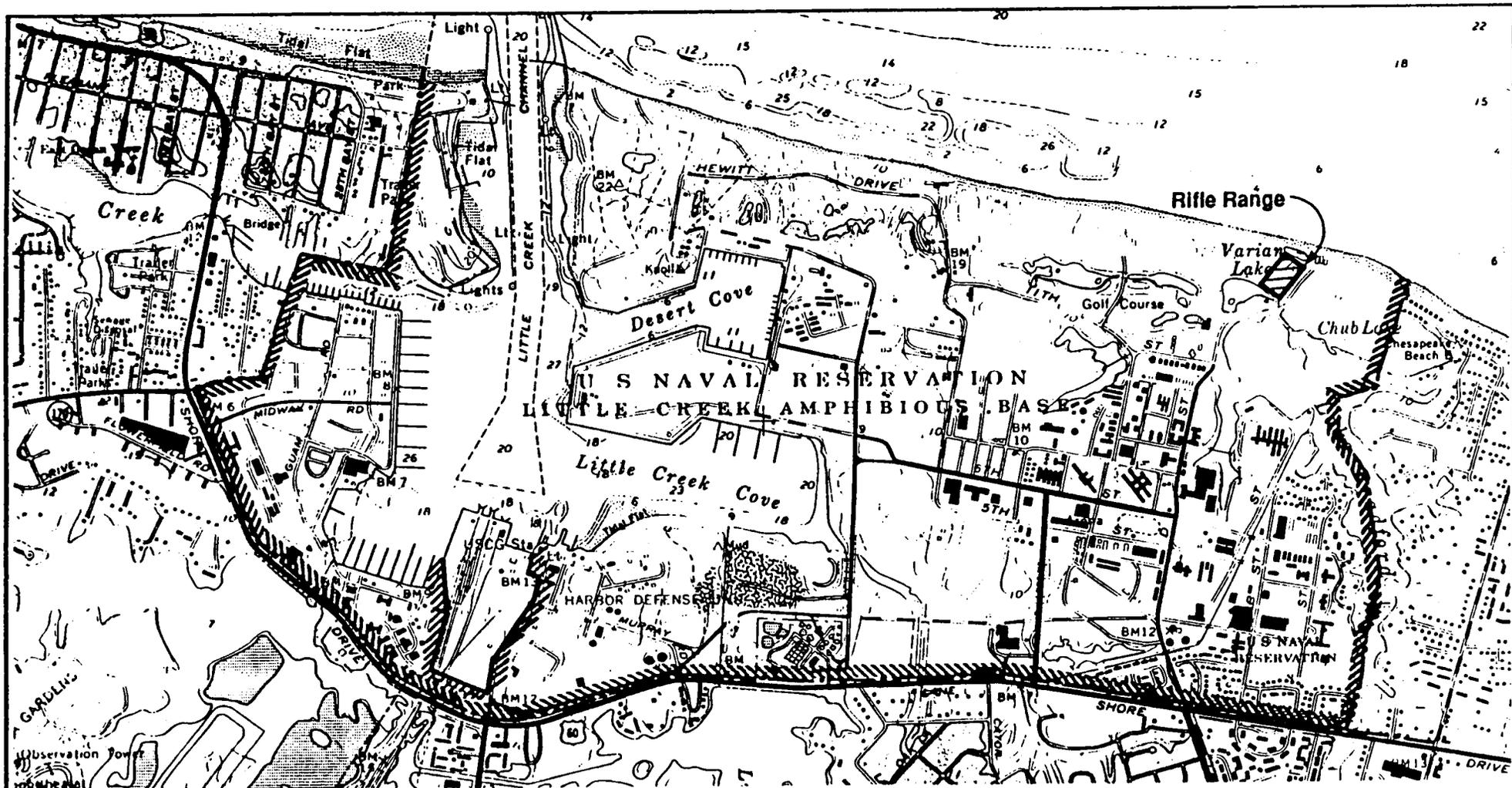
The field investigation portion of this study consisted of installing and sampling five monitoring wells within, and immediately adjacent to, the rifle range. The locations of these wells are shown in Figure 2.

### MONITORING WELL INSTALLATION

A TEC Associates of Virginia Inc., were subcontracted to install the monitoring wells according to the methodology presented in the Work/Sampling Plan. The wells were installed between January 23-30, 1989. As-built specifications are summarized for each well in Table 1. Boring logs for all of the monitoring wells are presented in Appendix A. Following installation, all wells were surveyed for relative vertical control using an arbitrary datum by Baldwin and Gregg, LTD., of Norfolk, Virginia.

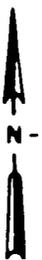
### GROUNDWATER SAMPLING/LABORATORY ANALYSIS

Groundwater samples were collected on February 6, 1989, in accordance with the Work/Sampling Plan. Prior to sampling, the water level in each well was measured. The measurements for all wells were taken within a 15-minute period to minimize potential tidal influences on groundwater levels. The groundwater sampling procedure included measuring pH, Eh, electrical conductivity, and temperature as each well was purged prior to sample collection.



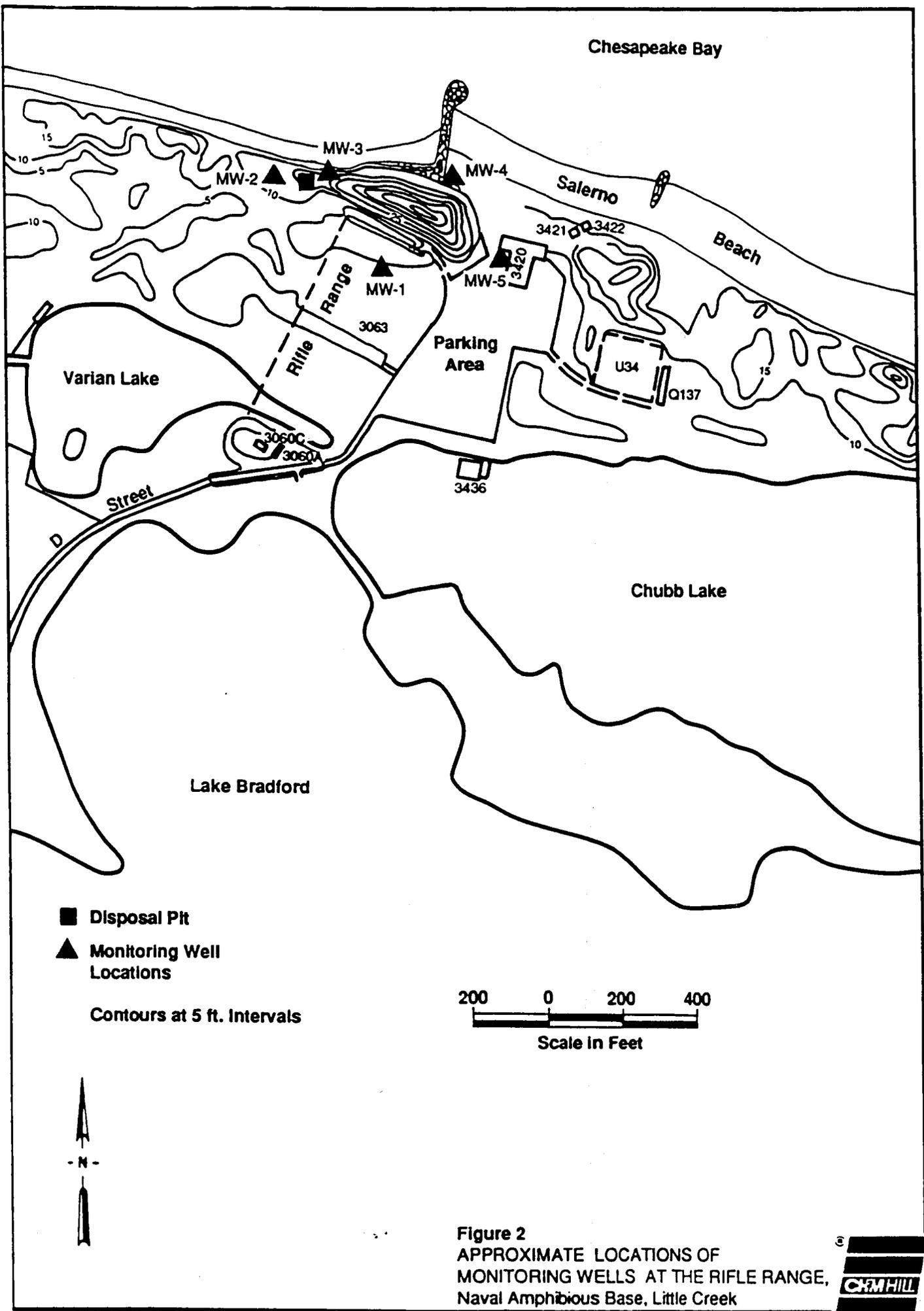
**LEGEND**

-  Base Boundary
-  Site Boundary



**Figure 1**  
**RIFLE RANGE LOCATION**  
**Naval Amphibious Base, Little Creek**





**Figure 2**  
 APPROXIMATE LOCATIONS OF  
 MONITORING WELLS AT THE RIFLE RANGE,  
 Naval Amphibious Base, Little Creek



Table 1  
AS-BUILT SPECIFICATIONS FOR MONITORING WELLS

General

Drilling Method: Hollow-stem auger

Borehole Diameter: 10 inches

Riser/Screen Diameter: 2-inch inside diameter

Riser/Screen Material: PVC (Schedule 40)

Screen Length: 10 feet

Specific

|                      | <u>MW-1</u>     | <u>MW-2</u>     | <u>MW-3</u> | <u>MW-4</u> | <u>MW-5</u> |
|----------------------|-----------------|-----------------|-------------|-------------|-------------|
| Depth of Well (feet) | 14              | 17.5            | 19          | 19          | 14          |
| Surface Completion   | FM <sup>1</sup> | AG <sup>2</sup> | AG          | AG          | FM          |

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<sup>1</sup> Flush mount, steel water meter cover

<sup>2</sup> Above grade with four guard posts

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In addition to the samples from each monitoring well, the following quality assurance (QA) samples were collected: (1) a duplicate sample from MW-3; (2) an equipment blank, following decontamination of the sampling equipment after collecting the samples from MW-3; and (3) a field blank from the rifle range water supply which was used during well installation. Following collection, the samples were shipped to CH2M HILL's laboratory in Montgomery, Alabama, for total dissolved lead analysis.

#### DATA EVALUATION

The water-level data are presented in Table 2. The resulting potentiometric map indicating groundwater contours is shown in Figure 3. The data indicate that in the vicinity of the target area, the general direction of groundwater flow is from MW-1 to MW-4, or north-northeast, toward the Chesapeake Bay.

The physical and chemical groundwater parameters measured in the field are presented in Table 3. The values represent measurements after the parameters had stabilized following the purging of each well. The results of the lead analyses are shown in Table 4. A copy of the laboratory report is presented in Appendix B. The level of detection for lead was 5 micrograms per liter ( $\mu\text{g}/\text{l}$ ). The results from the equipment blank indicate that the decontamination procedures were effective in eliminating any cross contamination between wells during sampling. The results of other laboratory and field QA procedures (i.e., matrix spike/matrix spike duplicate analyses) suggest that the data are representative of site conditions at the time of sampling.

The federal drinking water maximum contaminant level (MCL) and the Virginia groundwater quality standard is  $50 \mu\text{g}/\text{l}$  (40 CFR 141; Virginia Code § VR680-21-04.3). The laboratory results indicate that lead concentrations are at, or near, this standard in two wells (MW-1 and MW-3). The highest concentration ( $83 \mu\text{g}/\text{l}$ ) was detected in MW-3, which is located adjacent to, and downgradient from, the disposal pit. This value was confirmed by the duplicate sample ( $80 \mu\text{g}/\text{l}$ ).

#### CONCLUSIONS AND RECOMMENDATIONS

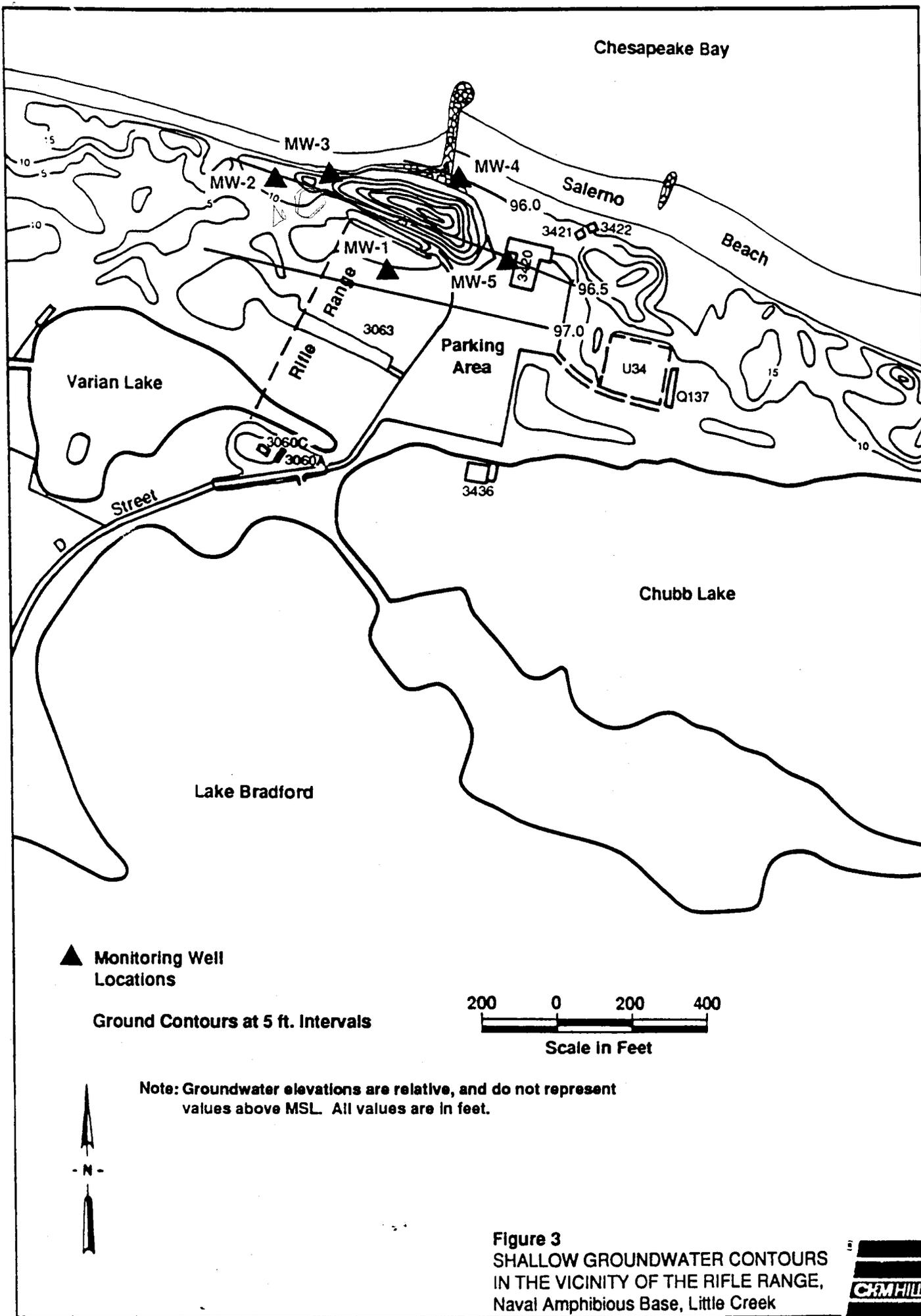
Water level and chemical data from MW-2 and MW-3, together with their location, suggest that the disposal pit may be a source of lead in the groundwater. Other sources of lead, which cannot be completely ruled out, may include (1) residual lead in the target area remaining after soil excavation; and/or (2) lead in the target area before the contaminated soil was removed. However, water level and

Table 2  
WATER LEVELS IN MONITORING WELLS  
February 6, 1989

(Measured Values in Feet)

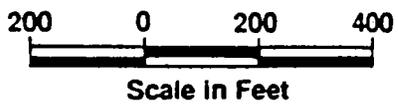
| <u>Well<br/>Number</u> | <u>Time</u> | <u>Top of Protective Casing<br/>Relative Elevation<br/>(well datum)</u> | <u>Water Level<br/>(below)<br/>well datum)</u> | <u>Relative<br/>Water Level<br/>Elevation</u> |
|------------------------|-------------|-------------------------------------------------------------------------|------------------------------------------------|-----------------------------------------------|
| MW-1                   | 09:50       | 100.00                                                                  | 3.09                                           | 96.91                                         |
| MW-2                   | 09:35       | 104.66                                                                  | 8.12                                           | 96.54                                         |
| MW-3                   | 09:40       | 107.73                                                                  | 11.08                                          | 96.65                                         |
| MW-4                   | 09:45       | 107.87                                                                  | 11.89                                          | 95.98                                         |
| MW-5                   | 09:47       | 101.46                                                                  | 4.97                                           | 96.49                                         |

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▲ Monitoring Well Locations

Ground Contours at 5 ft. Intervals



Note: Groundwater elevations are relative, and do not represent values above MSL. All values are in feet.



**Figure 3**  
SHALLOW GROUNDWATER CONTOURS  
IN THE VICINITY OF THE RIFLE RANGE,  
Naval Amphibious Base, Little Creek



Table 3  
FIELD PARAMETER MEASUREMENTS

| <u>Well No.</u> | <u>Date</u> | <u>Time</u> | <u>pH</u> | <u>Eh<sup>a</sup> (mV)</u> | <u>Conductivity (umho/cm)</u> | <u>Temperature (°C)</u> |
|-----------------|-------------|-------------|-----------|----------------------------|-------------------------------|-------------------------|
| MW-1            | 2/6/89      | 13:00       | 5.1       | -95                        | 175                           | 11                      |
| MW-2            | 2/6/89      | 10:35       | 5.7       | 10                         | 160                           | 12                      |
| MW-3            | 2/6/89      | 11:30       | 5.0       | 215                        | 139                           | 13                      |
| MW-4            | 2/6/89      | 15:11       | 6.1       | 105                        | 309                           | 14                      |
| MW-5            | 2/6/89      | 16:23       | 6.4       | 68                         | 300                           | 14                      |

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<sup>a</sup>Eh values are uncorrected field measurements.

WDR256/032

Table 4  
RESULTS OF LEAD ANALYSES IN GROUNDWATER  
February 6, 1989

(Concentrations in  $\mu\text{g}/\text{l}$ )

| <u>Well/Sample</u> | <u>Concentration</u> |
|--------------------|----------------------|
| MW-1               | 49                   |
| MW-2               | 14                   |
| MW-3               | 83/80 <sup>a</sup>   |
| MW-4               | 5                    |
| MW-5               | <5                   |
| Equipment Blank    | <5                   |
| Field Blank        | <5                   |

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<sup>a</sup>83/80 refers to sample and duplicate sample results.

<sup>b</sup><5--the concentration is less than the detection limit of 5  $\mu\text{g}/\text{l}$ .

WDR256/033

chemical data from MW-4 suggest that the target area is less likely than the disposal pit to be the source of lead in MW-2 and MW-3. The results from MW-1 (49  $\mu\text{g}/\text{l}$ ), upgradient of both the pit and the target area, indicate that lead may also be reaching the groundwater from other sources.

Removal of the waste soil within the pit will most likely eliminate the source of lead in MW-2 and MW-3. With the source removed, the shallow groundwater system will probably flush itself relatively quickly because the aquifer material is permeable (sand) and the groundwater discharges into the Chesapeake Bay less than 200 feet from these wells. The concentrations detected suggest that the amount of lead discharged into the Chesapeake Bay is small, and probably insignificant when dilution within the bay is considered. However, the extent of existing contamination has not been quantified.

If lead concentrations in MW-2 and MW-3 do not decline and the lead concentration in MW-4 increases, following removal of the pit, then more attention should be placed on past or present lead in the target area as being a potential source.

Further action at this site should be coordinated with the various regulatory agencies currently investigating the disposal area. What the appropriate agencies consider to be an acceptable concentration of lead in groundwater is not known at this time and will have to be negotiated with them. Groundwater in the vicinity of the rifle range is not used by humans. Additional work will depend on the agencies' response to the disposal pit.

The source of lead in MW-1 has not been determined. Depending on what the regulatory agencies consider to be an acceptable concentration, additional work at the site may be necessary. The additional work may involve the installation of additional wells, or it may simply entail more thorough research into past lead-contaminated soil disposal practices to identify the source.

WDR256/029

Appendix A  
MONITORING WELL BORING LOGS

WDR256/034/1

PROJECT NUMBER: WDC 20368

BORING NO.: RR-MW1

SHEET: 1 of 1

CH2M HILL

SOIL BORING LOG

PROJECT: LANTDIV

LOCATION: Rifle Range - NAB, Little Creek

ELEVATION:

DRILLING CONTRACTOR: ATEC Associates

DRILLING METHOD AND EQUIPMENT: Hollow Stem Auger

WATER LEVEL AND DATE: -5 ft bls

START: 1-24-89

FINISH: 1-24-89

LOGGER: Frank Lewis

| DEPTH<br>BELOW<br>SURFACE | DEPTH    |                       | STD.<br>PEN.<br>TEST | SOIL DESCRIPTION                                                                                             | S<br>Y<br>M<br>B<br>O<br>L | WELL CONSTRUCTION         |
|---------------------------|----------|-----------------------|----------------------|--------------------------------------------------------------------------------------------------------------|----------------------------|---------------------------|
|                           | INTERVAL | TYPE<br>AND<br>NUMBER |                      |                                                                                                              |                            |                           |
| 0 to 2                    |          |                       | 13"                  | 1-1-2-7 moist f. sand, grayish yellow (5Y 8/4), with 4" clayer silt with trace f. sand, olive gray (5Y 3/2). |                            | 2-inch PVC<br>FLUSH MOUNT |
| 2                         |          |                       |                      |                                                                                                              |                            |                           |
| 4                         | 4 to 6   |                       | 14"                  | 2-3-7-7 2" fill up, 12" m. to c. sand, saturated, med. lt. gray (N6).                                        |                            | BENTONITE                 |
| 6                         |          |                       |                      |                                                                                                              |                            | SAND                      |
| 8                         |          |                       |                      |                                                                                                              |                            |                           |
| 9 to 11                   |          |                       | 18"                  | 11-12-12-13 Saturated, c. sand with tr. med. sand, med. lt. gray (N6).                                       |                            |                           |
| 10                        |          |                       |                      |                                                                                                              |                            |                           |
| 12                        |          |                       |                      |                                                                                                              |                            |                           |
| 14                        | 14 to 16 |                       | 24"                  | 3-2-2-6 Top 21" c. sand with tr. f. to m. sand, med. lt. gray (N6), bottom 3" clayey silt with f. sand.      |                            |                           |
| 16                        |          |                       |                      |                                                                                                              |                            |                           |
| 18                        |          |                       |                      |                                                                                                              |                            |                           |

PROJECT NUMBER: WDC 20368.E0.06

BORING NO.: RR-MW2

SHEET: 1 of 1

CH2M HILL

SOIL BORING LOG

PROJECT: LANTDIV

LOCATION: Rifle Range - NAB, Little Creek

ELEVATION:

DRILLING CONTRACTOR: ATEC Associates

DRILLING METHOD AND EQUIPMENT: Hollow Stem Auger

WATER LEVEL AND DATE: 9 ft. BLS

START: 1-23-89

FINISH: 1-24-89

LOGGER: Frank Lewis

| DEPTH<br>BELOW<br>SURFACE | DEPTH    |                       | STD.<br>PEN.<br>TEST | SOIL DESCRIPTION                                                                                              | S<br>Y<br>M<br>B<br>O<br>L | WELL CONSTRUCTION   |
|---------------------------|----------|-----------------------|----------------------|---------------------------------------------------------------------------------------------------------------|----------------------------|---------------------|
|                           | INTERVAL | TYPE<br>AND<br>NUMBER |                      |                                                                                                               |                            |                     |
| 0                         | 0 to 2   |                       | 13"                  | 3-2-1-1 dry, m. to c. beach sand, bluish-white (5B 9/1).                                                      |                            | 2-inch PVC<br>GROUT |
| 2                         |          |                       |                      |                                                                                                               |                            |                     |
| 4                         | 4 to 6   |                       | 14"                  | 6-6-8-9 damp, m. to c. beach sand, lt. olive grey (5Y 6/1).                                                   |                            | BENTONITE           |
| 6                         |          |                       |                      |                                                                                                               |                            |                     |
| 8                         |          |                       |                      |                                                                                                               |                            | SAND                |
| 9                         | 9 to 11  |                       | 19"                  | 6-4-7-9 Saturated f. to m. sand, med. grey (N5).                                                              |                            |                     |
| 10                        |          |                       |                      |                                                                                                               |                            |                     |
| 12                        |          |                       |                      |                                                                                                               |                            |                     |
| 14                        | 14 to 16 |                       | 24"                  | 5-8-11-10 Saturated, top 14" silty clay, T. f. sand, dk. gray (N3), bottom 10" m. to c. sand, med. gray (N5). |                            |                     |
| 16                        |          |                       |                      |                                                                                                               |                            |                     |
| 18                        | 18 to 20 |                       | 24"                  | 4-6-6-4 Saturated, f. to m. sand, dk. gray (N3).                                                              |                            |                     |
| 20                        |          |                       |                      |                                                                                                               |                            |                     |

PROJECT NUMBER: WDC 20368

BORING NO.: RR-MM3

SHEET: 1 of 1

CH2M HILL

SOIL BORING LOG

PROJECT: LANTDIV

LOCATION: Rifle Range - NAB, Little Creek

ELEVATION:

DRILLING CONTRACTOR: ATEC Associates

DRILLING METHOD AND EQUIPMENT: Hollow Stem Auger

WATER LEVEL AND DATE: -10 ft bls

START: 1-25-89

FINISH: 1-25-89

LOGGER: Frank Lewis

| DEPTH    |                 | STD. PEN. | SOIL DESCRIPTION                                                                                                   | WELL CONSTRUCTION |
|----------|-----------------|-----------|--------------------------------------------------------------------------------------------------------------------|-------------------|
| DEPTH    | TYPE AND NUMBER | TEST      | SOIL NAME, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL |                   |
| 0 to 2   |                 | 13"       | 2-2-2-3 V. f. to f. sand with med. sand, moist, v. pale orange (10 YR 8/2).                                        | 2-inch PVC        |
| 2        |                 |           |                                                                                                                    |                   |
| 4 to 6   |                 | 16"       | 3-4-8-16 Same as above except bottom 6" color change to med. gray (N5).                                            | GROUT             |
| 6        |                 |           |                                                                                                                    | BENTONITE         |
| 9 to 11  |                 | 15"       | 6-7-7-10 Saturated, m. to c. sand w/ tr. f. sand, med. gray (N5), top 8" grayish orange (10 YR 7/4).               | SAND              |
| 11       |                 |           |                                                                                                                    |                   |
| 12       |                 |           |                                                                                                                    |                   |
| 14 to 16 |                 | 24"       | 6-6-8-10 F. to c. sand w/ silt, saturated, med. dk. gray (N4).                                                     |                   |
| 16       |                 |           |                                                                                                                    |                   |
| 18       |                 |           |                                                                                                                    |                   |
| 19 to 21 |                 | 24"       | 3-3-4-3 M. to c. wet sand, w/ tr. of f. sand and silt, med. dk. gray (N4).                                         |                   |
| 21       |                 |           |                                                                                                                    |                   |

PROJECT NUMBER: WDC 20368

BORING NO.: RR-MW4

SHEET: 1 of 1

CH2M HILL

SOIL BORING LOG

PROJECT: LANTDIV

LOCATION: Rifle Range - NAB, Little Creek

ELEVATION:

DRILLING CONTRACTOR: ATEC Associates

DRILLING METHOD AND EQUIPMENT: Hollow Stem Auger

WATER LEVEL AND DATE: -9 ft bls

START: 1-24-89

FINISH: 1-24-89

LOGGER: Frank Lewis

| DEPTH    |      | STD. PEN. |           | SOIL DESCRIPTION                                                                                                   | WELL CONSTRUCTION |
|----------|------|-----------|-----------|--------------------------------------------------------------------------------------------------------------------|-------------------|
| DEPTH    | TYPE | R         | TEST      | SOIL NAME, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL |                   |
| 0 to 2   |      | 14"       | 2-2-3-2   | f. to m. moist beach sand, grayish yellow (5Y 8/4).                                                                | 2-inch PVC        |
| 2        |      |           |           |                                                                                                                    |                   |
| 4 to 6   |      | 14"       | 2-2-3-4   | same as 0 to 2 ft.                                                                                                 | BENTONITE         |
| 6        |      |           |           |                                                                                                                    |                   |
| 9 to 11  |      | 16"       | 6-6-6-10  | m. to c. saturated beach sand, grayish yellow (5Y 8/4).                                                            | SAND              |
| 10       |      |           |           |                                                                                                                    |                   |
| 12       |      |           |           |                                                                                                                    |                   |
| 14 to 16 |      | 12"       | 4-7-9-16  | Saturated, m.-c. to v. c. sand, med. dk. gray (n4).                                                                |                   |
| 16       |      |           |           |                                                                                                                    |                   |
| 18       |      |           |           |                                                                                                                    |                   |
| 19 to 21 |      | 24"       | 5-8-10-16 | Saturated, m. to c. sand, med. dk. gray (n4)                                                                       |                   |
|          |      |           |           |                                                                                                                    |                   |

PROJECT NUMBER: WDC 20368

BORING NO.: RR-MW5

SHEET: 1 of 1

CH2M HILL

SOIL BORING LOG

PROJECT: LANTDIV

LOCATION: Rifle Range - NAB, Little Creek

ELEVATION:

DRILLING CONTRACTOR: ATEC Associates

DRILLING METHOD AND EQUIPMENT: Hollow Stem Auger

WATER LEVEL AND DATE: -5 ft b/s

START: 1-25-89

FINISH: 1-25-89

LOGGER: Frank Lewis

| DEPTH    |          | STD. | SOIL DESCRIPTION |                                                                | WELL CONSTRUCTION         |
|----------|----------|------|------------------|----------------------------------------------------------------|---------------------------|
| DEPTH    | TYPE     | PEN. | TEST             | SOIL NAME, COLOR, MOISTURE                                     | Y                         |
| BELOW    | INTERVAL | AND  | R                | CONTENT, RELATIVE DENSITY OR                                   | B O                       |
| SURFACE  | NUMBER   | E    | C                | CONSISTENCY, SOIL STRUCTURE,                                   | O G                       |
|          |          |      |                  | MINERALOGY, USCS GROUP SYMBOL                                  | L                         |
| 0 to 2   |          | 10"  | 19-8-9-9         | 4" asphalt, 6" moist f. to m. sand, v. pale orange (10YR 8/2). | 2-inch PVC<br>FLUSH MOUNT |
| 2        |          |      |                  |                                                                |                           |
| 4 to 6   |          | 14"  | 8-6-7-6          | Saturated, m. to c. sand w/ f. sand, tr. silt, med. gray (N5). | GROUT                     |
| 6        |          |      |                  |                                                                | BENTONITE                 |
| 8        |          |      |                  |                                                                | SAND                      |
| 9 to 11  |          | 12"  | 2-3-3-3          | V.f. to f. sand w/ tr. med. sand and silt, med. dk. gray (N4). |                           |
| 10       |          |      |                  |                                                                |                           |
| 12       |          |      |                  |                                                                |                           |
| 14 to 16 |          | 12"  | 7-9-8-8          | Same as above.                                                 |                           |
| 16       |          |      |                  |                                                                |                           |
| 18       |          |      |                  |                                                                |                           |

Appendix B  
LABORATORY REPORT

WDR256/034/2



Engineers  
Planners  
Economists  
Scientists

INORGANIC REPORT OF ANALYSIS

Page: 1  
Date: 03/01/89

CH2M HILL/WDC  
P.O. BOX 4400  
RESTON, VIRGINIA 22090

Project Number: WDC20368.E0.04

ATTN: MR. FRANK LEWIS

Laboratory Number: 12789

RE: Sample(s) received by CH2M HILL on 02/09/89.  
LANT DIV LITTLE CREEK

| Analysis Description | [Method]   | MW1      | MW2      | MW3      | MW-3 DUP | MW 4     | MW-5     |
|----------------------|------------|----------|----------|----------|----------|----------|----------|
|                      |            | 2/6/89   | 2/6/89   | 2/6/89   | 2/6/89   | 2/6/89   | 2/6/89   |
|                      |            | GRAB     | GRAB     | GRAB     | GRAB     | GRAB     | GRAB     |
| MATRIX               |            | WATER    | WATER    | WATER    | WATER    | WATER    | WATER    |
| LAB SAMPLE ID        |            | 12789001 | 12789002 | 12789003 | 12789004 | 12789005 | 12789006 |
| Lead (ug/L)          | [EPA239.2] | 49       | 14       | 83       | 80       | 5        | <5       |

Analyses performed in accordance with methods approved by the US EPA.

Legend: DW = Concentration expressed in mg/kg dry weight.  
 WW = Concentration expressed in mg/kg wet weight.  
 \* = Concentration expressed in mg/L.

% REC = Percent Recovered.  
 RPD = Relative Percent Difference.



Engineers  
Planners  
Economists  
Scientists

INORGANIC REPORT OF ANALYSIS

CH2M HILL/WDC  
P.O. BOX 4400  
RESTON, VIRGINIA 22090

Page: 2  
Date: 03/01/89

Project Number: WDC20368.E0.04

Laboratory Number: 12789

ATTN: MR. FRANK LEWIS

RE: Sample(s) received by CH2M HILL on 02/09/89.  
LANT DIV LITTLE CREEK

| Analysis Description | [Method]   | MW-5 UNFILT. | FIELD BLANK | EQUIP. BLANK | MATRIX SPIKE | DUPLICATE |
|----------------------|------------|--------------|-------------|--------------|--------------|-----------|
|                      |            | 2/6/89       | 2/6/89      | 2/6/89       | 2/6/89       | 2/6/89    |
|                      |            | GRAB         | GRAB        | GRAB         | GRAB         | GRAB      |
| MATRIX               |            | WATER        | WATER       | WATER        | WATER        | WATER     |
| LAB SAMPLE ID        |            | 12789007     | 12789008    | 12789009     | 12789M04     | 12789P04  |
| Lead (ug/L)          | [EPA239.2] | 75           | <5          | <5           | 96% REC      | 5.1 RPD   |

Analyses performed in accordance with methods approved by the US EPA.

Legend: DW = Concentration expressed in mg/kg dry weight.  
WW = Concentration expressed in mg/kg wet weight.  
\* = Concentration expressed in mg/L.

% REC = Percent Recovered.  
RPD = Relative Percent Difference.

Respectfully Submitted,

Mr. Craig Vinson  
Laboratory Manager