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**FIELD INVESTIGATION PHOTOGRAPH ALBUM**

**OPERABLE UNIT NO. 13  
(SITE 63 - VERONA LOOP DUMP)**

**MARINE CORPS BASE, CAMP LEJEUNE  
NORTH CAROLINA**

**CONTRACT TASK ORDER 0340**

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*Prepared for:*

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## LIST OF ACRONYMS AND ABBREVIATIONS

CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
DEHNR	North Carolina Department of Environment, Health, and Natural Resources
DoN	Department of the Navy
EPIC	Environmental Photographic Interpretation Center
FCLDA	French Creek Liquid Disposal Area
FFA	Federal Facilities Agreement
FTSA	Fuel Tank Sludge Area
HPBD	Hadnot Point Burn Dump
HPIA	Hadnot Point Industrial Area
LANTDIV	Atlantic Division Naval Facilities Engineering Command
MCB	Marine Corps Base
NC DEHNR	North Carolina Department of Environment, Health and Natural Resources
NPL	National Priorities List
OU	Operable Unit
PID	Photoionization Detector
POL	Petroleum, Oil, and Lubricants
PVC	Poly-Vinyl Chloride
RCRA	Resource Conservation and Recovery Act
RI/FS	Remedial investigation/Feasibility Study
SOP	Standard Operating Procedure
STP	Sewage Treatment Plant
SVOC	Semivolatile Organic Compound
TAL	Target Analyte List
TCL	Target Compound List
TCLP	Toxicity Characteristic Leaching Procedure
TOC	Total Organic Carbon
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compound

## 1.0 INTRODUCTION

Marine Corps Base (MCB), Camp Lejeune was placed on the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) National Priorities List (NPL) on October 4, 1989 (54 Federal Register 41015, 1989). Subsequent to this listing, the United States Environmental Protection Agency (USEPA) Region IV; the North Carolina Department of Environment, Health and Natural Resources (NC DEHNR); and the United States Department of the Navy (DoN) entered into a Federal Facilities Agreement (FFA) for MCB, Camp Lejeune. The primary purpose of the FFA is to ensure that environmental impacts associated with past and present activities at MCB, Camp Lejeune are thoroughly investigated and appropriate CERCLA response/Resource Conservation and Recovery Act (RCRA) corrective action alternatives are developed and implemented, as necessary, to protect public health, welfare, and the environment (FFA, 1989).

The Fiscal Year 1996 Site Management Plan for MCB, Camp Lejeune (Baker, 1995), the primary document referenced in the FFA, identifies 34 sites that require Remedial Investigation/Feasibility Study (RI/FS) activities. These 34 sites have been segregated into 17 operable units to simplify RI/FS activities. An RI was conducted at Operable Unit (OU) No. 13, Site 63, during November of 1995. This photograph album describes the RI conducted at Site 63, the Verona Loop Dump. Figure 1-1 depicts the location of OU No. 13 (Site 63).

### 1.1 Purpose and Format of Field Investigation Photograph Album

The primary purpose of the Field Investigation Photograph Album is to provide the Navy and Marine Corps with an overview of the RI field activities that have been conducted at MCB, Camp Lejeune, OU No. 13 (Site 63). The field investigation was conducted by Baker Environmental, Inc. (Baker) during November of 1995. This album contains photographs of Site 63 and the various field investigations that were conducted during the RI.

The Field Investigation Photograph Album is formatted to allow ease of review. Section 1.0 provides the introduction, purpose, and format of the photograph album. Section 2.0 provides a brief description of Site 63 and a summary of the known or suspected waste management activities. Photographs have been included within Section 2.0 that illustrate present site conditions. Section 3.0 describes the various field investigations conducted at OU No. 13. Representative photographs of all field investigation activities (e.g., Soil Investigation, Groundwater Investigation) are included in this section. Corresponding 35 millimeter color slides of all photographs contained in this album are provided in Appendix A. Figure 1-2 presents a field investigation site map of the Verona Loop Dump and the approximate location and direction of photographs contained herein.

Each field investigation photograph has been designated with a unique number. The photograph designation format is:

**Operable Unit #. Site # or Investigation. Year. Photograph #**

An explanation of each identifier is given below.

**Operable Unit #:** The field investigation was conducted at Operable Unit No. 13.

**Site #:** The field investigation was conducted at Site 63, the only site that comprises OU No. 13.

**Investigation:**

SL	=	Soil Investigation
GW	=	Groundwater Investigation
SW	=	Surface Water Investigation
SD	=	Sediment Investigation

**Year:** The field investigation was conducted during 1995.

**Photograph #:** The photograph number indicates the sequential order of photographs.

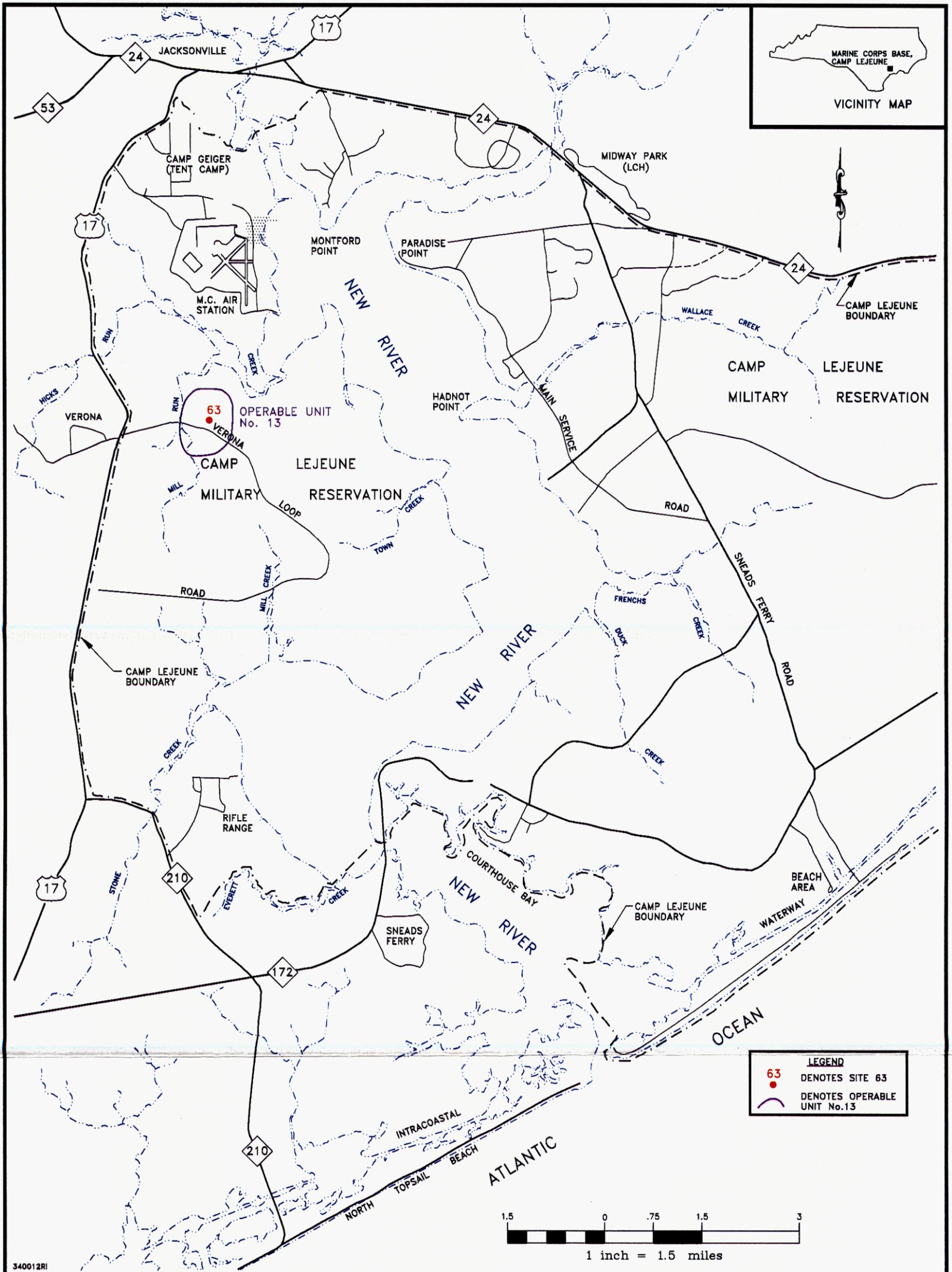


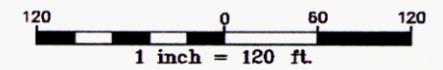
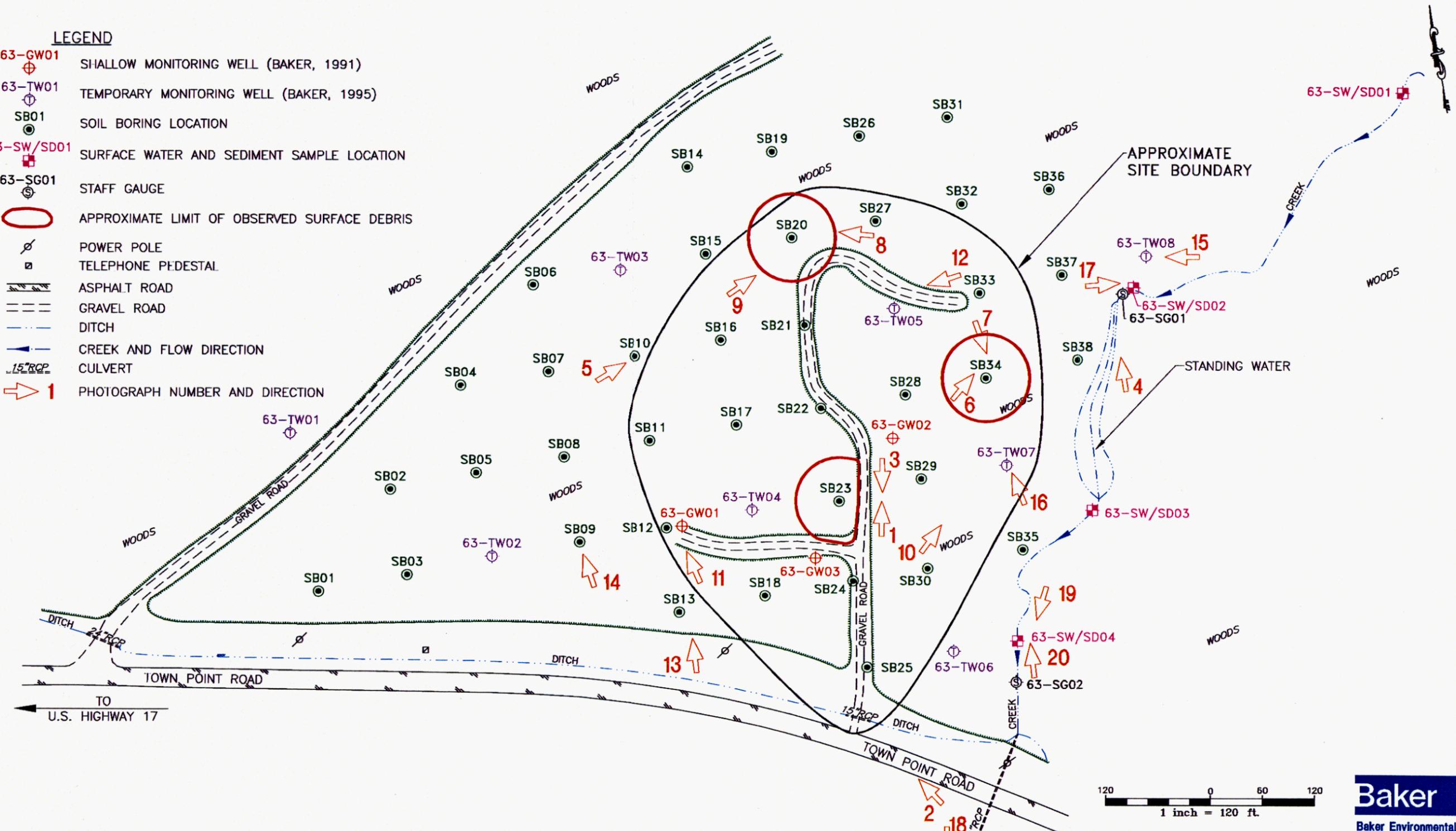
FIGURE 1-1  
 OPERABLE UNIT 13 - SITE 63  
 REMEDIAL INVESTIGATION, CTO-0340

MARINE CORPS BASE, CAMP LEJEUNE  
 NORTH CAROLINA

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**LEGEND**

- 63-GW01 SHALLOW MONITORING WELL (BAKER, 1991)
- 63-TW01 TEMPORARY MONITORING WELL (BAKER, 1995)
- SB01 SOIL BORING LOCATION
- 63-SW/SD01 SURFACE WATER AND SEDIMENT SAMPLE LOCATION
- 63-SG01 STAFF GAUGE
- APPROXIMATE LIMIT OF OBSERVED SURFACE DEBRIS
- POWER POLE
- TELEPHONE PEDESTAL
- ASPHALT ROAD
- GRAVEL ROAD
- DITCH
- CREEK AND FLOW DIRECTION
- CULVERT
- 1 PHOTOGRAPH NUMBER AND DIRECTION



**FIGURE 1-2**  
**SITE MAP AND**  
**FIELD INVESTIGATION PHOTOGRAPHS**  
**SITE 63, VERONA LOOP DUMP**  
**REMEDIAL INVESTIGATION, CTO-0340**  
**MARINE CORPS BASE, CAMP LEJEUNE**  
**NORTH CAROLINA**

SOURCE: LANTDIV, 1992  
 SURVEY: W.K. DICKSON & ASSOC., 1995

## **2.0 SITE BACKGROUND AND SETTING**

The following section provides both the location and setting of OU No. 13, Site 63. A brief summary of past waste management activities at Site 63 is also provided within this section.

### **2.1 Site Location and Setting**

The Verona Loop Dump (Site 63) is comprised of approximately five acres and is located nearly two miles south of the MCAS, New River operations area. Vehicle access to the site is via Town Point Road, east from U.S. Route 17. The study area is located along Town Point Road approximately 1.3 miles from U.S. Route 17. The site is bordered to the south by Town Point Road, to the east by an unnamed tributary to Mill Run, and to the west by a gravel access road.

Site 63 is relatively flat, however, the eastern portion of the study area slopes toward an intermittent stream. The unnamed tributary that borders Site 63, to the east, discharges into Mill Run approximately 2,000 feet south of Site 63. Mill Run then discharges into the Southwest Creek which eventually flows into the New River. A drainage ditch along Town Point Road receives surface water runoff from the extreme southern portion of the site and the asphalt road surface.

Much of the site is heavily vegetated with dense understory and trees greater than three inches in diameter. During the January 1995 RI scoping site visit an area of potentially impacted vegetation was tentatively identified by representatives of LANTDIV and Baker. Within this small area, several standing trees of less than three inches in diameter were observed without bark. During the November 1995 field investigation, however, the same area had begun to revegetate with small pines and hardwoods. A partially improved gravel road provides access to the main portion of the study area; other unimproved paths extend from this road. Several personnel entrenchments, used during training exercises, have been excavated throughout the study area. Earthen berms and small to medium size trees have been felled to construct protective works around many of the entrenchments.

### **2.2 Site History**

Very little information is known regarding the history or occurrence of disposal activities at Site 63. The study area reportedly received wastes generated during training exercises. The type of materials generated during these exercises have been described by MCB, Camp Lejeune personnel as "bivouac" wastes. Additional information suggests that no hazardous wastes were disposed of at Site 63. Additionally, the years during which disposal operations may have taken place are not known.

Upon visual inspection of the site, conclusive indications (e.g., distressed vegetation, denuded areas, etc.) of hazardous waste disposal were not apparent; however, reinforced concrete rubble, construction material, and various other inert debris were identified during several site visits. The observed waste material was limited to a number of distinct piles or areas, rather than being strewn throughout the study area.

The Verona Loop portion of MCB, Camp Lejeune (refer to Figure 1-1), which includes Site 63, is currently unrestricted to military personnel. Training exercises, maneuvers, and recreational hunting are frequently conducted in the area.



**OU13.Site 63.1995.01:** This photograph depicts conditions at Site 63. The gravel road pictured here provides access to the central portion of the study area; unimproved paths extend outward from this road.



**OU 13.Site 63.1995.02:** This photograph was taken from Town Point Road facing Site 63. The study area is located along Town Point Road, approximately 1.3 miles east of U.S. Route 17.



**OU 13.Site 63.1995.03:** This photograph was taken facing south from the Site 63 gravel access road toward Town Point Road. As pictured, much of the site is heavily vegetated with dense understory and trees greater than three inches in diameter.



**OU 13.Site 63.1995.04:** This photograph depicts the unnamed tributary that borders Site 63 to the east. The tributary is less than two feet wide at this location.



**OU 13.Site 63.1995.05:** This photograph depicts the western portion of the study area, adjacent to soil test boring 63-SB10.



**OU 13.Site 63.1995.06:** This photograph depicts some of the debris and scrap metal identified during the field investigation.



**OU 13.Site 63.1995.07:** Rubber tires and vehicle parts, as pictured, were identified on the ground surface at Site 63. Glass shards, wood, and rusted metal debris were found in a limited number of subsurface samples obtained from the central portion of the study area.



**OU 13.Site 63.1995.08:** Reinforced concrete rubble, construction material, and various other inert debris, as pictured, were also identified at Site 63.



**OU13.Site 63.1995.09:** The observed surface debris, as pictured, was limited to a number of distinct piles or areas rather than being strewn throughout the study area (refer to Figure 1-2).



**OU13.Site 63.1995.10:** This photograph depicts one of the many personnel entrenchments, presumably constructed during training exercises, that have been hand-excavated throughout the study area. As pictured, an earthen berm and felled trees have been used to form protective works.

### 3.0 FIELD INVESTIGATION

The field investigation program at Site 63 was initiated to detect and characterize potential impacts to human health and the environment resulting from past waste management activities. This section discusses the site-specific RI field investigation activities that were conducted to fulfill that objective. The RI field investigation of OU No. 13 commenced on November 2, 1995 and continued through November 16, 1995. The RI field program at Site 63 consisted of a soil investigation, which involved direct-push sample collection; a groundwater investigation, which included temporary monitoring well installation, sampling, and aquifer testing; a surface water and sediment investigation; and a habitat evaluation. The following provides an overview of the various investigation activities carried out during the RI:

●	Surface Soil Samples Collected	46
●	Subsurface Soil Samples Collected	50
●	Temporary Wells Installed and Sampled	8
●	Existing Shallow Wells Sampled	3
●	Surface Water Samples Collected	5
●	Sediment Samples Collected	5

The various investigations were performed at Site 63 to assess the nature and extent of contamination that may have resulted from previous waste management practices or site activities; assess the human health, ecological, and environmental risks associated with exposure to surface and subsurface soils; and characterize the geologic and hydrogeologic setting of the study area. Environmental samples (excluding general chemistry and engineering properties) were analyzed by Contract Laboratory Program methods using Level D Data Quality Objectives; the resultant data were submitted for third party data validation.

#### 3.1 Soil Investigation

A soil investigation was conducted at Site 63 to characterize potential soil contamination that may have resulted from previous waste management practices or site activities. Analytical data were compiled during the investigation to assess both the human health and ecological risks associated with exposure to site soil. Soil collection was performed using a direct-push (GeoProbe™) sampling system. Borings were advanced by either a truck-mounted rig or by a hand sampler unit. The direct-push sampling system employed a stainless steel cutting shoe and collection tube. A dedicated acetate liner, inserted into the stainless steel collection tube, was used to collect and then extrude soil samples for field and laboratory analyses. All soil sampling activities conducted at Site 63 were performed in Level D personnel protection. A total of 46 test borings were sampled during the soil investigation at Site 63. Soil samples were collected throughout Site 63 as provided on Figure 1-2.

Two types of borings were installed during the soil investigation: exploratory test borings (i.e., borings installed for sample collection and description of subsurface units) and borings advanced for the purpose of temporary monitoring well installation. Selected soil samples from each of the two types of borings were submitted for laboratory analysis. Soils obtained from exploratory borings were collected from the surface (i.e., ground surface to a depth of twelve inches) and at continuous two-foot intervals starting at one foot below ground surface. Continuous sample collection proceeded until the boring was terminated at the approximate depth of the water table, which varied at Site 63 from one to 13 feet below ground surface. An additional soil sample was

obtained from below the water table to confirm groundwater depth and ensure that the true water table had been encountered (i.e., not a perched zone).

Where conditions warranted (i.e., when groundwater was encountered at depths greater than two feet below ground surface) a minimum of two samples were retained for laboratory analyses from each of the soil boring locations. In some cases, a third sample from the borehole was also submitted for analysis if indications of contamination (i.e., elevated photoionization detector (PID) readings or visual contamination) were noted or if the water table was encountered greater than ten feet below ground surface. Each soil sample was prepared and handled according to USEPA Region IV Standard Operating Procedures (SOPs). Samples collected for volatile organic analysis were extracted with a stainless-steel spoon from different sections of the extruded soil core so that the resulting composite was representative of the entire sampling interval. Precautions were taken not to aerate the sample, thus minimizing volatilization. Samples retained for other analytical parameters (e.g., semivolatiles, pesticides, PCBs, and metals) were thoroughly homogenized prior to being placed in the appropriate laboratory containers.



**OU13.SL.1995.11:** During the Site 63 field investigation each test boring, monitoring well, and surface water/sediment sampling location was surveyed to the nearest tenth of a foot. Horizontal data points were referenced to the North Carolina State Plane Coordinate System.



**OU13.SL.1995.12:** Wooden stakes and flagging, as pictured, were used to identify the various sampling locations at Site 63.



**OU13.SL.1995.13:** As this photograph depicts, all operations relating to the soil investigation (i.e., soil acquisition, field analysis, and decontamination) were mobilized between test boring locations.



**OU13.SL.1995.14:** This photograph depicts GeoProbe™ soil sampling operations. The direct push sampling system, as pictured, generated only a very small amount of waste soils during the investigation.

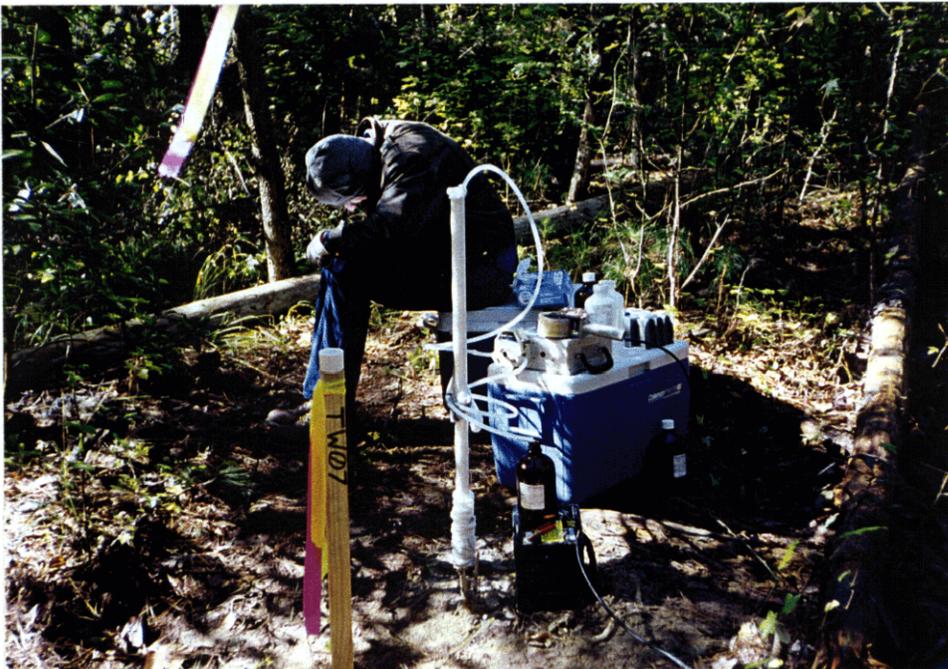
### **3.2 Groundwater Investigation**

In addition to three existing permanent wells, eight temporary wells were employed to further assess groundwater conditions at Site 63. The eight temporary shallow monitoring wells (i.e., wells installed to evaluate the upper most portion of the surficial aquifer and then be removed after sample acquisition) were installed throughout Site 63 depicted on Figure 1-2. The newly installed temporary shallow monitoring wells were situated spatially to intercept potentially impacted groundwater from the suspected disposal area, and to characterize the nature and horizontal extent of possible contamination. The network of newly-installed temporary and existing monitoring wells was also used to evaluate groundwater flow patterns within the upper portion of the surficial aquifer. Placement of the temporary monitoring wells was based on review of previous investigations, and analytical data generated during the 1991 Site Inspection. The eight temporary wells were constructed of one-inch nominal diameter, Schedule 40, flush-joint and threaded PVC casing placed in an open borehole immediately following the soil acquisition. A synthetic well sleeve was used to filter fine materials from the surrounding formation.

A minimum of three to five well volumes were purged from each well prior to sampling. Measurements of pH, specific conductance, temperature, and turbidity were taken after each well volume was purged to ensure that the groundwater characteristics had stabilized before sampling. During the groundwater sampling event, a low flow well purging and sampling technique was employed. The sampling methodology was developed in response to conversations with USEPA Region IV personnel in Athens, Georgia. A peristaltic pump (GeoPump™), with the intake set two to three feet into the static water column, was used to purge each of the wells. While purging groundwater from each of the monitoring wells, a flow rate of less than 0.25 gpm was maintained. Samples collected for both organic and metal analyses were obtained directly from the pump discharge. Dedicated sections of polyethylene and silicon pump-head tubing were used during purge and sampling activities at each well. Rinsate blanks were collected from the polyethylene and silicon tubing to verify that proper procedures had been followed.



**OU13.GW.1995.15:** Temporary monitoring wells were installed using the same direct push sampling system employed during the soil investigation. The personnel pictured here are in the process of installing the one-inch polyvinyl chloride well.



**OU13.GW.1995.16:** Groundwater sampling operations were mobilized between temporary wells. A peristaltic pump (GeoPump™), with the intake set two to three feet into the static water column, was used to purge and sample each of the permanent and temporary monitoring wells.

### **3.3 Surface Water and Sediment Investigations**

A total of five surface water and five sediment samples were collected at Site 63 with each sampling station yielding one surface water and one sediment sample. Each of the sampling stations were located in an unnamed tributary to Mill Run, which borders the eastern portion of the study area. Figure 1-2 depicts the locations of the surface water and sediment sampling locations. Surface water samples were assigned the designation "SW" and "SD" was specified for identification of sediment samples.

At each of the five surface water sampling stations, samples were collected by dipping containers directly into the water. Samples to be analyzed for volatiles were obtained first, samples for additional analytical fractions were collected immediately following. Care was taken to avoid excessive agitation that could result in loss of VOCs. Water quality readings were taken at each sampling station (i.e., pH, dissolved oxygen, salinity, specific conductance, and temperature).

Sediment samples were collected below the aqueous layer by driving a sediment corer, equipped with a disposable tube, into the sediment. The first six inches of sediment at each station were submitted for analyses. The sediment was extruded from the disposable sampling tube and placed into the appropriate sample containers. Sampling containers were provided by the laboratory and certified to be contaminant free. The volatile fraction was collected first, followed by the remaining analytical parameters. Samples to be analyzed for TCL semivolatiles, pesticides, PCBs, total organic carbon (TOC), and TAL metals were thoroughly homogenized before the sample jars were filled. Surface water and sediment samples were collected at downstream sampling locations first. All sample locations were marked by placing a wooden stake at the nearest point along the bank.

### **3.4 Ecological Investigation**

An ecological investigation, consisting of a habitat evaluation, was conducted at Site 63. During the habitat evaluation, dominant vegetation types and species were qualitatively assessed in the field. Based on previous habitat evaluations conducted in similar habitats at MCB, Camp Lejeune, species expected to live at the site were identified. Amphibians, reptiles, birds, and mammals were also identified as visual sightings or evidence allowed. In addition, photographs were used to determine dominant vegetation types and species. From this information, ecological communities were established and biohabitat maps developed.



**OU13.SW.1995.17:** This photograph depicts surface water and sediment sampling station 63-SW/SD02. The unnamed tributary that borders the eastern portion of the study area is approximately eight inches deep at this location.



**OU13.SW.1995.18:** Sediment samples were collected using a manually-driven core barrel, as pictured, and dedicated acetate sleeves. The sediment samples were then extruded from the acetate sleeves into appropriate sample jars.



**OU13.SD.1995.19:** This photograph depicts surface water collection procedures. At each of the five surface water sampling stations, samples were collected by dipping containers directly into the water.



**OU13.SD.1995.20:** In addition to laboratory tests, measurements of specific conductance, pH, and dissolved oxygen were recorded during the surface water investigation.

#### 4.0 REFERENCES

Baker Environmental, Inc. January 1994. Site Inspection Report - Site 63, Verona Loop Dump. Final. Prepared for the Department of the Navy, Naval Facilities Engineering Command, Atlantic Division, Norfolk, Virginia. January 1994.

Baker Environmental, Inc. 1995. Remedial Investigation/Feasibility Study Project Plans for Operable Unit No. 13 (Site 63), Marine Corps Base Camp Lejeune, North Carolina. Final. Prepared for the Department of the Navy, Naval Facilities Engineering Command, Atlantic Division, Norfolk, Virginia. September 1995.

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Water and Air Research, Inc. (WAR). 1983. Initial Assessment Study of Marine Corps Base Camp Lejeune, North Carolina. Prepared for the Department of the Navy, Naval Energy and Environmental support Activity, Port Hueneme, California. April 1983.

**APPENDIX A**  
**35-millimeter COLOR SLIDES**

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