133236.PM.PO/D1/01

06.09-5/1/01-3012

Final

# No Action
# Decision Document
# Site 75
# MCB, Camp Lejeune, North Carolina

**Prepared For**

## Department of the Navy
### Atlantic Division
### Naval Facilities Engineering Command
**Norfolk, Virginia**

Contract No. N62470-95-D-6007
CTO-0120

**May 1, 2001**

**Prepared by**

CH2M HILL
Federal Group, Ltd.

**Baker**
Environmental, Inc.

**CDM**
Federal Programs Corp.

## TABLE OF CONTENTS



## LIST OF TABLES



## LIST OF FIGURES

## ATTACHMENTS

## ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| Baker | Baker Environmental, Inc. |
| bgs | Below Ground Surface |
| CERCLA | Comprehensive Environmental Response, Compensation, and Liability Act |
| CERCLIS | Comprehensive Environmental Response, Compensation, and Liability Information System |
| DD | Decision Document |
| DoD | Department of Defense |
| DON | Department of the Navy |
| EM | Electromagnetic |
| ESE | Environmental Science and Engineering, Inc. |
| FFA | Federal Facilities Agreement |
| FS | Feasibility Study |
| HI | Hazard Index |
| HQ | Hazard Quotient |
| ILCR | Incremental Lifetime Cancer Risk |
| LANTDIV | Atlantic Division Naval Facilities Engineering Command |
| MCAS | Marine Corps Air Station |
| MCB | Marine Corps Base |
| msl | Mean Sea Level |
| NA | No Action |
| NCP | National Oil and Hazardous Substances Pollution Contingency Plan |
| NC DENR | North Carolina Department of Environment and Natural Resources |
| NFRAP | No Further Remedial Action Plan |
| NPL | National Priorities List |
| PA | Preliminary Assessment |
| PCB | Polychlorinated Biphenyl |
| Pre-RI | Pre-Remedial Investigation |
| RI | Remedial Investigation |
| RI/FS | Remedial Investigation/Feasibility Study |
| RA | Removal Action or Remedial Action |
| RBC | Risk-Based Concentrations |
| SARA | Superfund Amendments and Reauthorization Act |
| SI | Site Investigation |
| SVOA | Semivolatile Organic Compound |

## ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| TAL | Target Analyte List |
| TCL | Target Compound List |
| µg/kg | micrograms per kilogram |
| USEPA | United States Environmental Protection Agency |
| USGS | United States Geologic Society |
| VOC | Volatile Organic Compound |

# DECLARATION

## SITE NAME AND LOCATION

Site 75
Marine Corps Air Station (MCAS) Basketball Court
Marine Corps Base, Camp Lejeune, North Carolina

## STATEMENT OF BASIS

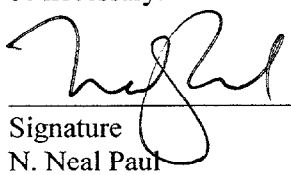
This No Action (NA) decision is based on the results of a Pre-Remedial Investigation (Pre-RI) Screening Study conducted at Site 75 in October 1995. The Pre-RI Screening Study included a review of previous investigations, completion of a geophysical survey, installation of groundwater monitoring wells, and associated soil and groundwater sampling. The Department of the Navy (DON) and the Marine corps have obtained concurrence from the State of North Carolina Department of Environment and Natural Resources (NC DENR) and from the United States Environmental Protection Agency (USEPA) Region IV on the selected remedy. Copies of the NC DENR and USEPA approval letters are presented in Attachments A and B.

## DESCRIPTION OF THE SELECTED REMEDY

Based on the current conditions at Site 75, it has been determined that no threat to public health exists. Therefore, no action under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), is warranted.

## DECLARATION STATEMENT

This NA Decision Document (DD) represents the selected action for Site 75, developed in accordance with CERCLA, as amended by SARA, and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). Because contaminant levels at the site have been determined to present no significant threat to human health, it has been determined that no action is protective of human health, attains federal and state applicable or relevant and appropriate requirements (ARARs), and is cost-effective. The statutory preference for treatment is not satisfied because treatment was not found to be necessary.



Signature
N. Neal Paul
Head, Installation Restoration Branch
Installation and Environment Division
Marine Corps Base, Camp Lejeune, NC

5-08-01

Date

# DECISION SUMMARY

## 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, October 5, 1989). Subsequent to this listing, the United States Environmental Protection Agency (USEPA) Region IV; the North Carolina Department of Environment and Natural Resources (NC DENR); and the United States Department of the Navy (DON) entered into a Federal Facilities Agreement (FFA) on March 1, 1991 (effective date) for MCB, Camp Lejeune. The objectives of the FFA are:

- To ensure that the environmental impacts with past and present activities at MCB, Camp Lejeune are thoroughly investigated and appropriate CERCLA response actions are developed and implemented as necessary to protect the public health, welfare and the environment;

- To establish a procedural framework and schedule for developing, implementing and monitoring appropriate response actions at MCB, Camp Lejeune in accordance with CERCLA, the NCP, and USEPA policy relevant to remediation at MCB, Camp Lejeune; and

- To facilitate cooperation, exchange of information and participation of the parties in such action.

The Fiscal Year 2001 Site Management Plan for MCB, Camp Lejeune, the primary document referenced in the FFA, accounts for each of the sites at the Base and provides detailed strategic planning. Many of the sites listed in the FFA have been investigated through the completion of Remedial Investigation/Feasibility Studies (RI/FS). However, several sites, (Site 75 included) did not warrant a full scale RI/FS. As such, these sites were investigated by completing Pre-Remedial Investigation (Pre-RI) Screening Studies. The goal of these investigations was to determine if a full RI study was necessary or if a decision of no action was appropriate.

This NA Decision Document (DD) supports no action for Site 75. The purpose of this NA DD is to summarize the existing data for the site and to describe the Marine Corps' rationale for selecting the No Action alternative.

Decision documents of this type can fall into four categories. The category into which a site is placed is determined by the investigation(s) that have been conducted at the site. They are divided as follows: Category I - NA decision is based on the results of a Preliminary Assessment (PA), a PA supplement, or an equivalent effort; Category II - NA decision is based on the results of a Site Inspection (SI), an SI supplement, or an equivalent effort; Category III - NA decision is based on the results of a Remedial Investigation (RI) and, if required, a Feasibility Study (FS), or an equivalent effort; Category IV - NA decision is based on the completion of a removal action or remedial action (RA) (including interim actions), or an equivalent effort.

Site 75 is a Category II designation. The Pre-RI Screening Study was completed to determine if further investigations were warranted. This effort is equivalent to a SI. The Pre-RI Screening Study completed at Site 75 provides sufficient information about the history, nature of the site and subsequently verifies the lack of contamination. Therefore, a Category II - NA DD is herein presented in accordance with all Category II requirements.

The objectives of this NA DD for Site 75 are:

- To briefly describe the location, history and environmental setting of Site 75 and its relationship to MCB, Camp Lejeune;
- To describe the current status of the site based on the results of the related investigations; and
- To assess the potential risks to human health at the site.

Data from the Pre-RI Screening Study (Baker, 1998) were used to derive and support no action for Site 75. The Pre-RI Screening Study was initiated to detect and characterize potential impacts to human health and to determine if the site required further investigative work. The investigation included a review of previous studies, a geophysical survey, soil sampling, permanent monitoring well installation, groundwater sampling, and a site survey.

## 1.1 Site Location and Description

To provide the reader with the entire framework of Site 75 the following subsections discuss site locations and descriptions for both MCB, Camp Lejeune and Site 75.

### 1.1.1 MCB, Camp Lejeune

MCB, Camp Lejeune is located on the coastal plain of North Carolina in Onslow County. The facility is bisected by the New River and encompasses approximately 236 square miles (of which approximately 40 square miles is water, made up by the New River and it's tributaries). The New River flows in a southeasterly direction and forms a large estuary before entering the Atlantic Ocean. The southeastern border of MCB, Camp Lejeune is the Atlantic Ocean shoreline. The western and northeastern boundaries of the facility are U.S. Route 17 and State Route 24, respectively. The City of Jacksonville borders MCB, Camp Lejeune to the north.

Construction of MCB, Camp Lejeune began in April 1941 at the Hadnot Point Industrial Area, where major functions of the base are centered today. The facility was designed to be the "World's Most Complete Amphibious Training Base." The MCB, Camp Lejeune complex consists of six geographical and operational locations under the jurisdiction of the Base Command. These areas include Camp Geiger, Montford Point (which includes Camp Johnson), Courthouse Bay, Mainside, the Rifle Range Area, and the Greater Sandy Run Area. Marine Corps Air Station (MCAS) New River is operationally under the control of MCAS Cherry Point. However, MCB, Camp Lejeune is responsible for the facilities and environmental management of MCAS New River.

The Air Station and Camp Geiger are considered as a single urban area possessing two separate missions and supported by two unrelated groups of personnel. The MCAS New River encompasses 2,772 acres and is located in the northwestern section of the complex and lies approximately five miles south of Jacksonville. The MCAS includes air support activities, troop housing and personnel support facilities, all of which immediately surround the aircraft operations and maintenance areas. Site 75 is located in the MCAS.

### 1.1.2 Site 75

Site 75 is located at the MCAS New River in the northwest portion of the MCB, Camp Lejeune. As shown on Figure 1-1, MCAS New River is accessed by U.S. Route 17, which borders the western portion of the base.

Figure 1-2 is a site location map which shows the boundary and features of the surrounding area. The site is located between Baxter Street and a gravel road which is considered a part of White Street (i.e., White Street Extension). Curtis Road borders the southern portion of the site and a heavily wooded area is present to the north. The Seaboard Coastline Railroad is located west of the site.

The site terrain is relatively flat and is covered by grass and wooded areas. There are several shallow drainage swales (one foot deep or less) that run north to south across the site. These swales are dry the majority of the time; however, during periods of heavy precipitation, water will collect and flow northward off the site through the swales.

## 1.2 Site History and Enforcement Activities

Site 75 was reported to be a drum disposal area that was used on at least one occasion in the early 1950s. The excavation for the drum disposal was reported to be an oval shaped pit approximately 90 feet long by 70 feet wide and was sufficiently deep to have cut into the groundwater table approximately five feet below ground surface (bgs). An estimated seventy-five to one-hundred 55-gallon drums were reportedly placed in this pit. The drums reportedly contained a chloroacetophenone tear gas solution which was used for training. Additional volatile organic compounds (VOCs) such as chloroform, carbon tetrachloride, and benzene, along with chloropicirin may also have been present in the solution.

Investigative activities at Site 75 have included geophysical surveys in an attempt to locate the buried material and sampling of various environmental media, (see Figure 1-3 for the area of the geophysical survey). In addition to the geophysical survey, the Pre-RI Screening Study also included sampling of surface soil, subsurface soil, and groundwater, evaluating the resultant analytical data, and the performance of a qualitative and quantitative risk assessment (see Figure 1-2 for sample locations). This study provided the information necessary to determine if the site had contributed hazardous substances to the environment.

The NCP states that sites which the USEPA determines to need no additional evaluation are given a "No Further Response Action Plan (NFRAP)" designation within the CERCLA Information System (CERCLIS). Through this designation, no supplemental investigation or remediation work will be performed at the site unless new information is presented indicating that the initial decision was not appropriate. This NA DD presents the pertinent information that supports the conclusion that Site 75 poses little or no potential threat to human health.

There are currently no enforcement activities in place at the site.

### 1.2.1 Investigative Activities

As mentioned above, the conditions at Site 75 have been evaluated through several separate investigative activities. The following subsections provide a summary of the previous studies completed at the site along with the results of the Pre-RI Screening Study.

#### 1.2.1.1 Previous Investigations

In 1984, shallow monitoring wells 75-GW01, 75-GW02, and 75-GW03 were installed at the site for the purpose of groundwater sampling (Figure 1-2) as part of the Site Summary Report completed in 1990 by Environmental Science and Engineering, Inc. (ESE). Well completion details were not available for 75-GW01, however, the remaining two monitoring wells were constructed with 15 feet of screen and had total depths of 22 and 23 feet, respectively. In July 1984, groundwater samples were collected from these three newly installed monitoring wells as well as from three existing water supply wells in the vicinity of the site. The ESE report identified water supply wells as 75-GW04, 75-GW05, and 75-GW06, however, these identifications could not be correlated with the present Camp Lejeune water supply well numbering system. Subsequently, the locations of these supply wells could not be determined and are not located on the figure. Monitoring wells 75-GW04 and 75-GW05 (as shown on Figure 1-2) were installed in 1996 for groundwater elevation purposes. The six groundwater samples were analyzed for VOCs only. The results of the groundwater analysis did not detect any VOCs. There were no soil samples collected during this investigation.

Prior to the installation of the three monitoring wells in 1984, a geophysical survey consisting of electromagnetic (EM) conductivity and other metal detection techniques was conducted on a grid system throughout the area. Potential dumping areas, identified from aerial photographs (currently unavailable), were investigated during the survey. No areas representative of buried metallic objects were identified as part of this initial geophysical survey.

Monitoring wells 75-GW01, 75-GW02, and 75-GW03 were resampled in November 1986. The sample analysis included VOCs along with chloropicirin and tetrachlorodioxin, both of which are associated with tear gas solution which was suspected to be present at the site. The laboratory report indicated that none of the samples detected any of the tested parameters (ESE, 1990).

#### 1.2.1.2 Pre-RI Screening Study

Field work for a Pre-RI Screening Study was completed by Baker Environmental, Inc. (Baker) in October 1995 with the subsequent final report completed in November 1998. The investigation included researching the previous studies and completing additional investigative tasks. The field activities included a geophysical survey, surface and subsurface soil sampling, and groundwater sampling.

The scope of the geophysical survey completed as part of the Pre-RI Screening Study was significantly broader than the initial EM survey. It not only covered the area of the initial EM investigation, but was expanded further to cover additional areas. The survey conducted at Site 75 was designed to explore the possibility that 55-gallon drums may have been buried at the site. Aside from surface reflections, the magnetic data collected from Site 75 did not indicate any magnetic anomalies. Based on the data, the suspected buried drums do not appear to be present within the boundaries covered by the survey.

Surface soil, subsurface soil, and groundwater samples were collected at Site 75. The soil samples were analyzed for Target Compound List (TCL) organics and Target Analyte List (TAL) metals. Groundwater samples were analyzed for the same parameters, but also included specific analyses for tear gas compounds which were expected at the site. Surface water and sediment samples were not collected because the drainage swales on site were dry and there was no evidence of sedimentation. Table 1-1 provides a summary of the detected compounds and analytes by media.

Table 1-1 to 1-6 contain criteria against which the sample results were compared by media. These criteria included USEPA Region III Risk Based Concentration (RBC) values, USEPA Soil Screening Levels for transfer from soil to groundwater, North Carolina Water Quality Standards (NCWQS), federal Maximum Contaminant Levels (MCLs), and twice the average base specific background concentrations for inorganic analytes. RBCs are promulgated by the USEPA Region III as a tool to determine potential risk to human health from contaminants in soil and groundwater. Region III RBC values were derived using conservative USEPA promulgated default values and the most recent toxicological criteria available. RBCs for potentially carcinogenic and noncarcinogenic chemicals were individually derived based on a target Incremental Lifetime Cancer Risk (ILCR) of $1 \times 10^{-06}$ and a target Hazard Quotient (HQ) of 1.0, respectively. For potential carcinogens, the toxicity criteria applicable to the derivation of the RBC are oral and inhalation cancer slope factors; for noncarcinogens, they are chronic oral and inhalation reference doses. For noncarcinogens, each RBC value was reduced by a factor of 10 to ensure that chemicals with additive effects are not prematurely eliminated during screening (USEPA, 1993a).

*Surface Soil*

A total of 15 surface soil samples were collected at Site 75. There were no VOCs or polychlorinated biphenyls (PCBs) detected in the surface soil samples. Two semivolatile organic compounds (SVOCs) were detected in the surface soil samples (Table 1-2). The compound di-n-butylphthalate was detected in three surface soil samples at concentrations ranging from 280 micrograms per kilogram (µg/kg) to 460 µg/kg. Bis(2-ethylhexyl)phthalate was detected in seven samples at estimated concentrations ranging from 40 estimate (J) µg/kg to 110J µg/kg. None of the detections exceeded respective screening standards.

As indicated on Table 1-2, pesticide compounds were detected in each of the surface soil samples except for boring locations 75-SB02 and 75-SB03. The pesticides 4,4'-DDE and 4,4'-DDT were the most frequently detected. Seven other compounds were detected, including 4,4'-DDD, dieldrin, heptachlor, heptachlor epoxide, endrin, alpha chlordane, and gamma chlordane. Pesticide concentrations ranged from 1.5J µg/kg of 4,4'-DDT to 470 µg/kg of gamma chlordane. None of the detections exceeded respective screening standards.

Eighteen metals were detected among the fifteen surface soil samples collected at Site 75 (Table 1-3). Fourteen metals including aluminum, arsenic, barium, calcium, chromium, iron, lead, magnesium, mercury, nickel, potassium, sodium, vanadium and zinc were detected at concentrations greater than twice the average base-specific (i.e., Camp Lejeune) background levels (refer to Table 1-3 for twice the average base specific background concentrations). Metals which excluded residential RBC values included aluminum, arsenic and iron. No metals exceeded the USEPA Soil Screening Levels for transfer from soil to groundwater.

*Subsurface Soil*

A total of 17 subsurface (i.e., greater than one-foot below ground surface) soil samples were collected at Site 75. There were no VOCs or PCB compounds detected among the subsurface samples. Two SVOCs were detected in three of the borings at the site (Table 1-4). Bis(2-ethylhexyl)phthalate was detected at concentrations ranging from 40J µg/kg to 66J µg/kg. Di-n-butylphthalate was detected once at boring location 75-SB08 at 64 µg/kg and once at 75-GW05 at 200J µg/kg. None of the detections exceeded respective screening standards.

Various pesticide compounds were detected among the 15 subsurface soil samples collected at Site 75 (Table 1-4). The compounds 4,4'-DDE and 4,4'-DDT were detected at concentrations of 6.7 µg/kg and 3.7 µg/kg, respectively at boring location 75-SB01. An additional, four pesticide compounds were detected at boring location 75-SB03 including dieldrin, 4,4'-DDD, alpha chlordane, and gamma chlordane. The concentrations ranged from 1.1J µg/kg of gamma chlordane to 41 µg/kg of 4,4'-DDD. None of the detections exceeded respective screening criteria.

Nineteen metals were detected among the 17 subsurface soils collected at Site 75 (Table 1-5). Fourteen metals including aluminum, arsenic, barium, calcium, chromium, iron, lead, magnesium, manganese, nickel, potassium, sodium, vanadium and zinc were detected at concentrations greater than twice the average base-specific background levels. Metals which exceeded residential RBC values included aluminum, antimony, arsenic, beryllium and iron. Metals which exceeded USEPA Soil Screening Levels for transfer from the soil to groundwater included arsenic, iron and selenium.

*Groundwater*

The groundwater investigation at Site 75 entailed the collection of samples from five monitoring wells. Each of the groundwater samples obtained at the site, were analyzed for full TCL organics, TAL metals, and specific analyses for the tear gas compounds chloroacetophenone and chloropicrin. There were no detections of any organic compounds in the groundwater samples collected at the site. In addition, the samples did not detect the presence of the specific tear gas compounds.

Metals were detected in each of the groundwater samples obtained at Site 75. Table 1-6 provides a summary of the metals detected within groundwater. Two metals (iron and manganese) exceeded the NCWQS for groundwater. Three metals including aluminum, iron and manganese exceeded the federal MCLs. There are no detections exceeding the Region III Tapwater RBC Values.

In summary, analytical testing of the soil samples at Site 75 detected SVOCs and pesticide organic compounds below the respective screening standards. Metals were detected in both the surface and subsurface soil samples with some concentrations exceeding the respective screening standards. There were no detections of organic compounds in the groundwater samples, however, several metals were detected at concentrations exceeding the respective screening criteria for groundwater.

### 1.2.2 Regulatory Agency/Public Involvement

The USEPA and NC DENR have been actively involved with the investigation of this site through report review and partnering meetings. Based on these results, no further investigative activities are needed at Site 75.

Public involvement is summarized in the following section.

## 1.3 Community Participation

A public meeting was held at MCAS, New River on August 27, 1996 to discuss the results of the Pre-RI Screening Study. The meeting included members of the local Base community, and representatives from MCB, Camp Lejeune, Naval Facilities Engineering Command (LANTDIV), and Baker Environmental, Inc. The members of the project team presented the findings of the investigation and discussed the results of the risk assessment. Members of the community were given the opportunity to ask questions and comment on the related information. These comments and questions were immediately and informally addressed at the public meeting.

This NA DD was made available to the public for comment at a public meeting held on April 19, 1998. However, there was no formal comment period. No comments have been received from the public on the draft document. Comments were received from Camp Lejeune and the NC DENR. These comments were addressed within the content of this document.

## 2.0 SUMMARY OF SITE CHARACTERISTICS

This section summarizes information pertaining to MCB, Camp Lejeune existing background information. In addition, specific information relevant to Site 75 is presented.

### 2.1 Climatology

MCB, Camp Lejeune experiences hot and humid summers; however, ocean breezes frequently produce a cooling effect. The winter months tend to be mild, with occasional brief cold spells. Average daily temperatures range from 34° F to 54° F in January, the coldest month, and 72° F to 89° F in July, the hottest month. The average yearly rainfall is 52.4 inches.

### 2.2 Physiography, Geology and Soils

MCB, Camp Lejeune is located in the Atlantic Coastal Plain physiographic province. The sediments of this province consist primarily of sand, silt, and clay. Other sediments may be present, including shell beds and gravel. Sediments may be of marine or continental origin. United States Geological Survey (USGS) studies at MCB, Camp Lejeuene indicate that the base is underlain by sand, silt, clay, calcareous clay and partially cemented limestone. The combined thickness of these sediments beneath the base is approximately 1,500 feet.

Site 75 is underlain by soils that are predominantly sands and silty sands beneath a foot of surface top soil. From ground surface to a depth of three feet, the soil is light brown silty sand with a trace of gray clay. The material is loose to medium dense and ranges from moist to damp. At approximately four feet bgs, the silt content decreases transitioning into a 'cleaner' sand. The sand color also changes as depth increases from a light brown to a dark gray.

### 2.3 Hydrogeology

The aquifers of primary interest are the surficial aquifer and the underlying Castle Hayne aquifer.

The surficial aquifer consists of interfingering beds of sand, clay, sandy clay, and silt that contain some peat and shells. The thickness of the surficial aquifer ranges from 0 to 73 feet and averages nearly 25 feet over MCB, Camp Lejeune. The beds are thin and discontinuous, and have limited lateral continuity. This aquifer is not used for water supply at MCB, Camp Lejeune. The Castle Hayne aquifer lies below the surficial aquifer and consists primarily of unconsolidated sand, shell fragments, and fossiliferous limestone. Between the surficial aquifer and Castle Hayne aquifer lies the Castle Hayne confining unit which consists of clay, silt, and sandy clay beds. The Castle Hayne aquifer is about 150 to 350 feet thick, increasing in thickness to the ocean. The top of the aquifer lies approximately 20 to 73 feet bgs. Onslow County and MCB, Camp Lejeune lie in an area where the Castle Hayne aquifer generally contains freshwater; therefore, the Castle Hayne aquifer is a viable potable water source for the region's population.

At Site 75, groundwater was encountered between 3.5 and 4.0 feet bgs. Shallow groundwater flow is in the northeast direction towards Edward Creek with a change in elevation of over three feet, from 12.20 feet above mean sea level (msl) in the southern most monitoring well to 8.86 feet above msl in the northern most monitoring well. Sixteen potable water supply wells are within a one-mile radius of Site 75.

## 2.4 Surface Water

The dominant surface water feature at MCB, Camp Lejeune is the New River. It receives drainage from a majority of the base. At MCB, Camp Lejeune, the New River flows in a southerly direction into the Atlantic Ocean through the New River Inlet.

Aside from the drainage swales, there are no significant surface water bodies at Site 75. The nearest surface water body is Edwards Creek which is located immediately north, approximately 500 feet from the northern boundary of the site. Edwards Creek flows in an easterly direction and empties into the New River.

## 2.5 Land Use

Land use within the Base is influenced by topography and ground cover, environmental policy, and base operational requirements. Much of the land within MCB, Camp Lejeune consists of freshwater swamps that are wooded and largely unsuitable for development. In addition, 3,000 acres of sensitive estuary and other areas were set aside for the protection of threatened and endangered species and are to remain undeveloped. Operational restrictions and regulations, such as explosive quantity safety distances, impact-weighted noise thresholds, and aircraft landing and clearance zones, may also greatly constrain and influence development (LANTDIV, 1988). The combined military and civilian population of MCB, Camp Lejeune has been the single greatest factor contributing to the rapid population growth of Jacksonville and adjacent communities, particularly during the period from 1940 to 1960.

## 2.6 Receptors

Site 75 is situated in a residential area of New River MCAS. The risk assessment recognizes this fact by preparing conceptual site models that included the following receptors:

- Current military personnel
- Current base residents (young child [ages 1-6 years] and adult)
- Future on-site residents (young child [ages 1-6 years] and adult)

The contaminants detected at the site in surface soils, subsurface soils, and groundwater can migrate from the various media in several ways, including:

- Vertical migration of contaminants from surface soil to subsurface soil.
- Leaching of contaminants from subsurface soil to water-bearing zones.
- Vertical migration from shallow water-bearing zones to deeper flow systems.
- Horizontal migration in groundwater in the direction of groundwater flow.
- Wind erosion and subsequent deposition of windblown dust.

## 3.0 DATA ANALYSIS/RISK ASSESSMENT

The risk assessment completed for Site 75 examined exposure pathways associated with each environmental medium and each human receptor. Pathways were evaluated both qualitatively and quantitatively, considering site conditions and associated receptors. The exposure to current military personnel, current base residents, and future on-site residents from soil and groundwater was considered.

Potential exposure to surface soil may occur by incidental soil ingestion, contaminant absorption through the skin and inhalation of airborne particulates. Surface soil exposure was evaluated for current and future residential children and adults.

Subsurface soil is available for contact only during excavation activities, so potential exposure to subsurface soil is limited to current military personnel involved in training exercises and maneuvers. These activities do not take place at Site 75, therefore exposure to subsurface soils was not considered.

Future residents were evaluated for groundwater exposure at Site 75. At the present time, shallow groundwater in the vicinity of the site is not used as a potable supply for residents or base personnel. However, in the future, (albeit unlikely due to poor transmissivity and insufficient flow) shallow groundwater may be tapped for potable water. Groundwater exposure was evaluated for future residential children and adults. Potential exposure pathways are ingestion, dermal contact, and inhalation of volatile contaminants while showering. However, it should be noted, that there were no VOCs detected in the groundwater samples. Therefore, inhalation of VOCs while showering was not evaluated as an exposure pathway.

Tables 1-1 through 1-6 presents a summary of the detected compounds and analytes at the site. The table presents the range of positive detections for each contaminant of concern. These detections were compared to USEPA Region III RBC values. As shown on the tables, none of the detections of SVOCs or pesticides in the surface or subsurface soil exceed the screening criteria. However, some metals detected in the surface and subsurface soil samples exceeded their respective screening criteria. The metals aluminum, arsenic, and iron were detected at concentrations greater than the applied screening standards. Each of the detections were considered in the risk assessment completed for Site 75, and none were identified as posing any significant risks to the receptors considered.

Table 3-1 presents the calculated carcinogenic and non-carcinogenic human health risks associated with these soil contaminants for current and future residential exposure scenarios. Risk calculations were not performed for subsurface soil contaminants because subsurface soil is not considered an exposure pathway for residential receptors.

As shown on Table 3-1, no potential carcinogenic risk is indicated for Site 75. The ingestion, dermal, and inhalation pathways for each human receptor resulted in a ILCR risk less than, or within the appropriate USEPA acceptable target risk range of $1.0x10^{-6}$ to $1.0x10^{-4}$. Potential noncarcinogenic risks are presented in terms of hazard indices (HI). The ingestion, dermal, and inhalation pathways for each human receptor resulted in HI values less than the USEPA's acceptable value of 1.0. Based on this, there are no potential carcinogenic or noncarcinogenic human health risks at Site 75.

## 4.0 DESCRIPTION OF THE NA ALTERNATIVE

No evidence exists to suggest that the soil or groundwater are sufficiently contaminated to pose a threat to human health. Current site conditions and environmental testing data indicated that no action is warranted at Site 75.

## 5.0 RESPONSIVENESS SUMMARY

This NA DD was made available to the public for comment at a public meeting held on April 19, 1998. However, there was no formal comment period. No comments have been received from the public on the draft document.

## 6.0 REFERENCES

Baker Environmental, Inc. 1998. Final Pre-Remedial Investigation Screening Study Sites 12, 68, 75, 76, 85, and 87. Marine Corps Base, Camp Lejeune, North Carolina.

Environmental Science and Engineering, Inc. (ESE). 1990. Site Summary Report, Final Marine corps Base, Camp Lejeune, North Carolina. Prepared for the Department of the Navy, Naval Facilities Engineering Command, Atlantic Division, Norfolk, Virginia. ESE Project No. 49-02036

LANTDIV. Naval Facilities Engineering Command, Atlantic Division. January 1988. Camp Lejeune Complex Master Plan and Capital Improvements Plan Update. Prepared for the Commanding General, marine Corps Base, Camp Lejeune, North Carolina.

USEPA, 1993. Selecting Exposure Routes and Contaminants of Concern by Risk-Based Screening, Region III Technical Guidance Manual. Region III, Philadelphia, Pennsylvania. January 1993. EPA/903/R-93-001

# TABLES

**TABLE 1-1**

**SUMMARY OF SITE CONTAMINATION**
**SITE 75, MCAS BASKETBALL COURT**
**MCB, CAMP LEJEUNE, NORTH CAROLINA**
**NA DECISION DOCUMENT, CTO-0120**

| Media | Fraction | Detected Contaminants or Analytes | Detection Frequency | Concentration Range | | Location of Maximum Detection |
|---|---|---|---|---|---|---|
| | | | | Min. | Max. | |
| Surface Soil | Semivolatiles | Di-n-butylphthalate | 3/15 | 280J | 460 | 75-SB08 |
| | | bis(2-Ethylhexyl)phthalate | 7/15 | 40J | 110J | 75-GW05 |
| | Pesticides | Heptachlor | 1/15 | 3J | 3J | 75-SB12 |
| | | Heptachlor Epoxide | 1/15 | 37J | 37J | 75-SB12 |
| | | Dieldrin | 2/15 | 1.9J | 3.4J | 75-SB01 |
| | | 4,4'-DDE | 15-Oct | 2.4J | 38J | 75-SB12 |
| | | Endrin | 1/15 | 11J | 11J | 75-SB12 |
| | | 4,4'-DDD | 4/15 | 1.6J | 47J | 75-SB12 |
| | | 4,4'-DDT | 13/15 | 1.5J | 16 | 75-GW04 |
| | | Alpha-Chlordane | 2/15 | 1.1J | 440 | 75-SB12 |
| | | Gamma-Chlordane | 3/15 | 1.1J | 470 | 75-SB12 |
| | Metals | Aluminum | 15/15 | 3070 | 8,310 | 75-SB08 |
| | | Arsenic | 15/15 | 0.44J | I.7J | 75-GW04 |
| | | Barium | 15/15 | 8.90 | 43 | 75-SB01 |
| | | Calcium | 15/15 | 936 | 44,700 | 75-SB12 |
| | | Chromium | 15/15 | 4 | 8.3 | 75-SB06 |
| | | Cobalt | 7/15 | 0.61 | 0.82 | 75-SB04 |
| | | Copper | 15/15 | 1.1 | 5.1 | 75-SB04 |
| | | Iron | 15/15 | 1600J | 3900 | 75-GW04 |
| | | Lead | 15/15 | 9.7J | 58.4J | 75-GW04 |
| | | Magnesium | 15/15 | 97 | 734 | 75-SB12 |
| | | Manganese | 15/15 | 6.1 | 16.7 | 75-SB10 |
| | | Mercury | 3/15 | 0.08 | 0.12 | 75-SB07 |
| | | Nickel | 2/15 | 2.5 | 3.7 | 75-GW05 |
| | | Potassium | 7/15 | 177 | 300 | 75-SB01 |
| | | Selenium | 6/15 | 0.26J | 0.35J | 75-SB06 |
| | | Sodium | 15/15 | 9.8 | 138 | 75-SB12 |
| | | Vanadium | 15/15 | 6 | 13.3 | 75-GW04 |
| | | Zinc | 15/15 | 5.5 | 64 | 75-SB04 |
| Subsurface Soil | Semivolatiles | Di-n-butylphthalate | 3/17 | 64J | 200J | 75-GW05 |
| | | bis(2-Ethylhexyl)phthalate | 3/17 | 40J | 66J | 75-SB03 |
| | Pesticides | Dieldrin | 2/17 | 1.5J | 6.6J | 75-SB03 |
| | | 4,4'-DDE | 3/17 | 6.7J | 39J | 75-SB03 |
| | | 4,4'-DDD | 2/17 | 40 | 41 | 75-SB03 |
| | | 4,4'-DDT | 3/17 | 3.7 | 10J | 75-SB03 |
| | | Alpha-Chlordane | 2/17 | 1.9J | 2.7J | 75-SB03 |
| | | Gamma-Chlordane | 2/17 | 1.1J | 2.0 | 75-SB03 |

TABLE 1-1 (Continued)

SUMMARY OF SITE CONTAMINATION
SITE 75, MCAS BASKETBALL COURT
MCB, CAMP LEJEUNE, NORTH CAROLINA
NA DECISION DOCUMENT, CTO-0120

| Media | Fraction | Detected Contaminants or Analytes | Detection Frequency | Concentration Range | | Location of Maximum Detection |
|---|---|---|---|---|---|---|
| | | | | Min. | Max. | |
| Subsurface Soil | Metals | Aluminum | 17/17 | 1,590 | 18,500 | 75-GW04 |
| | | Antimony | 1/17 | 4.5J | 4.5J | 75-SB03 |
| | | Arsenic | 14/17 | 0.22J | 44.6J | 75-SB10 |
| | | Barium | 17/17 | 2.6 | 41.4 | 75-SB03 |
| | | Beryllium | 1/17 | 0.17 | 0.17 | 75-SB11 |
| | | Calcium | 15/17 | 93.7 | 12,600 | 75-SB01 |
| | | Chromium | 17/17 | 2.4 | 19.7 | 75-GW04 |
| | | Cobalt | 9/17 | 0.51 | 1.2 | 75-GW04 |
| | | Copper | 13/17 | 0.37 | 1.5 | 75-SB04 |
| | | Iron | 17/17 | 449 | 7,450J | 75-SB12 |
| | | Lead | 17/17 | 2.4J | 17AJ | 75-SB10 |
| | | Magnesium | 17/17 | 47 | 1,300 | 75-SB10 |
| | | Manganese | 17/17 | 1.8 | 22.3 | 75-SB10 |
| | | Nickel | 4/17 | 2.5 | 16.7 | 75-SB03 |
| | | Potassium | 10/17 | 177.0 | 452 | 75-SB01 |
| | | Selenium | 5/17 | 0.26J | 0.55J | 75-SB04 |
| | | Sodium | 16/17 | 8J | 62.1J | 75-SB11 |
| | | Vanadium | 17/17 | 2.6 | 24.6 | 75-GW04 |
| | | Zinc | 13/17 | 2.3 | 39.2 | 75-SB06 |
| Groundwater | Metals | Aluminum | 115 | 785 | 785 | 75-GW03 |
| | | Barium | 4/5 | 19.8 | 45.9 | 75-GW03 |
| | | Calcium | 515 | 4,450 | 33,600 | 75-GW02 |
| | | Cobalt | 2/5 | 3.2 | 3.6 | 75-GW05 |
| | | Copper | 2/5 | 2.6 | 2.6 | 75-GW04 |
| | | Iron | 1/5 | 439 | 439 | 75-GW03 |
| | | Magnesium | 5/5 | 339 | 2,720 | 75-GW04 |
| | | Manganese | 4/5 | 3.2 | 68.3 | 75-GW04 |
| | | Potassium | 115 | 1,070 | 1070 | 75-GW04 |
| | | Selenium | 115 | 2.1J | 2AJ | 75-GW02 |
| | | Sodium | 5/5 | 1,810 | 24,300 | 75-GW05 |
| | | Zinc | 4/5 | 3.8 | 76.7 | 75-GW01 |

Notes: Organic concentrations are presented in ug/L for liquid and ug/kg for solids (ppb)
Metals concentrations for soils are presented in mg/kg (ppm)

**TABLE 1-2**

**SURFACE SOIL ORGANIC DATA**
**SITE 75, MCAS BASKETBALL COURT**
**MCB, CAMP LEJEUNE, NORTH CAROLINA**
**NA DECISION DOCUMENT, CTO-0120**

| Parameter | Contaminant Range/Frequency | | Comparison Criteria | | | |
|---|---|---|---|---|---|---|
| | Range of Positive Detections (µg/kg) | No. of Positive Detects/No. of Samples | Region III Residential RBC Value[1] (µg/kg) | Positive Detections Above Region III Residential RBC Value | Soil to Groundwater Soil Screening Levels[3] (µg/kg) | Detections Above Soil to Groundwater Soil Screening Level |
| **Semivolatiles** | | | | | | |
| Di-n-butylphthalate | 280J-460 | 3/15 | 780,000 | 0 | 1,560,000 | 0 |
| bis(2-Ethylhexyl)phthalate | 40J-110J | 7/15 | 46,000 | 0 | 46,000 | 0 |
| **Pesticide/PCBs** | | | | | | |
| Heptachlor | 3J | 1/15 | 140 | 0 | 140 | 0 |
| Heptachlor epoxide | 37J | 1/15 | 70 | 0 | 70 | 0 |
| Dieldrin | 1.9J-3.4J | 2/15 | 40 | 0 | 40 | 0 |
| 4,4'-DDE | 2.4J-38J | 10/15 | 1,900 | 0 | 1,900 | 0 |
| Endrin | 11J | 1/15 | 2,300 | 0 | 4,600 | 0 |
| 4,4'-DDD | 1.6J-47J | 4/15 | 2,700 | 0 | 2,700 | 0 |
| 4,4'-DDT | 1.5J-16 | 13/15 | 1,900 | 0 | 1,900 | 0 |
| Alpha-Chlordane | 1.1J-440 | 2/15 | 1,800[2] | 0 | 490 | 0 |
| Gamma-Chlordane | 1.1J-470 | 3/15 | 1,800[2] | 0 | 490 | 0 |

Notes:

µg/kg = micrograms per kilogram
J = Estimated value
[1] USEPA Region III RBC Table, October 2000.
[2] USEPA Region III RBC value for Chlordane used as a surrogate.
[3] USEPA Soil Screening Levels for Transfer from Soil to Groundwater (May 1996).

## TABLE 1-3

## SURFACE SOIL INORGANIC DATA
## SITE 75, MCAS BASKETBALL COURT
## MCB, CAMP LEJEUNE, NORTH CAROLINA
## NA DECISION DOCUMENT, CTO-0120

| Analyte | Contaminant Range/Frequency | | Comparison Criteria | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Range of Positive Detections (mg/kg) | No. of Positive Detects/No. of Samples | Twice the Average Base Specific Background Concentration[1] (mg/kg) | No of Times Exceeded Twice the Average Background Concentration | Region III Residential RBC Value[2] (mg/kg) | Detections Above Region III Residential RBC Value | Soil to Groundwater Soil Screening Levels[4] (mg/kg) | Detections Above Soil to Groundwater Soil Screening Level |
| Aluminum | 3,070 - 8,310 | 15/15 | 5,856.083 | 7 | 7,800 | 1 | 15,600 | 0 |
| Arsenic | 0.44J - 1.7J | 15/15 | 1.322 | 1 | 0.43 | 15 | 4.6 | 0 |
| Barium | 8.9 – 43.1 | 15/15 | 17.292 | 3 | 550 | 0 | 100 | 0 |
| Calcium+ | 936 – 44,700 | 15/15 | 1,372.977 | 10 | -- | -- | -- | -- |
| Chromium | 4 – 8.3 | 15/15 | 6.607 | 5 | 39 | 0 | 78 | 0 |
| Cobalt | 0.61 – 0.82 | 7/15 | 2.046 | 0 | 470 | 0 | 940 | 0 |
| Copper | 1.1 – 5.1 | 15/15 | 7.104 | 0 | 310 | 0 | 620 | 0 |
| Iron+ | 1,600J – 3,900 | 15/15 | 3,702.427 | 1 | 2,300 | 11 | 4,600 | 0 |
| Lead | 9.7J – 58.4J | 15/15 | 23.37 | 4 | 400[3] | 0 | 400 | 0 |
| Magnesium+ | 97 – 734 | 15/15 | 202.96 | 10 | -- | -- | -- | -- |
| Manganese | 6.1 – 16.7 | 15/15 | 18.51 | 0 | 190 | 0 | 360 | 0 |
| Mercury | 0.08 – 0.12 | 3/15 | 0.094 | 2 | 2.3 | 0 | 4.6 | 0 |
| Nickel | 2.5 – 3.7 | 2/15 | 3.455 | 1 | 160 | 0 | 320 | 0 |
| Potassium+ | 177 – 300 | 7/15 | 200.06 | 3 | -- | -- | -- | -- |
| Selenium | 0.26J – 0.35J | 6/15 | 0.753 | 0 | 39 | 0 | 78 | 0 |
| Sodium+ | 9.8 – 138 | 15/15 | 59.013 | 2 | -- | -- | -- | -- |
| Vanadium | 6 – 13.3 | 15/15 | 11.447 | 4 | 55 | 0 | 110 | 0 |
| Zinc | 5.5 - 64 | 15/15 | 13.763 | 7 | 2,300 | 0 | 4,600 | 0 |

Notes:

Shaded areas indicate analyte selected as COPC for human health risk assessment.
+ = Essential Nutrient
-- = No criteria published
mg/kg = milligrams per kilogram
J = Estimated value
(1) Soil background concentrations are based on reference background soil samples collected from MCB Camp Lejeune investigations.
(2) USEPA Region III RBC Table, October 2000.
(3) Action Level for residential soils (USEPA, 1994).
(4) USEPA Soil Screening Levels for Transfer from Soil to Groundwater (May 1996).

**TABLE 1-4**

**SUBSURFACE SOIL ORGANIC DATA**
**SITE 75, MCAS BASKETBALL COURT**
**MCB, CAMP LEJEUNE, NORTH CAROLINA**
**NA DECISION DOCUMENT, CTO-0120**

| Parameter | Contaminant Range/Frequency | | Comparison Criteria | | | |
|---|---|---|---|---|---|---|
| | Range of Positive Detections (µg/kg) | No. of Positive Detects/No. of Samples | Region III Residential RBC Value[1] (µg/kg) | Detections Above Region III Residential RBC Value | Soil to Groundwater Soil Screening Levels[3] (µg/kg) | Detections Above Soil to Groundwater Soil Screening Level |
| **Semivolatiles** | | | | | | |
| Di-n-butylphthalate | 64J – 200J | 3/17 | 780 | 0 | 24,800 | 0 |
| bis(2-Ethylhexyl)phthalate | 40J – 66J | 3/17 | 46,000 | 0 | -- | -- |
| **Pesticide** | | | | | | |
| Dieldrin | 1.5J – 6.6J | 2/17 | 40 | 0 | -- | -- |
| 4,4'-DDE | 6.7J – 39J | 3/17 | 1,900 | 0 | -- | -- |
| 4,4'-DDD | 40 – 41 | 2/17 | 2,700 | 0 | -- | -- |
| 4,4'-DDT | 3.7 – 10J | 3/17 | 1,900 | 0 | -- | -- |
| Alpha-Chlordane | 1.9J – 2.7J | 2/17 | 1,800[2] | 0 | 27.8 | 0 |
| Gamma-Chlordane | 1.1J - 2 | 2/17 | 1,800[2] | 0 | 27.8 | 0 |

Notes:

-- = No criteria published
µg/kg = micrograms per kilogram
J = Estimated value
(1) USEPA Region III RBC Table, October 2000.
(2) USEPA Region III RBC value for Chlordane used as a surrogate.
(3) USEPA Soil Screening Levels for Transfer from Soil to Groundwater (May 1996).

**TABLE 1-5**

**SUBSURFACE SOIL INORGANIC DATA**
**SITE 75, MCAS BASKETBALL COURT**
**MCB, CAMP LEJEUNE, NORTH CAROLINA**
**NA PLAN DECISION DOCUMENT, CTO-0120**

| Analyte | Containment Range/Frequency | | Comparison Criteria | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Range of Positive Detections (mg/kg) | No. of Positive Detects/No. of Samples | Twice the Average Base Specific Background[1] Concentration (mg/kg) | No of Times Exceeded Twice the Average Background Concentration | Region III Residential RBC Value[2] (mg/kg) | Detections Above Region III Residential RBC Value | Soil to Groundwater Soil Screening Levels[4] (mg/kg) | Detections Above Soil to Groundwater Soil Screening Level |
| Aluminum | 1,590 – 18,500 | 17/17 | 7,413.23 | 12 | 7,800 | 11 | -- | -- |
| Antimony | 4.5J | 1/17 | 6.498 | 0 | 3.1 | 1 | -- | -- |
| Arsenic | 0.22J – 44.6J | 14/17 | 1.971 | 1 | 0.43 | 11 | 26.2 | 1 |
| Barium | 2.6 – 41.4 | 17/17 | 14.37 | 8 | 550 | 0 | 848 | 0 |
| Beryllium | 0.17 | 1/17 | 0.191 | 0 | 0.15 | 1 | -- | -- |
| Calcium+ | 93.7 – 12,600 | 15/17 | 387.824 | 8 | -- | -- | -- | -- |
| Chromium | 2.4 – 19.7 | 17/17 | 12.537 | 2 | 39 | 0 | 27.2 | 0 |
| Cobalt | 0.51 – 1.2 | 9/17 | 1.611 | 0 | 470 | 0 | -- | -- |
| Copper | 0.37 – 1.5 | 13/17 | 2.41 | 0 | 310 | 0 | 704 | -- |
| Iron+ | 449 – 7,450J | 17/17 | 7,134.639 | 2 | 2,300 | 12 | 151.2 | 17 |
| Lead | 2.4J – 17.1J | 17/17 | 8.264 | 3 | 400[3] | 0 | 270.06 | 0 |
| Magnesium+ | 47 – 1,300 | 17/17 | 263.398 | 11 | -- | -- | -- | -- |
| Manganese | 1.8 – 22.3 | 17/17 | 7.99 | 2 | 180 | 0 | 65.2 | 0 |
| Nickel | 2.5 – 16.7 | 4/17 | 3.725 | 1 | 160 | 0 | 56.4 | 0 |
| Potassium+ | 177 – 452 | 10/17 | 344.252 | 2 | -- | -- | -- | -- |
| Selenium | 0.26J – 0.55J | 5/17 | 0.806 | 0 | 39 | -- | 0.223 | 5 |
| Sodium+ | 8J – 62.1J | 16/17 | 54.57 | 2 | -- | -- | -- | -- |
| Vanadium | 2.6 – 24.6 | 17/17 | 13.34 | 6 | 55 | 0 | -- | -- |
| Zinc | 2.3 – 39.2 | 13/17 | 6.668 | 3 | 2,300 | 0 | 1100.4 | -- |

Notes:

Shaded areas indicate analyte selected as COPC for human health risk assessment.
+ = Essential Nutrient
-- = No criteria published
mg/kg = milligrams per kilogram
J = Estimated value
(1) Soil background concentrations are based on reference background soil samples collected from MCB Camp Lejeune investigations.
(2) USEPA Region III RBC Table, October 2000.
(3) Action Level for residential soils (USEPA, 1994).
(4) USEPA Soil Screening Levels for Transfer from Soil to Groundwater (May 1996).

## TABLE 1-6

## GROUNDWATER INORGANIC DATA
## SITE 75, MCAS BASKETBALL COURT
## MCB, CAMP LEJEUNE, NORTH CAROLINA
## NA DECISION DOCUMENT, CTO-0120

| Parameter | Contaminant Range/Frequency | | Comparison Criteria | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Concentration Range (µg/L) | No. of Positive Detects/No. of Samples | NCWQS[1] (µg/L) | Detections Above NCWQS | MCL[2] (µg/L) | Detections Above MCL | Region III Tapwater RBC Value[3] (µg/L) | Detections Above Region III Tapwater RBC Value |
| **Inorganics** | | | | | | | | |
| Aluminum | 785 | 1/5 | -- | -- | 50/200[4] | 1/1 | 3,700 | 0 |
| Barium | 19.8 – 45.9 | 4/5 | 2,000 | 0 | 2,000 | 0 | 260 | 0 |
| Calcium+ | 4,450 – 33,600 | 5/5 | -- | -- | -- | -- | -- | -- |
| Cobalt | 3.2 – 3.6 | 2/5 | -- | -- | -- | -- | 220 | 0 |
| Copper | 2.6 – 2.6 | 2/5 | 1,000 | 0 | 1,300[5] | 0 | 150 | 0 |
| Iron | 439 | 1/5 | 300 | 1 | 300[4] | 1 | 1,100 | 0 |
| Magnesium+ | 339 – 2,720 | 5/5 | -- | -- | -- | -- | -- | -- |
| Manganese | 3.2 – 68.3 | 4/5 | 50 | 1 | 50[4] | 1 | 84 | 0 |
| Potassium+ | 1,070 | 1/5 | -- | -- | -- | -- | -- | -- |
| Selenium | 2.1J | 1/5 | 50 | 0 | 50 | 0 | 18 | 0 |
| Sodium+ | 1,810-24,300 | 5/5 | -- | -- | -- | -- | -- | -- |
| Zinc | 3.8 – 76.7 | 4/5 | 2,100 | 0 | 5,000[4] | 0 | 1,100 | 0 |

Notes:

+ = Essential Nutrient
-- = No Criteria Published
µg/L = micrograms per liter
J = Estimated Value

(1) NCWQS = North Carolina Water Quality Standards (North Carolina Administrative code. Title 15A, Subchapter 2L) October 25, 1994.

(2) MCL = Federal Primary Maximum Contaminant Levels. Maximum permissible level of a contaminant in water which is delivered to underground water systems (USEPA - Drinking Water Regulations and Health Advisories). October 1996

(3) USEPA Region III RBC Table, October 2000.

(4) SMCL = Secondary Maximum Contaminant Level

(5) Action Level for drinking water.

(6) USEPA Soil Screening Levels for Transfer from Soil to Groundwater (May 1996.)

TABLE 3-1

SURFACE SOIL HUMAN HEALTH RISK CALCULATIONS
SITE 75, MCAS BASKETBALL COURT
MCB, CAMP LEJEUNE NORTH CAROLINA
NA DECISION DOCUMENT, CTO-0120

| Receptor | Exposure Pathway | Contaminant | Carcinogenic Risk (ICR) | Non-Carcinogenic Risk (HI) |
|---|---|---|---|---|
| Current Residential Adult | Ingestion | Aluminum | 0.0E+00 | 9.1E-03 |
| | | Arsenic | 1.16E-07 | 4.5E-03 |
| | | Iron | 0.0E+00 | 1.5E-02 |
| | Dermal | Aluminum | 0.0E+00 | 2.6E-03 |
| | | Arsenic | 3.37E-08 | 1.3E-03 |
| | | Iron | 0.0E+00 | 4.3E-03 |
| | Inhalation | Aluminum | 0.0E+00 | 1.4E-03 |
| | | Arsenic | 1.8E-10 | 0.0E+00 |
| | | Iron | 0.0E+00 | 0.0E+00 |
| Current Residential Child | Ingestion | Aluminum | 0.0E+00 | 8.5E-02 |
| | | Arsenic | 1.08E-06 | 4.2E-02 |
| | | Iron | 0.0E+00 | 1.4E-01 |
| | Dermal | Aluminum | 0.0E+00 | 4.9E-03 |
| | | Arsenic | 6.24E-08 | 2.4E-03 |
| | | Iron | 0.0E+00 | 8.0E-03 |
| | Inhalation | Aluminum | 0.0E+00 | 4.8E-03 |
| | | Arsenic | 6.2E-10 | 0.0E+00 |
| | | Iron | 0.0E+00 | 0.0E+00 |
| Future Residential Adult | Ingestion | Aluminum | 0.0E+00 | 9.1E-03 |
| | | Arsenic | 8.72E-07 | 4.5E-03 |
| | | Iron | 0.0E+00 | 1.5E-02 |
| | Dermal | Aluminum | 0.0E+00 | 2.6E-03 |
| | | Arsenic | 2.53E-07 | 1.3E-03 |
| | | Iron | 0.0E+00 | 4.3E-03 |
| | Inhalation | Aluminum | 0.0E+00 | 1.4E-03 |
| | | Arsenic | 1.3E-09 | 0.0E+00 |
| | | Iron | 0.0E+00 | 0.0E+00 |
| Future Residential Child | Ingestion | Aluminum | 0.0E+00 | 8.5E-02 |
| | | Arsenic | 1.63E-06 | 4.2E-02 |
| | | Iron | 0.0E+00 | 1.4E-01 |
| | Dermal | Aluminum | 0.0E+00 | 4.9E-03 |
| | | Arsenic | 9.36E-08 | 2.4E-03 |
| | | Iron | 0.0E+00 | 8.0E-03 |
| | Inhalation | Aluminum | 0.0E+00 | 4.8E-03 |
| | | Arsenic | 9.3E-10 | 0.0E+00 |
| | | Iron | 0.0E+00 | 0.0E+00 |

Notes:

HI – hazard index
ICR – incremental cancer risk

# FIGURES

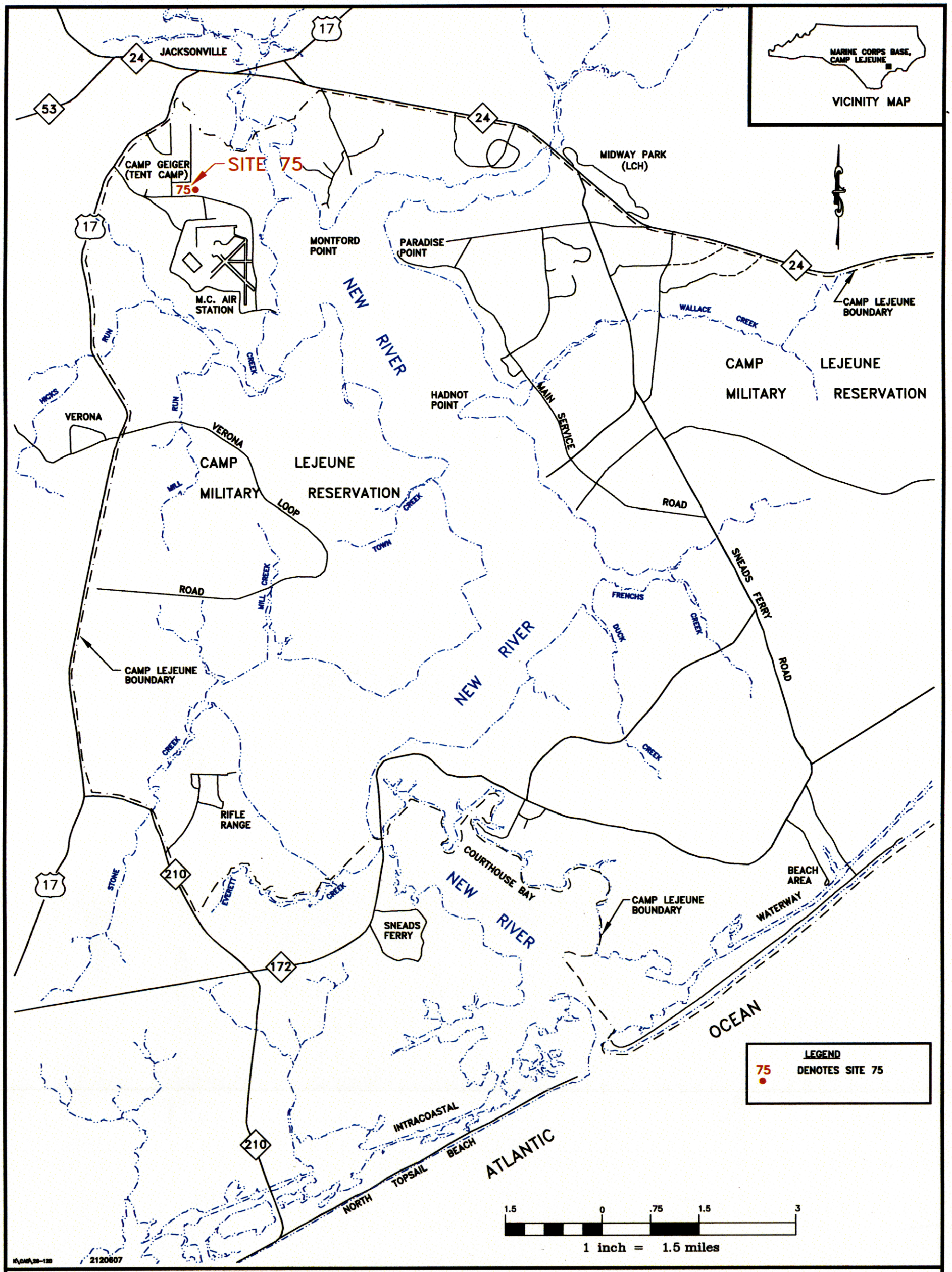
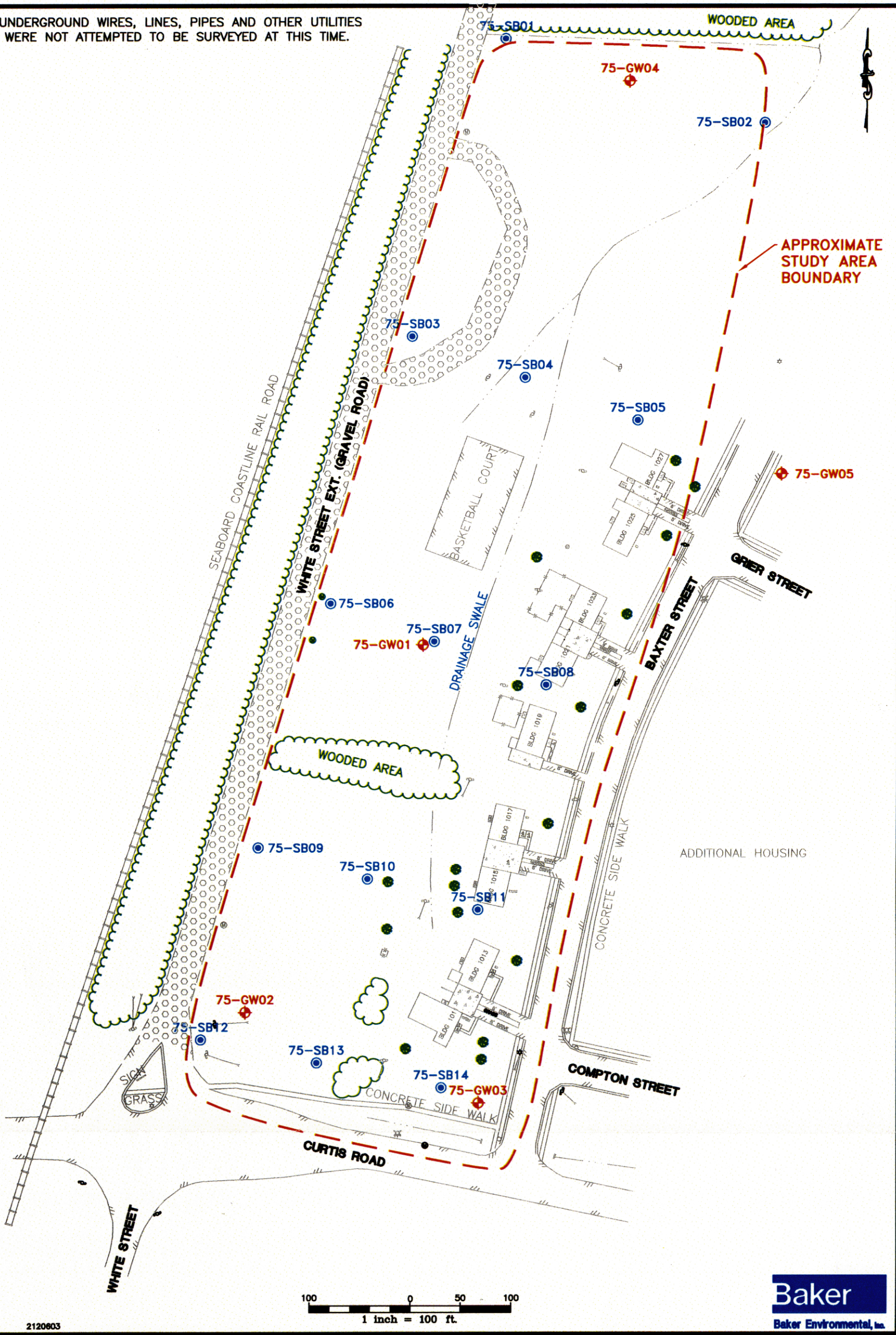



FIGURE 1–1
LOCATION OF SITE 75
MARINE CORPS AIR STATION BASKETBALL COURT
NA DECISION DOCUMENT
CTO – 0120

MARINE CORPS BASE, CAMP LEJEUNE
NORTH CAROLINA

NOTE: UNDERGROUND WIRES, LINES, PIPES AND OTHER UTILITIES WERE NOT ATTEMPTED TO BE SURVEYED AT THIS TIME.




K:\CAD\26-120 2120603

Baker
Baker Environmental, Inc.

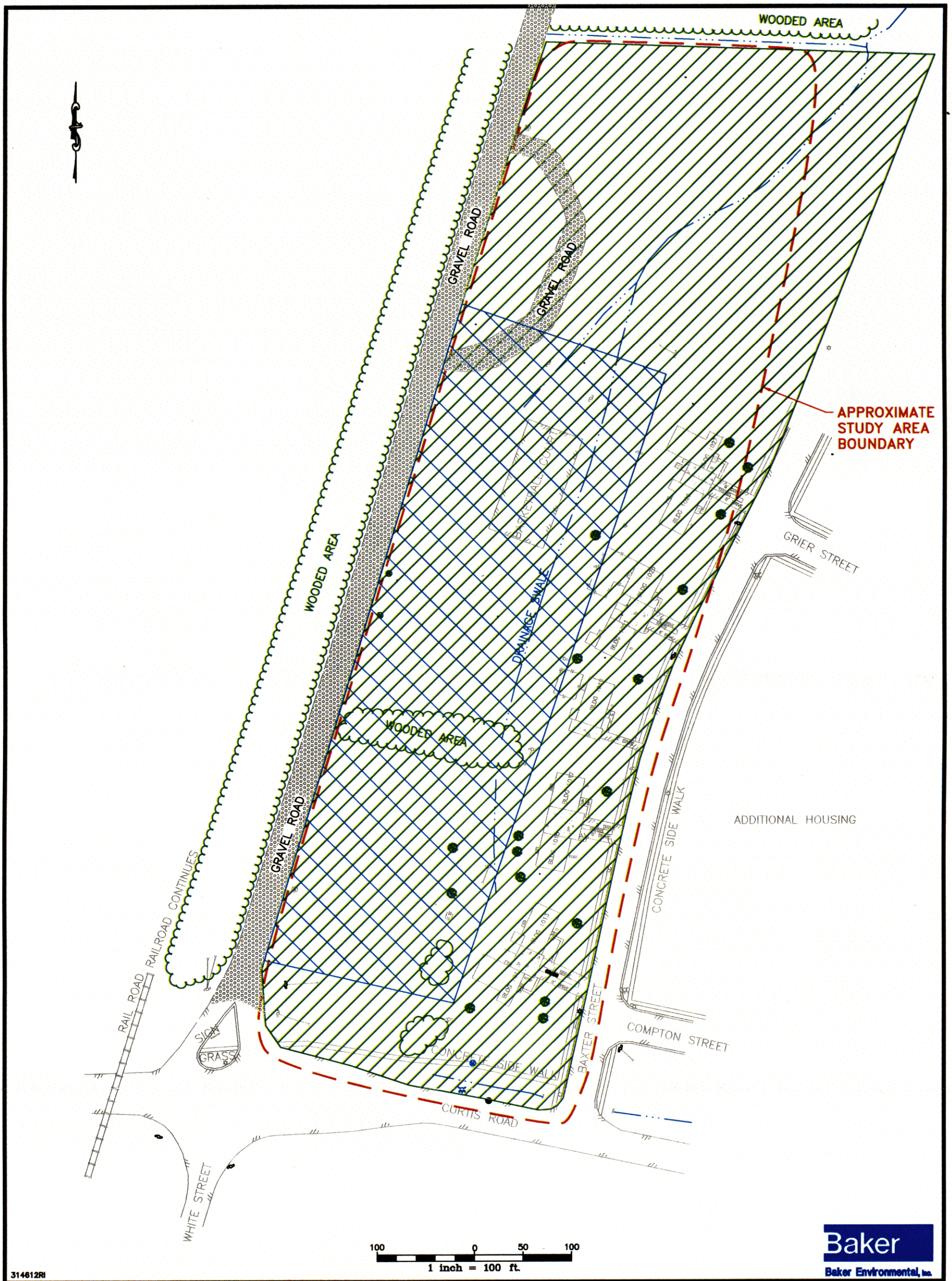
## LEGEND

- TREE LINE
- INTERMITTENT DRAINAGE SWALE
- TREE
- MONITORING WELL LOCATION
- SOIL BORING LOCATION

SOURCE: BRENT A. LANIER R.L.S., MARCH 1995.

# FIGURE 1-2
# SITE 75 - SITE LOCATION MAP
# MCAS BASKETBALL COURT
# NA DECISION DOCUMENT
# CTO - 0120

MARINE CORPS BASE, CAMP LEJEUNE
NORTH CAROLINA




314612RI

Baker
Baker Environmental, Inc.

## LEGEND

- AREA OF GEOPHYSICAL SURVEY (1983)
- AREA OF GEOPHYSICAL SURVEY (1996)
- DRAINAGE SWALE
- TREE

SOURCE: BRENT A. LANIER R.L.S., MARCH 1995.

FIGURE 1-3
AREA OF
GEOPHYSICAL SURVEY
SITE 75
NA DECISION DOCUMENT
CTO - 0120
MARINE CORPS AIR STATION, NEW RIVER
NORTH CAROLINA

**ATTACHMENT A**
**STATE OF NORTH CAROLINA APPROVAL LETTER**

NORTH CAROLINA
DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES
DIVISION OF WASTE MANAGEMENT

MICHAEL F. EASLEY, GOVERNOR
WILLIAM G. ROSS, JR., SECRETARY
DEXTER R. MATTHEWS, INTERIM DIRECTOR

July 30, 2001

Commanding General
(ATTN: AC/S EMD/IRD)
Marine Corps Base
PSC Box 20004
Camp Lejeune, NC 28542-0004

RE: No Further Action (NFA) Decision Document
Site 75
MCB Camp Lejeune

Dear Sir:

The Superfund Section has completed its review of this document. MCB Camp Lejeune requests that we concur with the NFA designation for Site 75. Based on results presented in the Pre-Remedial Investigation (RI) Screening Study, the Superfund Section concurs with the NFA designation. The Pre-RI Screening Study did not reveal significant contamination. No remediation will be required unless the Superfund Section later determines, based on new information or information not previously provided to the Section, that the site is contaminated above current standards or that the Section was provided with false or incomplete information.

We appreciate the opportunity to review this document. If you have any questions or comments, please contact me at (919) 733-2801, extension 278.

Sincerely,

David J. Lown, LG, PE
Geological Engineer
Superfund Section

1646 MAIL SERVICE CENTER, RALEIGH, NORTH CAROLINA 27699-1646
401 OBERLIN ROAD, SUITE 150, RALEIGH, NC 27605
PHONE: 919-733-4996 \ FAX: 919-715-3605

# ATTACHMENT B
# USEPA REGION IV APPROVAL LETTER

**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY**
REGION 4
SAM NUNN ATLANTA FEDERAL CENTER
61 FORSYTH STREET, S.W.
ATLANTA, GEORGIA 30303

June 26, 2001

4WD-FFB

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Commanding General
Attn.: AC/S, EMD/IRD
Marine Corps Base
PSC Box 20004
Camp Lejeune, NC 28542-0004

SUBJ: MCB Camp Lejeune
Site 75
No Action Decision Document

Dear Sir:

The U.S. Environmental Protection Agency (EPA) Region 4 has reviewed the above subject decision document and concurs with the selected No Action Remedy for Site 75. This remedy is supported by the previously completed Pre-Remedial Investigation Screening Study.

This remedial action is protective of human health and the environment, complies with Federal and State requirements that are legally applicable or relevant and appropriate to the remedial action and is cost effective.

If there are any questions or comments, I can be reached at (404) 562-8538.

Sincerely,

Gena D. Townsend
Senior Project Manager

cc: Thomas Burton, Camp Lejeune
Dave Lown, NCDENR
Kirk Stevens, LANTDIV